

J.J. College of Arts and Science (Autonomous)

Sivapuram, Pudukkottai - 622 422

Department of Information Technology



B.Sc., Information Technology

Syllabus based on



TANSCH Regulations on Learning Outcomes - Based Curriculum Frame Work for Under Graduate Education

[Those who Join 2023 - 2024 Onwards]

B.Sc. – Information Technology (Course Structure under CBCS)
Proposed Course Structure based on TANSCHÉ and UGC-LOCF

(For the Candidates admitted from academic year 2023 - 2024 onwards)

SE M	Part	Course Code	Course Title	Hrs/ Wee k	Credit	Exa m Hrs	Marks		Total Marks
							Int.	Ext	
I	I	U1R3TL1	Language Course – I	6	3	3	25	75	100
	II	U1R3EL1	English Language Course – I	6	3	3	25	75	100
	III	U1R3ITCC1	Core Course – 1 Programming in C	5	5	3	25	75	100
		U1R3ITCC2P	Core Course – 2 Programming in C Practical	5	5	3	40	60	100
		U1R3ITDSE1:1 /1:2	Elective – 1 Numerical Methods/ Multimedia Systems	4	3	3	25	75	100
	IV	U1R3ITSEC1 (NME)	Skill Enhancement Course - 1 - to be taken from other department	2	2	3	25	75	100
		U1R3ITFC	Foundation Course FC- Fundamentals of Computers	2	2	3	25	75	100
TOTAL				30	23	-	-	-	700
II	I	U2R3TL2	Language - I (Tamil/Hindi/French)	6	3	3	25	75	100
	II	U2R3EL2	Language - II (English)	6	3	3	25	75	100
	III	U2R3ITCC3	JAVA Programming	5	5	3	25	75	100
		U2R3ITCC4P	Practical II - JAVA Programming and Data Structures Practical	5	5	3	40	60	100
		U2R3ITDSE 2:1/ 2:2	Digital Logic Fundamentals / Discrete Structures	4	3	3	25	75	100
	IV	U2R3ITSEC2 (NME2)	To be opted from other Department	2	2	3	25	75	100
		U2R3ITSEC3	Quantitative Aptitude	2	2	3	25	75	100
TOTAL				30	23	-	-	-	700

III	I	U3R3TL3	Language Course – III	6	3	3	25	75	100
	II	U3R3EL3	English Language Course- III	6	3	3	25	75	100
	III	U3R3ITCC5	Core Course – 5 Data Structures and Algorithms	5	5	3	25	75	100
		U3R3ITCC6P	Core Course – 6 Algorithm Practical	5	5	3	40	60	100
		U3R3ITDSE 3:1 /3:2	Elective Course – 3 Web Application Development / Software Testing	4	3	3	25	75	100
	IV	U3R3ITSEC 4:1P/ 4:2P	Skill Enhancement Course -4 Web Practical/ R Programming Practical	2	2	3	40	60	100
		U3R3VE	Value Education	2	2	3	25	75	100
TOTAL				30	23	-	-	-	700
IV	I	U4R3TL4	Language Course – IV	5	3	3	25	75	100
	II	U4R3EL4	English Language – IV	5	3	3	25	75	100
	III	U4R3ITCC7	Core Course 7 – Operating Systems	5	5	3	25	75	100
		U4R3ITCC8P	Core Course – 8 OS – Practical	5	5	3	40	60	100
		U4R3ITDSE 4:1 /4:2	Elective Course 4 Python Programming / E – Commerce	4	3	3	25	75	100
	IV	U4R3ITSEC 5:1P/5:2P	Skill Enhancement Course – 5 Python Programming Practical/ Visual Programming Practical	2	2	3	40	60	100
		U4R3ITSEC 6:1/6:2	Skill Enhancement Course – 6 Visual Programming/ ASP Programming	2	2	3	25	75	100
		U4R3ES	Environmental Studies(EVS)	2	2	3	25	75	100
	TOTAL				30	25	-	-	-
V	III	U5R3ITCC9	Core Course – 9 Computer Networks	5	5	3	25	75	100
		U5R3ITCC10	Core Course – 10 Database Management Systems	5	4	3	25	75	100
		U5R3ITCC11	Core Course – 11 Microprocessor	5	4	3	25	75	100
		U5R3ITCC12P	Core Course – 12	5	4	3	40	60	100

			DBMS Practical						
		U5R3ITDSE 5:1/ 5:2	Elective Course - 5 Data Mining and Warehousing / Information Security	5	3	3	25	75	100
		U5R3ITDSE 6:1 /6:2	Elective Course - 6 Introduction to Data Science / System Administration and Maintenance	5	3	3	25	75	100
	IV	U5R3ITINT	Internship (Carried out in II Year Summer vacation)	-	2	-	-	-	100
TOTAL				30	25	-	-	-	700
VI	III	U6R3ITCC13	Core Course – 13 PHP Programming	5	4	3	25	75	100
		U6R3ITCC14P	Core Course – 14 PHP Programming Practical	5	4	3	40	60	100
		U6R3ITCC15PW	Core Course – 15 Project work	6	4	-	-	-	100
		U6R3ITDSE 7:1 /7:2	Elective Course - 7 Software Engineering/ Artificial Intelligence	5	3	3	25	75	100
		U6R3ITDSE 8:1 /8:2	Elective Course - 8 Big Data Analytics / Image Processing	5	3	3	25	75	100
	IV	U6R3ITSEC 7:1/7:2	Skill Enhancement Course – 8 Ruby Programming/ Cloud Computing	2	2	3	25	75	100
	V	U6R3GS	Gender Studies	2	1	3	25	75	100
		-	Extension Activity	-	1	-	-	-	-
TOTAL				30	22	-	-	-	700
MOOC Online Course					(04)				
Grand Total				141(04)					4300

CORE COURSE – 1 **PROGRAMMING IN C (U1R3ITCC1)**

Hours/Week: 05

Max. Marks : 100 (CIA:25+Ext:75)

Total Hours: 75

Credits : 5

Nature of the Course: **Skill Development**

Learning Objectives :

1. To gain knowledge in C language.
2. To inculcate fundamental programming skills.
3. To know the Array concepts
4. To develop knowledge in Structure
5. To gain knowledge in **Pointer**

Unit I

Overview of C: 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, as volatile. Operators and Expressions -Managing Input and Output Operations.**

Unit II

Decision Making and Branching: **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: Declaration and accessing of one & two-dimensional arrays, initializing two-dimensional arrays, multidimensional arrays. **Functions:** 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, storage classes-character arrays and string functions.

Unit IV

Structure and Unions: Defining, giving values to members, initialization and comparison of structure variables, arrays of structure, **arrays within structures, structures within structures, structures and functions, unions.**

Unit V

Pointers: definition, declaring and initializing pointers, accessing a variable through address and through pointer, pointer expressions, pointer increments and scale factor, pointers and arrays.

File Management in C: Opening, closing and I/O operations on files, random access to files, command line arguments.

TEXT BOOKS: E. Balagurusamy, Programming in ANSI C, Fifth Edition, Tata McGraw-Hill, 2010.

BOOKS FOR REFERENCE :

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

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Remember the program structure of C with its syntax and semantics	K3
CO 2	Understand the programming principles in C (data types, operators, branching and looping, arrays, functions, structures, pointers and files)	K2
CO 3	Apply the programming principles learnt in real-time problems	K1
CO 4	Analyze the various methods of solving a problem and choose the best method	K4
CO 5	Code, debug and test the programs with appropriate test cases	K5

Relationship Matrix for CO, PO, PSO

Course Name – Programming in C						Course Code – U1R3ITCC1					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	3	2	2	2	2	3	2	2	2	2.2
CO2	2	2	2	2	3	2	3	2	3	2	2.3
CO3	2	2	2	2	2	3	2	2	2	3	2.2
CO4	2	3	2	3	2	2	2	2	2	2	2.2
CO5	2	3	2	3	2	2	2	3	2	2	2.3
	Mean Overall Score										2.24
	Result										High

CORE COURSE - 2: C PROGRAMMING PRACTICAL(U1R3ITCC2P)

Hours/Week: 05

Max. Marks : 100(CIA:40+Ext:60)

Total Hours: 75

Credits : 3

Nature of the Course : Skill Development

OBJECTIVES

1. To train the student to the basic concepts of the C-programming language.
2. To improve the programming skills through C language.
3. To get the knowledge in summation of series, string manipulation.
4. To gather the knowledge in recursion and matrix manipulation.
5. To improve the skill of sorting and searching techniques.

I Summation of Series

1. Sin(x), 2. Cos(x), 3. Exp(x) (Comparison with built in functions)

II String Manipulation

1. Counting the number of vowels, consonants, words, white spaces in a line of text and array of lines.
2. Reverse a string and check for palindrome.
3. Sub string detection, count and removal.
4. Finding and replacing substrings.

III Recursion

1. GCD of two numbers
2. Fibonacci sequence
3. Maximum & Minimum

IV Matrix Manipulation

1. Addition and Subtraction
2. Multiplication
3. Transpose, and trace of a matrix
4. Determinant of a Matrix

V Sorting and Searching

1. Insertion Sort
2. Bubble Sort
3. Linear Search
4. Binary Search

TEXT BOOKS : E. Balagurusamy, Programming in ANSI C, Fifth Edition, Tata McGraw-Hill, 2010.

BOOKS FOR REFERENCE :

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

Web References

1. <https://www.tutorialspoint.com/cprogramming>
2. <https://www.javatpoint.com/c-programming-language-tutorial>

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Remember and understand how to write programs using the basic syntax and semantics in C	K 2
CO 2	Apply the concepts of functions, macros, arrays, structures, pointers and files in programs to solve problems	K1
CO 3	Analyze and understand programs written in C language	K5
CO 4	Evaluate the program execution flow with test cases and apply debugging	K4
CO 5	Design algorithms and write programs in C language for the given problems.	K3

Relationship Matrix for CO, PO, PSO

Course Name – C Programming Practical						Course Code – U1R3ITCC2P					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
C01	2	2	2	3	3	2	2	2	2	2	2.2
C02	3	2	3	2	3	2	3	2	3	2	2.5
C03	2	2	3	2	2	3	2	2	2	3	2.3
C04	2	2	2	3	2	3	2	2	2	2	2.2
C05	2	2	2	3	2	3	2	3	2	2	2.3
	Mean Overall Score										2.3
	Result										High

DISCIPLINE SPECIFIC ELECTIVE COURSE - 1

NUMERICAL METHODS (U1R3ITDSE1:1)

Hours/Week: 04

Max. Marks : 100(CIA:25+Ext:75)

Total Hours:60

Credits : 3

Nature of the Course: Skill Development

Objectives:

1. To introduce the various topics in Numerical methods.
2. To make understand the fundamentals of algebraic equations.
3. To apply interpolation and approximation on examples.
4. To solve problems using numerical differentiation and integration.
5. To solve linear systems, numerical solution of ordinary differential equations.

Unit I: Fundamentals of Algebraic Equations (12 Hours)

Solution of algebraic and transcendental equations-Bisection method – Fixed point iteration method – Newton Raphson method –linear system of equations – Gauss elimination method – Gauss Jordan method .

Unit II: Iterative and Interpolation (12 Hours)

Iterative methods - Gauss Jacobi and Gauss Seidel – Eigen values of a matrix by Power method and Jacobi's method for symmetric matrices. Interpolation with unequal intervals – Lagrange's interpolation – Newton's divided difference interpolation(Proof no needed)

Unit III: Interpolation with Equal interval (12 Hours)

Difference operators and relations. -Interpolation with equal intervals – Newton's forward and backward difference formulae. (Problems only).

UnitIV: Numerical Differentiation and Integration (12 Hours)

Approximation of derivatives using interpolation polynomials – Numerical integration using Trapezoidal, Simpson's 1/3 rule

Unit V: Initial Value Problems For ODE (12 Hours)

Single step methods – Taylor's series method – Euler's method – Runge Kutta method for solving(first, second , Third and 4th) order equations.

Text books:

1. **Introductory methods of numerical analysis**, S.S. Sastry, Prentical Hall India, 1994.
2. **Numerical Methods**, N. Subramaniam, Scm Publishers, Erode.

e – Resources:

1. <https://youtu.be/pUDeeE-ugyc>
2. <https://www.maths.dur.ac.uk/users/anthony.yeates/na17.pdf>

Reference Books:

1. **Numerical Methods**, P.Kandasamy, S.Chand & Co., New Delhi, .1998
2. **Statistics**, R.S.N. Pillai and Bagavathi S, Chand & Co Ltd., New Delhi, 1999.

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Know how to solve various problems on numerical methods	K2
CO 2	Use approximation to solve problems	K3
CO 3	Differentiation and integration concept are applied	K2
CO 4	Know about numerical methods to solve Numerical differentiation and Integration.	K1
CO 5	Numerical solution of ordinary differential equations	K5

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate;

K6 - Create

CO-PO Relationship Matrix

Course Name – Numerical Methods						Course Code – U1R3ITDSE1:1					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	3	2	2	3	2	3	3	2	2	2.4
CO2	3	2	3	3	2	2	2	3	2	2	2.4
CO3	3	2	2	2	2	2	2	3	2	2	2.2
CO4	3	2	2	2	2	2	3	2	2	2	2.2
CO5	3	2	2	3	2	2	3	3	2	2	2.4
	Mean Overall Score										2.32
	Result										High

DISCIPLINE SPECIFIC ELECTIVE COURSE - 1

MULTIMEDIA SYSTEMS (U1R3ITDSE1:2)

Hours/Week: 04

Max. Marks : 100(CIA:25+Ext:75)

Total Hours: 60

Credits : 3

Nature of the Course: Skill Development

OBJECTIVES

1. To teach the basic concepts of multimedia..
2. Educating the students how to work in images
3. To teach the concept of animation.
4. Provides the details in making multimedia.
5. Improve the knowledge in planning and costing .

UNIT I Introduction:

12 Hours

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

UNIT II Images:

12 Hours

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(ICT Class) - Multimedia System Sounds
- Audio File Formats -Vaughan's Law of Multimedia Minimums - Adding Sound to Multimedia Project.

UNIT III Animation:

13 Hours

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

UNIT IV Multimedia:

13 Hours

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

UNIT V Planning and Costing:**10 Hours**

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

TEXT BOOK

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

REFERENCE BOOK

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

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understand the concept of multimedia.	K2
CO 2	Gather the knowledge of multimedia images.	K4
CO 3	Gather the strong ideas in animation.	K5
CO 4	Improve the knowledge in making multimedia.	K3
CO 5	Improve the knowledge in planning and costing.	K6

Relationship Matrix for CO, PO, PSO

Course Name – Multimedia Systems						Course Code – U1R3ITDSE2:3					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	3	3	2	2	2	2	3	3	2	2.4
CO2	2	2	2	2	2	3	2	2	2	2	2.1
CO3	3	2	3	3	2	2	3	2	3	2	2.5
CO4	2	3	2	3	2	2	2	2	2	2	2.2
CO5	2	2	2	3	2	3	2	3	3	2	2.4
	Mean Overall Score										2.32
	Result										High

Non Major Elective I

OFFICE AUTOMATION (U1R3ITSEC1)

Hours/Week: 02

Max. Marks : 100(CIA:25+Ext:75)

Total Hours: 30

Credits : 2

Nature of the Course: Skill Development

Course Objective		
1.	Understand the basics of computer systems and its components.	
2.	Understand and apply the basic concepts of a word processing package.	
3.	Understand and apply the basic concepts of electronic spreadsheet software.	
4.	Understand and apply the basic concepts of database management system.	
5.	Understand and create a presentation using PowerPoint tool.	
UNIT	Details	No. of Hours
I	Introductory concepts: Memory unit– CPU-Input Devices: Key board, Mouse and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems & its features: DOS– UNIX–Windows. Introduction to Programming Languages.	6
II	Word Processing: Open, Save and close word document; Editing text – tools, formatting, bullets; Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers, numbering; printing–Preview, options, merge.	6
III	Spreadsheets : Excel–opening, entering text and data, formatting, navigating; Formulas–entering, handling and copying; Charts–creating, formatting and printing, analysis tables, preparation of financial statements, introduction to data analytics.	6

IV	Database Concepts: The concept of data base management system; Data field, records, and files, Sorting and indexing data; Searching records. Designing queries, and reports; Linking of datafiles; Understanding Programming environment in DBMS; Developing menu drive applications in query language (MS–Access).	6
V	Power point: Introduction to Power point - Features – Understanding slide typecasting & viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition– Animation effects, audio inclusion, timers.	6
	Total	30
Text Book		
1	Peter Norton, “Introduction to Computers” –Tata Mc Graw-Hill.	
Reference Books		
1.	Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, “Microsoft 2003”, Tata McGrawHill.	
Web Resources		
1.	https://www.udemy.com/course/office-automation-certificate-course/	
2.	https://www.javatpoint.com/automation-tools	

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Possess the knowledge on the basics of computers and its components	K2
CO 2	Gain knowledge on Creating Documents, spreadsheet and presentation.	K2
CO 3	Learn the concepts of Database and implement the Query in Database.	K2
CO 4	Demonstrate the understanding of different automation tools.	K2
CO 5	Utilize the automation tools for documentation, calculation and presentation purpose.	K2

Relationship Matrix for CO, PO, PSO

Course Name – Office Automation						Course Code – U1R3ITSEC1					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	3	2	3	2	2	2	2	2	2.2
CO2	3	2	2	3	2	2	3	2	3	2	2.4
CO3	2	2	2	3	2	2	2	3	3	2	2.3
CO4	3	2	2	3	2	2	2	3	2	2	2.3
CO5	2	2	2	3	2	3	2	2	2	2	2.2
	Mean Overall Score										2.28
	Result										High

FOUNDATION COURSE

FUNDAMENTALS OF COMPUTERS (U1R3ITFC)

Hours/Week: 02

Max. Marks : 100(CIA:25+Ext:75)

Total Hours: 30

Credits : 2

Nature of the Course: Skill Development

Subject Code	L	T	P	S	Credits	Inst. Hours	Marks		
							CIA	External	Total
	2	0	0	II	2	2	25	75	100
Learning Objectives									
1.	To analyze a problem with appropriate problem solving techniques								
2.	To understand the main principles of imperative, functional and logic oriented programming languages and								
3.	To increase the ability to learn new programming languages.								
4.	To Understand the basic concepts functions								
5.	To analyze a Programming Structure								
Prerequisites: Basic knowledge about programming concepts									
Unit	Contents							No. of Hours	
I	Introduction: Characteristics of Computers - Evolution of Computers Basic Computer Organization: I/O Unit - Storage Unit - Arithmetic Logic Unit - Control Unit - Central Processing Unit							6	
II	Computer Software: Types of Software - System Architecture Computer Languages: Machine Language - Assembly Language - High Level Language - Object Oriented Languages							6	

III	Problem Solving Concepts: Problem Solving in Everyday life - Types of Problems - Problem solving with computers - Difficulties with Problem Solving	6
IV	Problem Solving concepts for the computer: Constant Variables - Data Types - Functions -Operators - Expressions and Equations - Organizing the Solution: Analyzing the problem - Algorithm - Flowchart - Pseudo code	6
V	Programming Structure: Structuring a solution - Modules and their function - Local and Global variables - Parameters - Return values - Sequential Logic Structure - Problem solving with Decision - Problem Solving with Loops	6
TOTAL		30
Textbooks		
➤	Pradeep K.Sinha and Priti Sinha, (2004) —Computer Fundamentals, Sixth Edition, BPB Publications. (Unit I : Chapter 1 & 2, Unit II : Chapter 10 & 12)	
➤	Maureen Sprankle and Jim Hubbard, (2009) —Problem Solving and Programming Concept, Ninth Edition, Prentice Hall. (Unit III: Chapter 1,2 &3) Unit IV : Chapter 3, Unit V : Chapter 4,5 ,6,7 & 8)	
Reference Books		
1.	R.G. Dromey, (2007), —How to Solve it by Computer, Prentice Hall International Series in Computer Science.	
2.	C. S. V. Murthy, (2009), —Fundamentals of Computers, Third Edition, Himalaya Publishing House.	
NOTE: Latest Edition of Textbooks May be Used		
Web Resources		
1.	http://www.tutorialspoint.com/computer_fundamentals/	
2.	http://www.comptechdoc.org/basic/basicut/	
3.	http://www.homeandlearn.co.uk/	

4.	http://www.top-windows-tutorials.com/computer-basics/
5.	https://www.programiz.com/article/flowchart-programming (Algorithm and flow chart)

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Outline the Computer fundamentals and various problem solving concepts in Computers	K 1
CO 2	Describe the basic computer organization, software, computer languages, software development life cycle and the need of structured programming in solving a computer problem	K2
CO 3	Identify the types of computer languages, software, computer problems and examine how to set up expressions and equations to solve the problem.	K4
CO 4	Choose most appropriate programming languages, constructs and features to solve the problems in diversified domains.	K5
CO 5	Analyze the design of modules and functions in structuring the solution and various Organizing tools in problem solving.	K3

Relationship Matrix for CO, PO, PSO

Course Name Fundamentals of Computers						Course Code – U1R3ITFC					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	2	2	3	2	2	3	2	2	2.3
CO2	2	2	2	2	2	2	2	2	3	2	2.1
CO3	2	3	2	3	2	3	2	2	3	2	2.4
CO4	3	2	2	3	2	2	3	2	3	2	2.4
CO5	2	2	3	3	2	2	2	3	3	2	2.4
	Mean Overall Score										2.32
	Result										High

SEMESTER II
CORE COURSE – 3: JAVAPROGRAMMING(U2R3ITCC3)

Hours/Week: 05

Max. Marks : 100(CIA:25+Ext:75)

Total Hours: 75

Credits : 5

Nature of the Course: Employability

Subject Code	L	T	P	S	Credits	Inst. Hours	Marks		
							CIA	External	Total
	5	0	0	II	5	5	25	75	100
Learning Objectives									
LO1	To provide knowledge on fundamentals of object-oriented programming.								
LO2	To improve the knowledge in constant, variable and data types.								
LO3	To understand the concept of class objects and methods.								
LO4	To gain the knowledge in inheritance and interfaces.								
LO5	to have the ability to use the SDK environment to create, debug and run servlet programs								
Prerequisites: Basic knowledge about programming concepts									
Unit	Contents							No. of Hours	
I	Fundamentals of Object- Oriented Programming: Introduction – Object Oriented Paradigm – Concepts of Object – Oriented Programming – Benefits of OOP – Evolution: Java History- Java Features - Differs from C and C++ - Overview of Java Language: Java Program- Structure – Tokens – Java Statements – Java Virtual Machine – Command Line Arguments							15	
II	Constants, Variables and Data Types – Operators and Expressions – Decision making and Branching – Looping – Arrays - Strings – Collection Interfaces and classes							15	
III	Classes objects and methods: Introduction – Defining a class – Method Declaration – Constructors - Method Overloading – Static Members – Nesting of methods – Inheritance – Overriding – Final variables and methods – Abstract methods and classes							15	
IV	Multiple Inheritance: Defining Interfaces – Extending Interfaces – Implementing Interfaces – Packages: Creating Packages – Accessing Packages – Using a Package – Managing Errors and Exceptions -							15	

	Multithreaded Programming	
V	Layout Managers - JDBC – Java Servlet: - Servlet Environment Role – Servlet API – Servlet Life Cycle – Servlet Context – HTTP Support – HTML to Servlet Communication	15
TOTAL		75
Textbooks		
➤	E Balagurusamy(2010), “Programming with Java”, Tata McGraw Hill Edition India Private Ltd, 4th Edition	
➤	C Xavier,”Java Programming – A Practical Approach”, Tata McGraw Hill Edition Private Ltd	
Reference Books		
3.	P.Naughton and H.Schildt (1999), “Java 2 The Complete Reference”, TMH, 3rd Edition	
4.	Jaison Hunder & William Crawford (2002),”Java Servlet Programming”, O'Reilly	
5.	Jim Keogh (2002), “J2EE: The Complete Reference”, Tata McGraw Hill Edition.	
NOTE: Latest Edition of Textbooks May be Used		
Web Resources		
6.	http://javabeginnerstutorial.com/core-java/	
7.	http://www.tutorialspoint.com/java/	
8.	http://beginnersbook.com/java-tutorial-for-beginners-with-examples/	
9.	http://www.homeandlearn.co.uk/java/java.html	
10.	http://www.journaldev.com/1877/servlet-tutorial-java (Unit V : Servlet API)	

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Outline the basic terminologies of OOP, programming language techniques, JDBC and Internet programming concepts	K 2
CO 2	Solve problems using basic constructs, mechanisms, techniques and technologies of Java	K1
CO 3	Analyse and explain the behavior of simple programs involving different techniques such as Inheritance, Packages, Interfaces, Exception Handling and Thread and technologies such as JDBC and Servlets	K5
CO 4	Assess various problem-solving strategies involved in Java to develop a high-level application.	K4
CO 5	Design GUI based JDBC applications and able to develop Servlets using suitable OOP concepts and techniques	K3

Relationship Matrix for CO, PO, PSO

Course Name – JAVA Programming						Course Code – U2R3ITCC3					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	3	2	2	3	2	3	3	2	2	2.4
CO2	3	2	3	3	2	2	2	3	2	2	2.4
CO3	3	2	2	2	2	2	2	3	2	2	2.2
CO4	3	2	2	2	2	2	3	2	2	2	2.2
CO5	3	2	2	3	2	2	3	3	2	2	2.4
	Mean Overall Score										2.32
	Result										High

CORE COURSE – 4 JAVA PROGRAMMING AND DATA

STRUCTURES PRACTICAL (U2R3ITCC4P)

Hours/Week: 05

Max. Marks : 100(CIA:40+Ext:60)

Total Hours: 75

Credits : 5

Nature of the Course: Skill Development

Course Objectives:

1. To improve the knowledge about Basic JAVA programs
2. To provide the knowledge in Class and Objects.
3. To gain practical expertise in coding Core Java programs.
4. To gain the knowledge in inheritance and interfaces.
5. To become proficient in the use of AWT, Event Handling and Swing.

General Objective:

To enable the student to code, debug and execute programs in Java.

Course Objectives:

- To gain practical expertise in coding Core Java programs
- To become proficient in the use of AWT, Event Handling and Swing.

1. Basic Programs
2. Arrays
3. Strings
4. ArrayList, HashSet and Vector collection classes
5. Classes and Objects
6. Interfaces
7. Inheritance
8. Packages
9. Exception Handling
10. Threads
11. Linked List
12. Stacks
13. Queue
14. Sorting
15. Binary Tree Representation
16. Working with Database using JDBC

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Code, debug and execute Javaprogramstosolvethегivenproblems.	K 2
CO 2	Implement multi-threading and exception-handling	K1
CO 3	Implement functionality using String and String Buffer classes.	K5
CO 4	Demonstrate Event Handling.	K4
CO 5	Create applications using Swing and AWT	K3

Relationship Matrix for CO, PO, PSO

Course Name – JAVA Programming & Data Structures Practical						Course Code – U2R3ITCC4P					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	3	2	2	2	3	3	2	3	2	2.4
CO2	2	2	2	2	2	2	2	2	2	3	2.1
CO3	2	2	2	2	2	2	3	2	2	2	2.1
CO4	2	2	2	3	2	2	2	2	2	2	2.1
CO5	2	2	3	2	3	2	3	2	2	2	2.3
	Mean Overall Score										2.20
	Result										High

DISCIPLINE SPECIFIC ELECTIVE COURSE - 2
DIGITAL LOGIC FUNDAMENTALS (U2R3ITDSE2:1)

Hours/Week: 04

Max. Marks : 100(CIA:25+Ext:75)

Total Hours: 60

Credits : 3

Nature of the Course: Skill Development

Objective:

1. To provide the knowledge about numbering systems.
2. To gain the knowledge about Boolean algebra and logic gates.
3. To provide the knowledge about combinational logic circuit.
4. To understand the concept about Sequential logic circuit.
5. To understand the concept of Processor Logic Design.

Unit I: Binary Systems

12 Hours

Binary Systems: Digital Computers and Digital Systems-**Binary Numbers**-Number base Conversion-**Octal and Hexa decimal numbers**-Complements-Binary codes-Binary logic.

Unit II: Boolean Algebra and Logic gates

12 Hours

Boolean Algebra and Logic gates: Basic definitions-Axiomatic definition of Boolean algebra -Basic theorems and properties of Boolean algebra-Digital logic gates. Simplification of Boolean function: The Map method-Up to four variables.

Unit III: Combinational logic

12 Hours

Combinational logic: Introduction-Design procedure-**Adders-Subtractors. Combinational logic with MSI and LSI: Decoders-Multiplexers.**

Unit IV: Sequential logic

12 Hours

Sequential logic: Introduction-Flip-Flops-Triggering of Flip-Flops-Design of Counters. Registers, Counters and the memory unit: Introduction-Registers-Shift registers- ripple counters-Synchronous counters.

Unit V: Processor Logic Design

12 Hours

Processor Logic Design: Design of Arithmetic logic unit-Status register-Design of Accumulator.

Text Book:

1. Logic and computer design fundamentals, M.M.Mano, 5th Edition, 2016, PHI

Reference Book:

1. T.C. Bartee-1997, Computer Architecture and logic design, International Edition, McGraw Hill.

Web References:

1. www.asic-World.com/digital/tutorial.html
2. https://course.ie.cuhk.edu.hk/~ieg2810/.../Lab_tutorial1_08.pdf

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understand the fundamental concepts and techniques of digital logic.	K 2
CO 2	Apply arithmetic operations in number system and various methods to	K1
CO 3	Implement simplification of Boolean functions.	K5
CO 4	Analyze the design of various combinational and sequential circuits.	K4
CO 5	Ability to identify requirements for a design application using logic gates,	K3

Relationship Matrix for CO, PO, PSO

Course Name – Digital Logic Fundamentals						Course Code – U2R3ITDSE2:1					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	3	2	3	2	3	3	3	2	2	2.5
CO2	2	3	2	2	2	3	2	2	3	2	2.3
CO3	2	2	2	2	2	2	2	2	2	2	2
CO4	2	3	3	2	2	3	2	3	3	2	2.5
CO5	2	3	3	3	3	2	2	2	2	2	2.4
	Mean Overall Score										2.34
	Result										High

DISCIPLINE SPECIFIC ELECTIVE COURSE - 2

DISCRETE STRUCTURE (U2R3ITDSE2:2)

Hours/Week: 04

Max. Marks : 100(CIA:25+Ext:75)

Total Hours:60

Credits : 3

Nature of the Course: Skill Development

COURSE OBJECTIVES

1. To understand the logic, functions and reasoning.
2. To learn relations and probability
3. To educate the Mathematical reasoning
4. To improve the Set and Relations concepts
5. To provides the ideas about Sequence and Summations

UNIT I Logic

12 Hours

Logic: propositional logic, logical equivalence, predicates & quantifiers, and logical reasoning. Sets: basics, set operations

UNIT II Functions

12 Hours

Functions: one-to-one, onto, inverse, composition, graphs Integers: greatest common divisor, Euclidean algorithm.

UNIT III Sequence and Summations

12 Hours

Sequences and Summations, Mathematical reasoning and induction: Proof strategies, Mathematical Induction, Recursive definitions, Structural Induction

UNIT IV Counting

12 Hours

Counting: basic rules, Pigeonhole principle, Permutations and Combinations, Binomial coefficients and Pascal triangle. Probability: Discrete probability. Expected values and variance

UNIT V Relations

12 Hours

Relations: Properties, Combining relations, Closures, Equivalence, Partial ordering, Graphs: directed, undirected graphs.

TEXT BOOK

1.Kenneth H. Rosen. Discrete Mathematics and Its Applications, 7th Edition, McGraw Hill, 2012

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understand the concept of Relations.	K3
CO 2	Gather the knowledge of Sets.	K4
CO 3	Gather the strong ideas in Sequence.	K2
CO 4	Improve the knowledge in Summations.	K6
CO 5	Improve the knowledge in Functions.	K5

Relationship Matrix for CO, PO, PSO

Course Name – Discrete Structure						Course Code – U2R3ITDSE2:2					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	2	3	3	3	3	3	2	2	2.6
CO2	2	3	2	3	3	2	3	2	2	2	2.4
CO3	3	2	3	3	3	3	2	2	2	2	2.5
CO4	2	2	2	3	2	2	3	3	2	2	2.3
CO5	2	2	2	3	2	2	2	2	2	2	2.1
	Mean Overall Score										2.38
	Result										High

Non Major Elective II

ADVANCED EXCEL (U2R3ITSEC2)

Hours/Week: 02

Max. Marks : 100(CIA:25+Ext:75)

Total Hours: 30

Credits : 2

Nature of the Course: Skill Development

Course Objectives:

1. To understand the concept of basics of Excel.
2. To gain the knowledge about data validations.
3. To improve the knowledge about sorting and filtering data.
4. To understand the concept of functions.
5. To understand the concept of charts, formatting charts and 3D graphs.

The objective of this course is to help the students learn the advanced features of Excel, to summarise, analyse, explore, and present visualisations of data in the form of charts, graphs.

UNIT I: Basics of Excel

6 Hours

Basics of Excel- Customizing common options- Absolute and relative cells- Protecting and un-protecting worksheets and cells- Working with Functions - Writing conditional expressions - logical functions - lookup and reference functions.

UNIT II: Data Validations

6 Hours

Data Validations - Specifying a valid range of values - Specifying a list of valid values- Specifying custom validations based on formula - Working with Templates Designing the structure of a template- templates for standardization of worksheets.

UNIT III: Sorting and Filtering Data

6 Hours

Sorting and Filtering Data -Sorting tables- multiple-level sorting- custom sorting- Filtering data for selected view - advanced filter options- Working with Reports Creating subtotals- Multiple-level subtotal.

UNIT IV: More Functions

6 Hours

More Functions Date and time functions- Text functions- Database functions- Power Functions - Formatting Using auto formatting option for worksheets- Using conditional formatting option for rows, columns and cells- What If Analysis - Goal Seek- Data Tables- Scenario Manager.

UNIT V Charts**6 Hours**

Charts - Formatting Charts- 3D Graphs- Bar and Line Chart together- Secondary Axis in Graphs- Sharing Charts with PowerPoint / MS Word, Dynamically- New Features Of Excel Sparklines, Inline Charts, data Charts- Overview of all the new features.

PRESCRIBED TEXT:

1. Excel 2019 All-in-One For Dummies – 2018- Greg Harvey

2. Microsoft Excel 2019 Pivot Table Data Crunching-2019,Bill Jelen and Michael Alexander.

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Handle large amounts of data	K2
CO 2	Aggregate numeric data and summarise into categories and subcategories	K2
CO 3	Filtering, sorting, and grouping data or subsets of data	K2
CO 4	Create pivot tables to consolidate data from multiple files	K2
CO 5	Presenting data in the form of charts and graphs	K2

Relationship Matrix for CO, PO, PSO

Course Name – Advanced Excel						Course Code – U2R3ITSEC2					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	3	2	3	2	2	2	2	2	2.2
CO2	3	2	2	3	2	2	3	2	3	2	2.4
CO3	2	2	2	3	2	2	2	3	3	2	2.3
CO4	3	2	2	3	3	2	2	3	2	2	2.3
CO5	2	2	2	3	2	3	2	2	2	2	2.2
	Mean Overall Score										2.34
	Result										High

SKILL ENHANCEMENT COURSE III
QUANTITATIVE APTITUDE (U2R3ITSEC3)

Hours/Week: 02

Max. Marks : 100(CIA:25+Ext:75)

Total Hours: 30

Credits : 2

Nature of the Course: Skill Development

Course Objectives:

1. To improve the skill in numbering systems
 2. To understand the concept of problem solving techniques.
 3. To enhance the problem-solving skills of the students.
 4. To prepare the students for the competitive exams.
 5. To prepare the students for the campus recruitments.
- The primary objective of this course is to enhance the problem-solving skills of the students.
 - To prepare the students for the competitive exams and campus recruitments.

UNIT I

6 Hours

Numbers- HCF and LCM of numbers-Decimal fractions-Simplification-Square roots and cube roots-Average-problems on Numbers.

UNIT II

6 Hours

Problems on Ages - Surds and Indices - percentage - profits and loss - ratio and proportion-partnership-Chain rule.

UNIT III

6 Hours

Time and work - pipes and cisterns - Time and Distance - problems on trains -Boats and streams - simple interest - compound interest - Logarithms - Area -Volume and surface area-coding and decoding.

UNIT IV

6 Hours

Permutation and combination-probability-Analytical reasoning – verbal reasoning-puzzles-Odd man out and Series.

UNIT V

6 Hours

Calendar - Clocks - stocks and shares - Data representation - Tabulation – Bar Graphs- Pie charts- Line graphs.

TEXTBOOK

1. “Quantitative Aptitude”, R.S. AGGARWAL., S.Chand & Company Ltd.,

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understand the concept of Number System	K2
CO 2	Gather the knowledge of LCM	K4
CO 3	Gather the strong ideas in Multiplication	K5
CO 4	Improve the knowledge in Verbal Reasoning	K6
CO 5	Improve the knowledge in Tables and Graph.	K1

Relationship Matrix for CO, PO, PSO

Course Name – Quantitative Aptitude						Course Code – U2R3ITSEC3					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	3	2	3	2	2	2	2	2	2.2
CO2	3	2	2	3	2	2	3	2	3	2	2.4
CO3	2	2	2	3	2	2	2	3	3	2	2.3
CO4	3	2	2	3	2	2	2	3	2	2	2.3
CO5	2	2	2	3	2	3	2	2	2	2	2.2
	Mean Overall Score										2.28
	Result										High

Data Structures and Algorithms (U3R3ITCC5)

Text Books

1. E. Horowitz & Sahni, Fundamental Data Structure, Galgotia Book Source, 1983.
2. Fundamentals of Computer Algorithms – Ellis Horowitz, Sartaj Sahni, Galgotia Publications, 2001.

Reference Books

1. Data Structures – LIPSCHUTA, Tata Mcgraw Hill, Schaum's Outline Series.
2. Sanjoy DasGupta, C. H. Papadimitriou, Umesh Vazirani. Algorithms, First Edition, Tata McGraw Hill, 2006. ISBN: 978-0073523408.

Web Resources:

1. <https://leetcode.com/explore/interview/card/leetcode-interview-crash-course-data-structures-and-algorithms/703/arraystrings/>
2. <https://www.geeksforgeeks.org/learn-data-structures-and-algorithms-dsa-tutorial/>
3. <https://www.hackerrank.com/domains/data-structures>
4. <https://www.codechef.com/certification/data-structures-and-algorithms/prepare>

Course Outcomes:

Upon Completion of the Course Students would be able to		Knowledge level
CO1	Demonstrated basic data structures, their implementation and some of their standard applications	K2
CO2	Developed the ability to choose the appropriate data structure for designing efficient algorithms.	K2
CO3	Developed algorithms such as shortest path and minimum spanning tree	K3
CO4	Synthesized and apply sorting techniques for real time applications.	K3
CO5	Developed skills to apply appropriate data structures in problem solving.	K4

Relationship Matrix for CO, PO, PSO

Course Name – Data Structures and Algorithms						Course Code – U3R3ITCC5					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	2	3	3	2	3	2	2	2	2.3
CO2	3	2	3	2	2	2	3	2	3	2	2.4
CO3	2	2	3	2	2	3	2	2	2	2	2.2
CO4	2	2	2	3	2	3	2	2	2	2	2.2
CO5	2	2	2	3	2	3	2	3	2	2	2.3
	Mean Overall Score										2.28
Mean Overall Relationship is 2.28 which is HIGH											

CORE COURSE – 6

Algorithm Practical (U3R3ITCC6P)

Hours/Week: 05

Max. Marks: 100 (CIA:40+Ext.:60)

Total Hours: 75

Credits: 05

Nature of the Course: **Employability**

Objectives:

1. To learn data structures for various applications.
2. To implement different operations of data structures by optimizing the performance.
3. To elucidate how the data structure selection influences the algorithm complexity.
4. To develop applications using Divide and Conquer paradigm.
5. To implement applications using greedy approach.

Practical List:

1. Write a program to implement Stack Operations.
2. Write a program to implement Queue Operations.
3. Write a program that uses functions to perform the following operations on singly linked list.:
i) Creation ii) Insertion iii) Deletion.
4. Write a program to implement graph traversals.
5. Write a program to implement binary search using recursion.
6. Write a program to implement Merge sort for the given list of integer values.
7. Write a program to implement Quicksort for the given list of integer values.
8. Write a program to find minimum cost spanning tree using Prim's algorithm
9. Write a program to find minimum cost spanning tree using Kruskal's algorithm
10. Write a program to find a single source shortest path for a given graph.

Web Resources:

1. <https://www.studocu.com/row/document/university-of-central-punjab/data-structure/data-structures-algorithms-lab-manual/20360140>
2. https://svrec.ac.in/docs/CSE/lab_manuals/ADSA%20LAB%20MANUAL.pdf

Course Outcomes:

Upon Completion of the Course Students would be able to		Knowledge level
CO1	Developed and applied data structure operations.	K1
CO2	Understood and applied non-linear data structure operations.	K2
CO3	Applied traversals on tree and graph data structures.	K2
CO4	Applied Greedy, divide and conquer algorithms.	K3
CO5	Illustrated and applied backtracking algorithms	K4

Relationship Matrix for CO, PO, PSO

Course Name – Data Structures Practical						Course Code – U3R3ITSEC4:1P					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	2	2	3	2	2	2	2	2	2.1
CO2	2	2	3	2	3	2	3	2	3	2	2.4
CO3	2	2	3	2	2	3	2	2	2	2	2.2
CO4	2	2	2	3	2	2	2	2	2	2	2.1
CO5	2	2	2	3	2	2	2	3	2	2	2.2
	Mean Overall Score										2.20
Mean Overall Relationship is 2.20 which is HIGH											

Discipline Specific Elective 3

Web Application Development (U3R3ITDES3:1)

Hours/Week: 04

Max. Marks: 100 (CIA:25+Ext.:75)

Total Hours: 60

Credits: 03

Nature of the Course: Skill Development

Course Objectives:

1. To enable the students to understand the basics of web development.
2. To create well-structured HTML documents using proper tags and elements.
3. To apply CSS to style web pages.
4. To impart the basic knowledge of JavaScript.
5. To develop dynamic web pages and to ensure form validations.

UNIT I : HTML

(15 Hours)

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

UNIT II : Forms & Images

(15 Hours)

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 : CSS & XML

(10 Hours)

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

UNIT IV : JavaScript

(10 Hours)

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

UNIT V: Advanced script

(10 Hours)

Advanced script, JavaScript and objects, JavaScript own objects, the DOM and web browser environments, forms and validations.

Text Books:

1. Pankaj Sharma, “Web Technology”, SkKataria& Sons Bangalore 2011.
2. Mike Mcgrath, “Java Script”, Dream Tech Press 2006, 1st Edition.
3. Achyut S Godbole&AtulKahate, “Web Technologies”, 2002, 2nd Edition.

Reference Books:

1. Web designing and development, Satish Jain, BPB Publications.
2. Laura Lemay, RafeColburn , Jennifer Kyrnin, “Mastering HTML, CSS &Javascript Web Publishing”, 2016.
3. DT Editorial Services (Author), “HTML 5 Black Book (Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP, jQuery)”, Paperback 2016, 2nd Edition.
4. Learning Web App development, Semmy Purewal, O’Reilly.

Web Resources:

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

Course Outcomes:

Upon Completion of the Course Students would be able to		Knowledge level
CO1	Developed knowledge of HTML	K1
CO2	Developed and published Web pages using Hypertext Markup Language (HTML).	K2
CO3	Optimized page styles and layout with Cascading Style Sheets (CSS).	K2
CO4	Gathered Knowledge in a JAVA script	K3
CO5	Developeddynamic web application	K4

Relationship Matrix for CO, PO, PSO

Course Name : Web Application Development						Course Code – U3R3ITDES3:1					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	2	3	3	2	2	2	2	2	2.2
CO2	3	2	3	2	3	2	3	2	3	2	2.5
CO3	2	2	3	2	2	3	2	2	2	3	2.3
CO4	2	2	2	3	2	3	2	2	2	2	2.2
CO5	2	2	2	3	2	3	2	3	2	2	2.3
	Mean Overall Score										2.30
Mean Overall Relationship is 2.30 which is HIGH											

Discipline Specific Elective 3

Software Testing (U3R3ITDSE3:2)

Hours/Week: 04

Max. Marks: 100 (CIA:25+Ext.:75)

Total Hours: 60

Credits: 03

Nature of the Course: Skill Development

Objectives:

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 (12 Hours)

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

UNIT II Flow / Graphs and Path Testing (14 Hours)

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

UNIT III Testing Strategies (10 Hours)

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

UNIT IV Software Metrics (12 Hours)

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

UNIT V Decision Tables (12 Hours)

Logic Based Testing–Decision Tables–Transition Testing– States, StateGraph, StateTesting.S

Text Books :

1. B.Beizer,“SoftwareTestingTechniques”,IIEdn.,DreamTechIndia,NewDelhi ,2003.
2. K.V.K.Prasad,“SoftwareTestingTools”,DreamTech.India,NewDelhi,2005

Reference Books :

1. I.Burnstein,2003,“PracticalSoftwareTesting”,SpringerInternationalEdn.
2. E. Kit, 1995, “Software Testing in the Real World: Improving the Process”,PearsonEducation,Delhi.

Skill Enhancement Course - 4

Web Practical (U3R3ITSEC4:1P)

Hours/Week: 02

Max. Marks: 100 (CIA:40+Ext.:60)

Total Hours: 30

Credits: 02

Nature of the Course: Employability

Objectives:

1. To impart knowledge to handle basic HTML Tags.
2. To make the students capable of publishing a website independently.
3. To prepare the students to develop static and dynamic websites.
4. To enumerate knowledge about the Web applications.
5. To develop the skills which will help the students to design a webpage.

Practical List :

1. Write a program to display your CV using HTML.
2. Write an HTML code to display your education details in a tabular format.
3. Create a webpage for implementing different types of Lists.
4. Create a webpage using image as a button and set image as background.
5. Create a webpage to implement Frame tags.
6. Create a webpage to link -
 - a. An external page of different website.
 - b. To an E-Mail ID.
7. Create a webpage for demonstration of CSS –
 - a. By applying Internal Style Sheet.
 - b. By applying External Style Sheet.
8. Write an HTML code to create a Home page having three links: About Us, Our Services and Contact Us.
9. Write an HTML code to create a login form.
10. Write a JavaScript program to design an entry form of student details and to store at database server like SQL, Oracle or MS Access.
11. Write a JavaScript for webpage to display browser information.
12. Write a JavaScript program to validate E-Mail form.

Text Books

1. Philippe Hong, “Practical Web Design”, Packt, ISBN :9781788395038, April 2018.
2. Abhishek R. Mehta, “Web Design- A Practical Approach”, Notion Press, ISBN: 9781636692500, Edition 2020.

Web Resources :

1. <https://www.scribd.com/document/398511999/web-designing-Lab-Manual>
2. <https://sunilwanjarisvpct.wordpress.com/computer-lab-i-html-and-css/>
3. <https://www.webstepbook.com/supplements/labsection/lab1-aboutme/>

Course Outcomes:

Upon Completion of the Course Students would be able to		Knowledge level
CO1	Identified and implemented front-end development to current web standards.	K2
CO2	Prepared images for the web, balancing speed with quality.	K2
CO3	Developed web pages using CSS.	K2
CO4	Gained practical experience on web development.	K4
CO5	Created Dynamic Web Pages using Java Script in HTML forms.	K4

Relationship Matrix for CO, PO, PSO

Course Name – Web Practical						Course Code – U3R3ITSEC4:1P					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	2	3	3	2	2	2	2	2	2.2
CO2	3	2	3	2	3	2	3	2	3	2	2.5
CO3	2	2	3	2	2	3	2	2	2	3	2.3
CO4	2	2	2	3	2	3	2	2	2	2	2.2
CO5	2	2	2	3	2	3	2	3	2	2	2.3
	Mean Overall Score										2.30
Mean Overall Relationship is 2.30 which is HIGH											

Skill Enhancement Course - 4

R Programming Practical (U3R3ITSEC4:2P)

Hours/Week: 02

Max. Marks: 100 (CIA:40+Ext.:60)

Total Hours: 30

Credits: 02

Nature of the Course: Employability

Objectives:

1. To understand the fundamentals, standards of functions and capabilities of RLanguage.
2. To learn the basic R-Language Constructs
3. To describe key terminologies, concepts and techniques employed in Statistical Analysis.
4. To extract data from different sources and use it for data analysis.
5. To visualize and summarize the data.
- 6.

Practical List :

1. Write a R program to get student details from the user and print the values.
2. Write a R program to get the details of objects in memory.
3. Write a R program to create a simple bar plot of five subject marks.
4. Write a R program to append values to a given empty vector.
5. Write a R program to create a sequence of numbers from 1 to 25 and also find its sum and mean.
6. Write a R program to create a matrix from a list of given vectors.
7. Write a R program to merge two given lists into one list.
8. Write a R program to create a 2D-Array of sequence of even integers.
9. Write a R program to find whether given number is positive or not.
10. Write a R program to find factorial of a given number using FOR Loop.
11. Write a R program to find sum of digits of a given number using WHILE Loop.
12. Write a R program to concatenate two given matrices of same column but different rows.

Web Resources:

3. <https://kottesandeep.blogspot.com/2022/03/r-programming-lab.html>
4. <https://www.studocu.com/in/document/sri-venkateswara-university/bachelor-of-computer-applications/r-language-lab-manual-lab-1/56789451>
5. <https://kccollege.edu.in/wp-content/uploads/2022/04/R-software-book.pdf>

Course Outcomes:

Upon Completion of the Course Students would be able to		Knowledge level
CO1	Knownthe installation of R Programming Environment.	K1
CO2	Utilized R Data types for developing programs.	K2
CO3	Used different R Data Structures.	K2
CO4	Developed programming logic using R Packages	K3
CO5	Analyzed the datasets using R programming capabilities.	K4

Relationship Matrix for CO, PO, PSO

Course Name – R Programming Practical						Course Code – U3R3ITSEC4:2P					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	2	2	3	2	2	3	2	2	2.2
CO2	2	2	3	2	2	2	2	2	3	2	2.2
CO3	2	2	3	2	2	3	2	2	2	2	2.2
CO4	3	2	2	3	2	2	2	2	2	2	2.2
CO5	2	3	2	3	2	2	2	3	2	3	2.4
	Mean Overall Score										2.24
Mean Overall Relationship is 2.24 which is HIGH											

SEMESTER - IV
CORE COURSE – 7

OPERATING SYSTEMS (U4R3ITCC7)

Hours/Week: 05

Max. Marks: 100 (CIA:25+Ext.:75)

Total Hours: 75

Credits: 05

Nature of the Course: Skill Development

Objectives:

1. To provide an introduction to operating systems.
2. To identify and understand Memory Management in operating systems.
3. To study and focus on the core concepts such as Device Management.
4. To learn UNIX architecture and features.
5. To understand the concepts of Shell programming.

UNIT I Introduction

(16 Hours)

Introduction: importance of Operating System –An OS Resource Manager I/O Programming :Types of I/O channels-I/O programming Concept –Interrupt Structure and processing: Interrupt types-Interrupt mechanism-Interrupt handler processing.

UNIT II Memory Management

(13 Hours)

Memory Management: Single Contiguous Allocation-partitioned Allocation-Paged Memory Management-Demand Paged Memory Management-Segmented Memory Management.

UNIT III Device Management

(17 Hours)

Device Management: Techniques for Device Management-Device Characteristics-Channels and Control Units-Device Allocation Consideration-I/O Traffic Controller-I/O Scheduler-I/O Device Handlers.

UNIT IV UNIX

(13 Hours)

Unix Architecture-features of Unix –General purpose Utilities-CAT,DATE ECHO, PRINTF, BC, Script, mail Basics: Mail, Passwd, WHO, Uname -tty&stty . handling Ordinary File :Cat, CP , run, mv, more, we ,od, cmp , comm, diff .

UNIT V Shell Programming

(16 Hours)

Control Statement and Operator: Essential Shell Programming : read, using command line argument- exit if- test –case- expr- logical operators- while –For- trap.

Textbooks

1. Stuart E.Madnick .John J.Donovan —Operating Systems TATA McGraw-Hill Edition1997.
2. Sumitabha Das4th edition”unix and Application concepts”.

Reference Books

1. William Stallings (1997), —Operating Systemsll, Prentice Hall of India.
2. ISRD Group Lucknow ,”Basics of OS, UNIX and Shell Programming”by the TATA McGraw-Hill publication.

Web Resources

1. http://www.tutorialspoint.com/operating_system/
2. <http://www.reallylinux.com/docs/files.shtml>
3. http://www.tutorialspoint.com/operating_system/os_linux.html

Course Outcomes:

Upon Completion of the Course Students would be able to		Knowledge level
CO1	Outlined the fundamental concepts of an OS and their respective functionality.	K1
CO2	Illustrated the importance of memory management.	K2
CO3	Identified and stimulated the management activities of operating system.	K3
CO4	Analyzed the various services provided by the Unix architecture.	K3
CO5	Interpreted Shell programming the concept of control statement and operators.	K4

Relationship Matrix for CO, PO, PSO

Course Name – Operating Systems						Course Code – U4R3ITCC7					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	2	3	3	3	3	3	2	2	2.6
CO2	2	3	2	3	3	2	3	2	2	2	2.4
CO3	3	2	3	3	3	3	2	2	2	2	2.5
CO4	2	2	2	3	3	2	2	3	2	2	2.3
CO5	2	2	2	3	2	2	2	2	2	2	2.1
	Mean Overall Score										2.39
Mean overall Relationship is 2.39 Which is High											

CORE COURSE 8

OS PRACTICAL(U4R3ITCC8P)

Hours/Week: 05

Max. Marks: 100 (CIA:40+Ext.:60)

Total Hours: 75

Credits: 05

Nature of the Course: Employability

Objectives:

1. To learn the concept of SHELL Programming.
2. To know the concept of binary search technique.
3. To know the concept of sequential technique.
4. To understand the concept of bubble sort.
5. To gain the knowledge of palindrome.

Program List:

1. Write a shell script to convert the content of a file from lower case to upper case.
2. Write a shell script to count the words, lines and characters of a given file. File name should be provided at run time.
3. Write a shell script that take a word from user and find out the frequency of the word in a given file.
4. Write a shell script that gets executed at the moment of user login and it displays Good Morning, Good afternoon, Good Evening, Good Night, depending upon the time at which the user logs on.
5. Write a shell script to print Pascal diamond.
6. Write a shell script to find a number using sequential search method.
7. Write a shell script to find a number using binary search technique.
8. Write a shell script to sort a set of integer numbers using bubble sort.
9. Write a shell script to find out the factorial of a given number.
10. Write a shell script to reverse a string and check whether it is a palindrome.

Course Outcomes:

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understood the concept of OS program.	K1
CO 2	Created knowledge shell script	K3
CO 3	Improved the details of binary search.	K2
CO 4	Improved the details of bubble sort.	K5
CO 5	Improved the details of sequential technique.	K6

Relationship Matrix for CO, PO, PSO

Course Name – OS PRACTICAL						Course Code – U4R3ITCC8P					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	2	3	3	3	3	3	2	2	2.6
CO2	2	3	2	3	3	2	3	2	2	2	2.4
CO3	3	2	3	3	3	3	2	2	2	2	2.5
CO4	2	2	2	3	3	2	2	3	2	2	2.3
CO5	2	2	2	3	2	2	2	2	2	2	2.1
	Mean Overall Score										2.38
Mean Overall Relationship is 2.38 Which is High											

DISCIPLINE SPECIFIC ELECTIVE-4
PYTHON PROGRAMMING (U4R3ITDSE4:1)

Hours/Week: 04

Max. Marks: 100 (CIA:25+Ext.:75)

Total Hours: 60

Credits: 03

Nature of the Course: Skill Development

Objectives:

1. To understand the concepts of Python program.
2. To apply the OOPs concept in Python program.
3. To impart knowledge on demand and supply concept.
4. To learn about the concept of python modules.
5. To understand the concepts of python file handling.

UNIT I Introduction (12 Hours)

Data, Expressions, statements; Introduction-basics of python programming using the REPL(Shell)-Running Python scripts- **Identifiers, Keywords, indentation, variables-Input and output-Standard data types – operators.**

UNIT II Functions and Control Structures (13 Hours)

Functions-Function arguments-the anonymous functions- modules-related problems. Control flow: If statement-if ...else statement-the elif statement-loops-while loop-the infinite loop-for loop-nested loops-loop control statement-break statement-continue statements – pass statement.

UNIT III Strings and Arrays (13 Hours)

Fruitful functions – scope of variables – composing two functions – Recursion – Strings – String slices – Mutable and immutability – String methods – python string functions – python string methods – the string module – Arrays – List as arrays.

UNIT IV Lists (11 Hours)

Python Lists – Basic list operations – Build – in list functions and methods –Tuples – Sets – Dictionaries – Build-in Dictionaries functions and methods.

UNIT V Files (11 Hours)

Reading and Writing to text files in Python – command line arguments – Error and ExpressionHandling an Exception – Modules- Python packages.

Textbooks

1. K.Nageswararao, ShaikAkbar, Immadi Murali Krishna,” PROBLEM SOLVING AND PYTHON PROGRAMMING”, Scitech Publications(India) Pvt.Ltd.,2018.

Reference Books

1. Head First Python, 2nd Edition – Paul Barry, 2018

Web Resources

1. <https://www.programiz.com/python-program>
2. <https://www.guru99.com/python-tutorials.html>

CourseOutcomes:

Upon Completion of the Course Students would be able to		Knowledge level
CO1	Outlined the basic concepts in python language.	K1
CO2	Interpreted different looping and conditional statements in python language.	K1
CO3	Applied the various data types and identify the usage of control statements, loops, functions and Modules in python for processing the data.	K2
CO4	Analyzed and solved problems using basic constructs and techniques of python.	K3
CO5	Assessed the approaches used in the development of interactive application.	K4

Relationship Matrix for CO, PO, PSO

Course Name – Python Programming						Course Code – U4R3ITDSE4:1					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	2	2	2	2	2	2	2	3	2.2
CO2	2	2	2	3	2	2	3	3	2	2	2.3
CO3	3	2	2	2	3	2	2	2	3	2	2.3
CO4	2	2	2	2	2	3	2	3	2	2	2.2
CO5	3	2	2	2	2	2	2	2	2	3	2.2
	Mean Overall Score										2.24
Mean Overall Relationship is 2.24 Which is High											

DISCIPLINE SPECIFIC ELECTIVE 4

E-COMMERCE(U4R3ITDSE4:2)

Hours/Week: 04

Max. Marks: 100 (CIA:25+Ext.:75)

Total Hours: 60

Credits: 03

Nature of the Course: Skill Development

Objectives:

1. To understand the concepts of e-commerce.
2. To apply the concept NSFNET in e-commerce.
3. To impart knowledge on EPS and EDI concept.
4. To learn about the concept of marketing on the internet.
5. To understand the concepts of EDI implementation.

UNIT I Introduction

(11 Hours)

Welcome to E-Commerce – **Electronic Commerce Framework** – Electronic commerce and Media convergence – **The anatomy of E-Commerce Applications** – **Components of the I- Way** – **Network Access Equipment** – Global Information Distribution Networks.

UNIT II Internet Service Provider

(13 Hours)

ISP: National, Regional-level, Local-level and Abroad Level - **Network Interconnection Points and Options** - Logistics of Being an Internet Service Provider – **Electronic Payment Systems (EPS)** – Types - Designing EPS - Smart Cards and EPS – Credit Cards and EPS.

UNIT III Electronic Data Interchange

(12Hours)

Electronic Data Interchange (EDI) : Applications – **Security and Privacy Issues** –Software Implementations – **Value Added Networks** – Internal Information System – Work- flow Automation and Coordination– **Supply Chain Management** .

UNIT IV Marketing

(13 Hours)

Marketing on the Internet: Advertising on the Internet – **Charting the On-LineMarketing Process** – E-Commerce Catalogs or Directories – Information Filtering – **Consumer- Data Interface: Emerging Tools.**

UNIT V Software Agents

(11 Hours)

Software Agents Introduction - **Characteristics and Properties** - Technology Behind Software Agents – **Telescript Agent Language** - **Safe TCL** - **Applets, Browsers and Software Agents** - **Software Agents in Action.**

TextBook:

1. RaviKalakota,AndrewWinston,"FrontiersofElectronicCommerce",PearsonEducation Asia,2010 edition.

ReferenceBooks:

1. JefferyF.Rayport,BernardJ.Jaworski,"E-commerce",TMCH, 2002
2. E.FramiTurban,JAELee,DavidKing,K.MichaleChung,"ElectronicCommerce",Pearso Education,2000

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Developed basics understanding and working knowledge of E-commerce.	K1
CO 2	Created knowledge in smart card.	K2
CO 3	Manipulated the Electronic Data Interchange.	K2
CO 4	Improved the knowledge of Marketing on the Internet.	K4
CO 5	Worked with Software Agents.	K5

Relationship Matrix for CO, PO, PSO

Course Name –E-commerce						Course Code – U4R3ITDSE4:2					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	2	2	2	2	2	2	2	3	2.2
CO2	2	2	2	3	3	2	3	3	2	2	2.4
CO3	3	2	2	2	3	2	2	2	3	2	2.3
CO4	2	2	2	2	2	3	2	3	2	2	2.2
CO5	3	2	2	2	3	2	2	2	2	3	2.3
	Mean Overall Score										2.28
Mean Overall Relationship is 2.28 Which is High											

SKILL ENCHANCEMENT COURSE 5

PYTHON PROGRAMMING PRACTICAL(U4R3ITSEC5:1P)

Hours/Week: 02

Max. Marks: 100 (CIA:40+Ext.:60)

Total Hours: 30

Credits: 02

Nature of the Course: Employability

Objectives:

1. To learn the concept of python.
2. To know the concept of factorial.
3. To know the concept of function.
4. To understand the concept of linear search.
5. To gain the knowledge of selection sort.

List of practical:

1. Write a python program to check whether the given number is perfect or not.
2. Write a python program to check whether the given number is palindrome or not.
3. Write a python program to print prime number in a given interval.
4. Write a python program to check the given number is Armstrong or not.
5. Write a python program to matrix multiplication.
6. Write a python program to find the factorial using module.
7. Write a python program to create simple calculator by using functions.
8. Write a python program to manipulate list in python.
9. Write a python program to implement the linear search.
10. Write a python program to implement selection sort.

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Developed basics understanding and working knowledge of python programming.	K1
CO 2	Created knowledge in python functions.	K2
CO 3	Manipulated list in python.	K3
CO 4	Improved the knowledge of data structures.	K4
CO 5	Worked with algorithms.	K5

Relationship Matrix for CO, PO, PSO

Course Name – Python Programming						Course Code – U4R3ITSEC5:1P					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	2	2	2	3	2	2	2	2	2.2
CO2	2	3	2	2	2	3	2	2	2	3	2.3
CO3	2	2	2	2	2	2	3	2	3	2	2.2
CO4	3	3	2	2	2	2	2	2	2	3	2.3
CO5	2	2	3	2	2	3	3	2	2	2	2.3
	Mean Overall Score										2.26
Mean overall Relationship is 2.26 which is HIGH											

SKILL ENCHANCEMENT COURSE 5

VISUAL PROGRAMMING PRACTICAL(U4R3ITSEC5:2P)

Hours/Week: 02

Max. Marks: 100 (CIA:40+Ext.:60)

Total Hours: 30

Credits: 02

Nature of the Course: Employability

Objectives:

1. To learn the concept of visual programming.
2. To know the concept of menu editor.
3. To know the concept of OLE control.
4. To understand the concept of font dialogue box.
5. To gain the knowledge of Data control.

List of practical:

1. Write a VB program to create a simple calculator.
2. Write a VB program to check the given string is palindrome or not.
3. Write a VB program to find the factorial of the given number by using functions.
4. Write a VB program to design a form using shape control to display signal and change its color using timer control.
5. Write a VB program for copying the elements from one list to the other list and vice versa.
6. Write a VB program to sort the given list of numbers.
7. Write a VB program to design form to create a font dialog box using combo/ list, text, option buttons, and check box control.
8. Design a simple application using OLE control.
9. Design a form using menu editor (eg.File , Edit , Format) .
10. Design a simple database application using Data control.

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Developed basics understanding and working knowledge of visual programming.	K1
CO 2	Created knowledge in visual functions.	K2
CO 3	Improved the Knowledge in VB controls.	K2
CO 4	Improved the knowledge of data controls.	K5
CO 5	Worked with font dialogue box.	K6

Relationship Matrix for CO, PO, PSO

Course Name – Visual Programming Practical						Course Code – U4R3ITSEC5:2P					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	2	2	2	2	2	2	2	2	2.1
CO2	3	3	2	3	3	3	2	3	2	3	2.7
CO3	2	2	3	2	2	2	2	3	2	3	2.3
CO4	2	2	2	3	3	2	2	2	2	3	2.3
CO5	2	2	2	2	2	3	2	3	2	2	2.2
	Mean Overall Score										2.32
Mean overall Relationship is 2.32 which is HIGH											

SKILL ENCHANCEMENT COURSE 6

VISUAL PROGRAMMING (U4R3ITSEC6:1)

Hours/Week: 02

Max. Marks: 100 (CIA:25+Ext.:75)

Total Hours: 30

Credits: 02

Nature of the Course: Skill Development

Objectives:

1. To teach the details of VB.
2. To give details of controls in VB.
3. To provide the ideas of Control Statements in VB.
4. To give selection and using controls.
5. To provide the ideas of checkboxes.

UNIT I:

(6 Hours)

INTRODUCTION TO VISUAL BASIC: Integrated Development Environment (IDE) Features – Anatomy of a Form - Working with Form - Properties.

UNIT II:

(5 Hours)

CONTROL STATEMENT: If ... End if, if else end if, – For...Next, While loop, Select case.....End select, Exit statementwith structure.

UNIT III:

(7 Hours)

PROCEDURE AND FUNCTION: Procedure – Function – Subroutine – Variables - Declaration – Constant -Creating your own constants - Scope of a constant.

UNIT IV

(7 Hours)

SELECTING AND USING CONTROLS – Introduction to Standard Controls – Command Buttons – Text Boxes – Labels – Image box – Picture box – Timer - Scroll bars.

UNIT V

(5 Hours)

ADVANCED CONTROLS: Check Boxes– Option control - List boxes – Combo boxes – Advanced controls:Rich textbox control - Menu Editor.

TEXT BOOK

1. Mohammed Azam, “Programming with Visual Basic 6.0”, Vikas Publishing House pvt Ltd,2002

REFERENCE BOOK

1. Visual Basic, 7th Edition, Tony Gaddis, Kip Irvine, Pearson Publication,2018.

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understood the concept of Visual programming	K1
CO 2	Created knowledge in Control Statements.	K3
CO 3	Improved the details of Functions.	K2
CO 4	Improved the details of selection and using controls.	K5
CO 5	Improved the details of Check boxes.	K6

Relationship Matrix for CO, PO, PSO

Course Name – Visual Programming						Course Code – U4R3ITSEC6:1					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	2	3	3	3	3	3	2	2	2.6
CO2	2	3	2	3	3	2	3	3	2	2	2.5
CO3	3	2	3	3	3	3	2	2	2	2	2.5
CO4	2	2	2	3	3	2	3	3	2	2	2.4
CO5	2	2	2	3	2	2	2	2	2	2	2.1
	Mean Overall Score										2.41
Mean overall Relationship is 2.41 which is HIGH											

SKILL ENCHANCEMENT COURSE 6

ASP PROGRAMMING (U4R3ITSEC6:2)

Hours/Week: 02

Max. Marks: 100 (CIA:25+Ext.:75)

Total Hours: 30

Credits: 02

Nature of the Course: Skill Development

Objectives:

1. To teach the details of ASP.
2. To give details of ASP models in ASP.
3. To provide the ideas of Understanding objectives in ASP.
4. To give details of working with users and using HTML forms.
5. To provide the ideas of working with cookies.

UNIT I:

(6 Hours)

INTRODUCTION: Introduction to ASP-ASP Models-ASP files-process of serving an active server page.

UNIT II:

(5 Hours)

SCRIPTING LANGUAGE: Using scripting language-setting the primary scripting language-including other files- Understanding objects -Understanding components-working with users.

UNIT III:

(7 Hours)

COOKIES and SESSIONS: Cookies-working with cookies-using cookies in ASP Application-Using Sessions.

UNIT IV

(7 Hours)

CONNECTION OBJECT: About the connection object – executing a SQL statement with the connection object – understanding session and connection pooling.

UNIT V

(5 Hours)

FORMS: Working with HTML forms-retrieving form data-using text boxes and text area.

Textbook:

1. "Practical ASP"-Ivan Bayross, BP Publication 2000.

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understood the concept of ASP	K1
CO 2	Created the knowledge in Scripting language.	K3
CO 3	Improved the details of Understanding Objects.	K2
CO 4	Improved the details of HTMLForms.	K4
CO 5	Improved the details of Cookies.	K4

Relationship Matrix for CO, PO, PSO

Course Name – ASP Programming						Course Code – U4R3ITSEC6:2					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	2	2	2	2	2	2	3	3	2.2
CO2	2	3	2	2	2	2	3	2	2	2	2.2
CO3	3	2	2	3	3	3	2	2	2	3	2.5
CO4	2	2	2	2	3	2	3	2	2	3	2.3
CO5	2	2	2	2	2	3	2	3	2	2	2.2
	Mean Overall Score										2.28
Mean overall Relationship is 2.28 which is HIGH											

SEMESTER - V

CORE COURSE – 9

COMPUTER NETWORKS (U5R3ITCC9)

Hours/Week: 05

Max. Marks: 100 (CIA:25+Ext.:75)

Total Hours: 75

Credits: 05

Nature of the Course: **Skill Development**

Course Objectives:

1. To make a proper understanding about the fundamentals of Computer networks.
2. To teach the concepts of different media.
3. To understand an inbound knowledge about the Data link layer in detail.
4. To give an inbound knowledge about the Network layer in detail.
5. To give an inbound knowledge about the Transport layer in detail.

UNIT-I: Introduction

(14 Hours)

Uses of Computer Networks- Network Hardware - Network Software-Reference Model: OSI Model-TCP/IP Model.

UNIT-II: Physical Layer

(15 Hours)

Guided Transmission Media -Wireless Transmission- Communication Satellites - The public Switched telephone Network.

UNIT-III: The Data Link Layer

(15 Hours)

Data Link Layer Design Issues - Error Detection and Correction- Elementary Data link Protocol - Sliding Window Protocols.

UNIT-IV: The Network Layer

(16 Hours)

Network Layer Design Issues - Routing Algorithms - Congestion Control Algorithms. - Internetworking.

UNIT-V: The Transport Layer

(15 Hours)

Services Provided to the Upper Layers-Transport Service Primitives - The Application Layer: Domain Name System - Electronic Mail - World Wide Web.

TEXT BOOK:

Andrew S. Tanenbaum, “Computer Networks”, 5th Edition, Prentice hall India, 2013

Unit-I : Chapter1 (1.1, 1.2, 1.3, 1.4, 1.5),

Unit-II : Chapter 2(2.2, 2.3, 2.4, 2.5),

Unit- III : Chapter 3(3.1, 3.2, 3.3.2, 3.4, 3.6.1),

Unit- IV : Chapter 5(5.1, 5.2, 5.3, 5.4.1, 5.4.2, 5.5),

Unit-V : Chapter 6(6.1.1, 6.1.2, 6.1.3), Chapter 7(7.1, 7.2, 7.3)

REFERENCE BOOKS:

1. Behruz A.Ferouzan, “Data Communication and Networking”, 4th Edition, Tata McGraw Hill Publication. 2010

Course Outcomes

CORE COURSE – 10
DATABASE MANAGEMENT SYSTEMS (U5R3ITCC10)

Hours/Week: 05

Max. Marks: 100 (CIA: 25+Ext.:75)

Total Hours: 75

Credits: 04

Nature of the Course: Skill Development

Course Objectives:

1. To understand the basic DBMS models and architecture
2. To identify and understand the basics of relational model
3. To study about the ER model.
4. To know about data manipulation.
5. To study the about the normalization and functional dependencies.

UNIT 1: BASIC CONCEPTS

(18 Hours)

Database system-Data independence Architecture for a database system- **Relational approach**-
Hierarchical approach - **Network approach**.

UNIT 2: RELATIONAL DATA STRUCTURE

(12 Hours)

Relations – **Domain and attributes** – **Keys** - Extensions and Intensions, the architecture of system R: Background – **Architecture- Query by Example**: Retrieval operations - Retrieval operations of Tree Structures Relations- Built- in Functions.

UNIT 3: RELATIONAL ALGEBRA AND RELATIONAL CALCULUS

(18 Hours)

Relational algebra: Introduction – Traditional Set operations – Attribute Names for Derived Relations – Special Relational operations - – **Relational Calculus**: Introduction – Tuple-Oriented Relational calculus – Domain- Oriented Relational calculus – System R Data Structure: Introduction – **Base Tables – Indexes - Discussions.**

UNIT 4: DATA MANIPULATION

(12 Hours)

System Data Manipulation : Introduction – Retrieval Operations – **Built- in Functions – Update Operations** – The System R Dictionary – Discussion - Embedded SQL: Introduction – Operations Not involving **Cursors** - Operations involving Cursors – **Dynamic Statements** - Discussion.

UNIT 5: NORMALIZATION

(15 Hours)

Normal Form – Functional Dependence – Fully Functional Dependence- First, second, Third Normal form, BCNF, Fourth and Fifth Normal Form.

Text Book:

1.“An Introduction to Database Systems Vol 1 “ C.J. DATE ,Narosa Publishing House, Third Edition.

Unit I(Chapter 1), Unit II (Chapter 2), Unit III (Chapter 3,4)

Unit IV (Chapter 5,6) ,Unit V (Chapter 7)

Reference Book:

1.Fundamentals of Database System, 7th Edition, – Elmasri, Navathe, Pearson Publication, 2018

- 1.<http://srikanthtechnologies.com/books/orabook/ch1.pdf>
- 2.<http://www.tutorialspoint.com/sql/sql-rdbms-concepts.htm>
- 3.<http://ecomputernotes.com/database-system/rdbms>

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Demonstrated the basic elements of a relational database management system.	K2
CO 2	Identified the data models for relevant problems.	K4
CO 3	Designed entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the Respect data into RDBMS and formulate SQL queries on the data.	K5
CO 4	Demonstrated their understanding of key notions of query evaluation and optimization techniques	K6
CO 5	Extended normalization for the development of application software's.	K1

Relationship Matrix for CO, PO, PSO

Course Name: DATABASE MANAGEMENT SYSTEMS						Course Code: U5R3ITCC10					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	2	3	2	2	2	2	2	2	2.2
CO2	2	2	2	3	2	3	2	2	3	2	2.3
CO3	2	3	2	2	2	2	2	2	2	3	2.2
CO4	3	2	2	2	2	3	2	2	3	2	2.3
CO5	2	2	2	2	3	2	3	2	2	2	2.2
	Mean Overall Score										2.24
Mean Overall Relationship is 2.24 which is HIGH											

CORE COURSE – 11
MICROPROCESSOR (U5R3ITCC11)

Hours/Week: 05

Max. Marks: 100 (CIA:25+Ext.:75)

Total Hours: 75

Credits: 04

Nature of the Course: Skill Development

Course Objectives:

1. To teach the basic concepts of Microprocessor.
2. To educate the students how to work in 8085 processor.
3. To teach the programming techniques.
4. To provide the details in assembly level programming.
5. To improve the knowledge in memory interface.

UNIT-1: Intel 8085

(15 Hours)

Introduction – Intel 8085 Architecture – ALU - Timing and Control unit- Registers- Buses –Pin Configuration.

UNIT -2: Instruction Set of Intel 8085

(16 Hours)

Introduction – Instruction and Data formats – Addressing Modes: Direct Addressing-Register addressing – Register indirect addressing – Immediate Addressing- Implicit Addressing-Status flag.

UNIT – 3: Assembly Language Programming

(14 Hours)

Addition of two 8-bit numbers – 8-bit subtraction- Multiplication – Division - Find 1's complement of an 8-bit number- Find 2's complement of an 8-bit numbers.

UNIT – 4: Logical Programming

(16 Hours)

Largest number of two numbers - Smallest number of two numbers – Ascending orders – Descending Order – Block Transfer – find out the root of the number-conversion of Hexadecimal number to Decimal number-Conversion of octal number into Decimal number-Conversion of binary number into Octal number.

UNIT – 5: Peripheral Devices

(14 Hours)

Introduction – Memory and I/O interfacing: Memory interfacing – I/O interfacing – Data Transfer schemes: Synchronous data transfer – Asynchronous data transfer – interrupt driven data transfer.

TEXT BOOK:

1. Fundamentals of Microprocessor and Microcomputer, B.RAM, Dhanpatrai Publication, Reprint 2016 edition.

REFERENCES BOOKS:

1. 8085 Microprocessor and Its Applications, A. Nagoor Kani, McGraw Hill Education, 2018.
2. Douglas V.Hall- Microprocessors and digital systems, McGraw Hill

1. https://www.tutorialspoint.com/compile_assembly_online.php
2. https://www.tutorialspoint.com/compile_assembly_online.php

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understood the concept of microprocessor.	K2
CO 2	Gathered the knowledge of 8085 processor.	K4
CO 3	Gathered the strong ideas in programming techniques.	K5
CO 4	Improved the knowledge in assembly level programming.	K6
CO 5	Improved the knowledge in memory interface.	K1

Course Name: MICROPROCESSOR						Course Code: U5R3ITCC11					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	3	2	2	2	2	2	2	2	3	2.2
CO2	3	2	2	2	3	2	2	3	2	2	2.3
CO3	3	2	3	2	3	2	3	2	2	3	2.5
CO4	2	2	2	2	2	3	2	2	3	2	2.2
CO5	3	2	3	2	2	3	2	3	2	2	2.4
	Mean Overall Score										2.32
Mean Overall Relationship is 2.32 which is HIGH											

CORE COURSE – 12

DBMS PRACTICAL (U5R3ITCC12P)

Hours/Week: 05

Max. Marks: 100 (CIA: 40+Ext.:60)

Total Hours: 75

Credits: 04

Nature of the Course: Skill Development/Employability Skill

Course Objectives:

1. To learn and implement SQL & PL/SQL.
2. Understand the basic concepts and the applications of database systems
3. Master the basics of SQL and construct queries using SQL.
4. Understand the relational database design principles.
5. Familiar with database storage structures and access techniques.

List of practicals:

1. To Retrieve 5 student related records from the student table

2. To update records in student table.

3. Rollback and Commit commands

Create Teacher table with the following fields(Name, DeptNo, Date of joining, DeptName,Location, Salary)

(a) Insert five records

(b) Give Increment of 25% salary for Mathematics
Department .(c) Perform Rollback command

(d) Give Increment of 15% salary for IT
Department(e) Perform commit command

4 . Order by and group by clauses

Create Sales table with the following fields(Sales No, Salesname, Branch, Salesamount, DOB)

(a) Insert five records

(b) Calculate total salesamount in each branch

(c) Calculate average salesamount in each branch .

(d)Display all the salesmen, DOB who are born in the month of
December as day in

character format i.e. 21-Dec-09

(e) Display the name and DOB of salesman in alphabetical order of the month.

5. Create an Emp table with the following fields:

(EmpNo, EmpName, Job, Basic, DA, HRA, PF, GrossPay, NetPay) (Calculate DA as 30% of Basic and HRA as 40% of Basic)

- (a) Insert Five Records and calculate GrossPay and NetPay.
- (b) Display the employees whose Basic is lowest in each department .
- (c) If NetPay is less than <Rs. 10,000 add Rs. 1200 as special allowances .
- (d) Display the employees whose GrossPay lies between 10,000 & 20,000 (e) Display all the employees who earn maximum salary .

6. Employee Database

An Enterprise wishes to maintain a database to automate its operations. Enterprise is divided into certain departments and each department consists of employees. The following two tables describes the automation schemas

Dept (deptno, dname, loc)

Emp (empno, ename, job, mgr, hiredate, sal, comm, deptno)

- a) Update the employee salary by 15%, whose experience is greater than 10 years.
- b) Delete the employees, who completed 30 years of service.
- c) Display the manager who is having maximum number of employees working under him?
- d) Create a view, which contain employee names and their manager

7. Using Employee Database perform the following queries

- a) Determine the names of employee, who earn more than their managers.
- b) Determine the names of employees, who take highest salary in their departments.
- c) Determine the employees, who are located at the same place.
- d) Determine the employees, whose total salary is like the minimum Salary of any department.
- e) Determine the department which does not contain any employees.

8. Consider the following tables namely “DEPARTMENTS” and “EMPLOYEES” Their schemas are as follows,

Departments (dept_no , dept_name , dept_location); Employees (emp_id , emp_name , emp_salary, dept_no);

- a) Develop a query to grant all privileges of employees table into departments table
- b) Develop a query to grant some privileges of employees table into departments table
- c) Develop a query to revoke all privileges of employees table from departments table
- d) Develop a query to revoke some privileges of employees table from departments table

e) Write a query to implement the save point.

9. Using the tables “DEPARTMENTS” and “EMP LOYEES” perform the following queries

- a) Display the employee details, departments that the departments are same in both the empand dept.
- b) Display the employee name and Department name by implementing a left outer join.
- c) Display the employee name and Department name by implementing a right outer join.
- d) Display the details of those who draw the salary greater than the average salary.

10. Write a PL/SQL program to demonstrate Exceptions.

11. Write a PL/SQL program to demonstrate Cursors.

12. Write a PL/SQL program to demonstrate Functions.

WEB RESOURCES:

- 1. <https://www.tutorialaicsip.com/it-402-prac/database-management-system-10/>
- 2. <https://study.com/academy/lesson/practical-lesson-for-database-programming-manipulating-data.html>

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Demonstrated the basic elements of a relational database management system	K2
CO 2	Identified the data models for relevant problems. In SQL	K4
CO 3	Demonstrated their understanding of key notions of query evaluation and optimization techniques.	K5
CO 4	Formulated PL/SQL queries on the data..	K6
CO 5	Extended normalization for the development of application software's.	K1,K2

Relationship Matrix for CO, PO, PSO

Course Name: DBMS PRACTICAL						Course Code: U5R3ITCC12P					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	2	2	2	2	2	2	2	3	2.1
CO2	2	2	2	2	2	2	3	2	3	2	2.2
CO3	3	2	3	2	2	3	2	2	2	2	2.3
CO4	2	2	3	2	2	3	2	3	2	2	2.3
CO5	2	2	2	2	3	2	3	2	2	2	2.2
	Mean Overall Score										2.22
Mean Overall Relationship is 2.22 which is HIGH											

Discipline Specific Elective Course 5

Data mining and Data Warehousing (U5R3ITDSE5:1)

Hours/Week: 05

Max. Marks: 100 (CIA:25+Ext.:75)

Total Hours: 75

Credits: 03

Nature of the Course: **Skill Development**

Course Objectives:

1. To learn about fundamentals of Data Mining.
2. To impart knowledge in various Data Association techniques.
3. To understand how to consolidate huge volume of data in one place efficiently.
4. To understand the concept of Data warehousing.
5. To understand the concept of the Information Privacy

UNIT I: Overview & Association Rule Mining (16 Hours)

Introduction -Data Mining process – Applications – Techniques – Practical Examples – Future – Guidelines – Limitations – Data mining software – Association Rule mining: Basics – The Task and a Naïve algorithm- Improving the efficiency of the Apriori algorithm.

UNIT II: Cluster analysis (14 Hours)

Cluster Analysis: Introduction – Desired features – Types of cluster analysis methods – Partitional methods – - Hierarchical methods – Density based methods .

UNIT III: Web Data Mining (14 Hours)

Introduction – Web mining – Web Terminology and characteristics – Locality and Hierarchy in the web – Web content mining – Web usage mining – Web structure mining – Web mining software – Search Engines: Introduction – Difference between Web search and information retrieval – Characteristics of search engines

UNIT IV: Data Warehousing (16 Hours)

Introduction – Operational Data stores – Data warehouses – Data warehouse Design – Guidelines for Data warehouse implementation – Data warehouse metadata – Software for ODS and Data warehousing.

UNIT V: Information Privacy (15 Hours)

Information Privacy: Basics principles – Privacy legislation – Uses and misuses of Data mining – Primary aims – Pitfalls of Data mining.

Text Book:

1. G. K. Gupta, Introduction to Data mining with case studies, Pretince Hall India, 2006.

Unit 1-Chapters 1,2;

Unit 2 – Chapter 4;

Unit 3 – Chapters 5,6;

Unit 4 – Chapter 7,

Unit5 – Chapter 9.

Reference Book:

1. K.P. Soman & Shyam and V.Ajay, Insight to Data Mining Theory and Practice, Pretice Hall of India, 2006.

Web Resources:

1. <https://www.datanovia.com/en/courses>

2. <https://www.nd.edu/>

3. <https://www.edx.org/course/business-analytics-fundamentals>

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Developed ability to design various algorithms based on data mining tools.	K2
CO 2	Developed further interest in research and design of new Data Mining techniques	K4
CO 3	Understood various tools of Data Mining and their techniques to solve the real time problems	K5
CO 4	Identified the scope and necessity of Data Mining & Warehousing for the society	K6
CO 5	Described the Information Privacy and its aims.	K1

Relationship Matrix for CO, PO, PSO

Course Name: Data mining and DataWarehousing						Course Code: U5R3ITDSE5:1					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	2	3	2	2	2	3	2	2	2.2
CO2	2	2	3	2	2	3	2	2	3	2	2.3
CO3	2	2	2	3	2	3	2	3	2	3	2.4
CO4	3	2	3	2	2	3	2	3	2	2	2.4
CO5	3	2	2	3	2	3	2	3	2	3	2.5
	Mean Overall Score										2.36
Mean Overall Relationship is 2.36 which is HIGH											

Discipline Specific Elective Course 5
INFORMATION SECURITY (U5R3ITDSE5:2)

Hours/Week: 05

Max. Marks: 100 (CIA:25+Ext.:75)

Total Hours: 75

Credits: 03

Nature of the Course: Skill Development

Course Objectives:

1. To provides an introduction and overview of information security.
2. To enhance technical, communication, problem solving and teaming skills, as they relate to the study of Information Security.
3. To understand about Symmetric and Asymmetric Cryptographic Techniques:
4. To understand about cryptography.
5. To understand about intrusion detection systems, data firewalls, malicious software, viruses, denial of service attacks, regulations, law and governance

UNIT-I Symmetric Ciphers

(15 Hours)

A model for Network Security-Symmetric Cipher Model –Substitution Techniques – Transposition Techniques-Strganography.

UNIT-II Block Ciphers and DES

(16 Hours)

Simplified DES – Block Cipher Principle – DES – The strength of DES – Differential and Linear Cryptanalysis – Block Cipher Principles – Block Cipher Modes of Operation – Publickey Cryptography and RSA algorithm.

UNIT-III Email Security

(15 Hours)

Authentication Applications : Kerberos – X.509 Authentication Services – Electronic Mail Security: PGP – S/MIME.

UNIT-IV IP Security

(15 Hours)

IP Security Overview – IP Security Architecture – Authentication Header – Web Security: Web Security Consideration – Secure Sockets layers and Transport Layer security – Secure Electronic Transaction.

UNIT-V Intruders and Malicious Software

(14 Hours)

Intruders – Intrusion Detection – Password Management – Malicious Software: Viruses and Related Threats – Virus Countermeasures – Firewalls.

TEXT BOOK :

“Cryptography and Network Security“ - William Stalling, 3rd Edition, McGraw Hill.

Unit I Chapter 1,2

Unit II Chapter 3, 9 Unit III Chapter 14,15

Unit IV Chapter 16,17 Unit V Chapter 18,19,20

REFERENCE BOOK:

“Computer Networking” - Michael B White, Tata Mcgraw Hill publications, 2018.

Web Resources:

1. <https://www.nativeintelligence.com/resources/cyber-security-links/>
2. <https://www.spiceworks.com/it-security/network-security/articles/what-is-url-filtering/>

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Formulated information security governance, and related legal and regulatory issues.	K2
CO 2	Gathered Devices how threats to an organization are discovered, analysed, and dealt with.	K4
CO 3	Evaluated network security threats and countermeasures.	K5
CO 4	Constructed network security designs using available secure solutions (such as PGP, SSL, IPSec, etc)	K6
CO 5	Acquired the knowledge of advanced security issues and technologies (such as DoS attack detection and containment, and anonymous communications	K1

Relationship Matrix for CO, PO, PSO

Course Name: INFORMATION SECURITY						Course Code: U5R3ITDSE5:2					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	3	2	2	2	2	2	2	2	2.1
CO2	2	2	2	3	2	2	2	2	3	3	2.3
CO3	2	3	2	2	3	3	2	3	2	3	2.5
CO4	2	2	2	3	2	2	2	2	2	2	2.1
CO5	2	3	2	3	2	3	2	3	2	2	2.4
	Mean Overall Score										2.28
Mean Overall Relationship is 2.28 which is HIGH											

Discipline Specific Elective Course: 6
INTRODUCTION TO DATA SCIENCE (U5R3ITDSE6:1)

Hours/Week: 05

Max. Marks: 100 (CIA:25+Ext.:75)

Total Hours: 75

Credits: 03

Nature of the Course: Skill Development

Course Objectives:

1. To develop relevant programming abilities.
2. To develop the ability to build and assess data-based models.
3. To execute statistical analyses with professional statistical software.
4. To demonstrate skill in data management.
5. To understand more complex models and can begin to construct models of their own.

Unit – I: Introduction (16 Hours)

Introduction to Data Science – Evolution of Data Science – Data Science Roles – Stages in a Data Science Project – Applications of Data Science in various fields – Data Security Issues.

Unit – II: Data Collection and Data Pre-Processing (16 Hours)

Data Collection Strategies – Data Pre-Processing Overview – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization.

Unit – III: Exploratory Data Analytics (18 Hours)

Descriptive Statistics – Mean, Standard Deviation, Skewness and Kurtosis – Box Plots – Pivot Table – Heat Map – Correlation Statistics – ANOVA.

Unit – IV: Model Development (15 Hours)

Simple and Multiple Regression – Model Evaluation using Visualization – Residual Plot – Distribution Plot – Polynomial Regression and Pipelines – Measures for In-sample Evaluation – Prediction and Decision Making.

Unit – V: Model Evaluation (10 Hours)

Generalization Error – Out-of-Sample Evaluation Metrics – Cross Validation – Overfitting – Under Fitting and Model Selection – Prediction by using Ridge Regression – Testing Multiple Parameters by using Grid Search.

Text Books:

1. Jojo Moolayil, “Smarter Decisions : The Intersection of IoT and Data Science”, PACKT, 2016.
2. Cathy O’Neil and Rachel Schutt , “Doing Data Science”, O’Reilly, 2015.

REFERENCE BOOK:

1. David Dietrich, Barry Heller, Beibei Yang, “Data Science and Big data Analytics”, EMC 2013

Web Resources:

1. https://www.w3schools.com/datascience/ds_introduction.asp
2. <https://rafalab.dfci.harvard.edu/dsbook/>

Course Outcomes:

Upon Completion of the Course Students would be able to		Knowledge level
CO1	Presented a report on how data is collected, managed and stored for data Science.	K1
CO2	Demonstrated scholarly knowledge while uncovering the concept of machine learning for analysis.	K2
CO3	Performed experiments on the estimation of the likelihood of events for generating recommendation.	K2
CO4	Determined sentiment analysis for twitter real- time data.	K3
CO5	Determined how data science can be applied in real time applications.	K4

Relationship Matrix for CO, PO, PSO

Course Name: INTRODUCTION TO DATA SCIENCE						Course Code: U5R3ITDSE6:1					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	2	2	2	3	2	2	2	2	2.2
CO2	2	2	2	3	2	2	3	2	3	2	2.3
CO3	3	2	2	3	2	2	2	3	2	3	2.4
CO4	3	2	2	2	3	2	2	3	2	3	2.4
CO5	3	2	3	2	2	2	2	3	2	2	2.3
	Mean Overall Score										2.32
Mean Overall Relationship is 2.32 which is HIGH											

Discipline Specific Elective Course: 6
SYSTEM ADMINISTRATION AND MAINTENANCE (U5R3ITDSE6:2)

Hours/Week: 05

Max. Marks: 100 (CIA:25+Ext.:75)

Total Hours: 75

Credits: 03

Nature of the Course: Skill Development/Employability Skill

Course Objectives

1. To teach the basic concepts of personal computer
2. To educate the students how to assemble in computer.
3. To teach the basic concept of operating systems
4. To provides the details in laptop and portable devices.
5. To improve the knowledge in network concepts.

UNIT- I Introduction: (15 Hours)

Introduction to Personal Computer: Computer System – Purposes & Characteristics of Cases - Power Supplies - Internal Components - Ports - Cables - Input devices - Output devices. Safe Lab Procedures and Tool Use: Safe Working Conditions and Procedures(ICT Class) - Tools and Software used with PC components.

UNIT – II Computer Assembly: (15 Hours)

Computer Assembly: Open Case - Install Power Supply - Attach Components to Motherboard - Installation: Motherboard - Internal Drives - Drives in External Bayes -Adapter Cards. Internal cables connections (ICT Class) -Reattach side panels- Connection of external cables-Boot the computer Preventive Maintenance and Troubleshooting (Seminar).Purpose of Preventing Maintenance-Steps of Troubleshooting Process (Assignment).

UNIT – III Fundamental Operating System: (12 Hours)

Fundamental Operating System: Purposes - Characteristics of Modern Operating Systems – Concepts Comparisons, Limitations, and Compatibilities - Determination of Operating System based on Customer Needs- Installation of Operating System (ICTClass)-Navigate a GUI (Windows) –Common PreventiveMaintenance Techniques- Troubleshoot.

UNIT–IV Fundamental Laptops and Devices: (18 Hours)

Fundamental Laptops and Portable Devices: Common Uses - Components of Laptop- Comparison of the components of Desktop and Laptops (Seminar) - Configure Laptops - Mobile Phone Standards -Preventive Maintenance Techniques - Troubleshoot Laptop and Portable Devices. Fundamental Printers and Scanners: Types of Printers and Scanners - Installation and Configuration Process(ICT Class) of Printers and Scanners - Preventive Maintenance Techniques - Troubleshoot.

UNIT–V Fundamental Networks: (15 Hours)

Fundamental Networks: Principles - Types - Concepts and Technologies - Physical Components - LAN Topologies and Architectures- Standard Organizations - Ethernet Standards - OSI and TCP/IP Models(ICT Class) - Configuration of NIC and Modem - Establishing Connectivity - Preventive Maintenance Techniques - Troubleshoot. Fundamental Security: Security Threats(Assignment) - Security Procedures - Preventive Maintenance Techniques - Troubleshoot Security

1. David Anfinson & Ken Quamme, "IT Essentials: PC Hardware and Software Companion Guide", 3rd Edition, Pearson Publications, 2008.

1. Quentin Docter, Emmett Dulaney and Toby Skandier, "CompTIA A+ Complete Review Guide: Exam 220-901, Exam 220 - 902", 3rd Edition, Wiley Publications, 2015.

1. <https://www.coursera.org/learn/system-administration-it-infrastructure-services>
2. <https://www.sciencedirect.com/topics/computer-science/system-administration>

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understood the concept of personal computer.	K2
CO 2	Gathered the knowledge of computer assembling.	K3
CO 3	Gathered the strong ideas in operating systems.	K6
CO 4	Improved the knowledge in laptop and portable devices.	K5
CO 5	Improved the knowledge in network concepts.	K1

Course Name: SYSTEM ADMINISTRATION AND MAINTENANCE						Course Code: U5R3ITDSE6:2					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	2	3	2	2	3	2	2	3	2.4
CO2	2	2	2	2	3	2	2	2	2	2	2.1
CO3	3	2	3	2	2	2	2	2	3	2	2.3
CO4	2	3	2	2	3	2	3	3	2	2	2.4
CO5	3	2	2	2	2	2	3	2	2	3	2.3
	Mean Overall Score										2.30
Mean Overall Relationship is 2.30 which is HIGH											

INTERNSHIP (U5R3ITINT)

(Carried Out in II Year Summer Vacation)

Credits: 02

Max. Marks: 100

Nature of the Course: Employability Skills

Course Objective:

1. To understand and prepare the problem statement.
2. To design and construct programs can run to complete complex computations.
3. To gain the knowledge of development tools and coding languages.
4. To create user friendly and efficient applications that are visually appealing and easy to navigate.
5. To improve the knowledge about correctness, completeness, efficiency, flexibility, consistency and maintainability.

Front End : Any Designing Tools

Back End : Any Database Tools

Methodology and Company Road map

Should submit minimum 15 page report

Course Outcomes:

Upon Completion of the Course Students would be able to		Knowledge level
CO1	Improved the analysing and designing knowledge.	K1
CO2	Design and developing tools.	K2
CO3	Improved development tools and coding languages.	K3
CO4	Developed user friendly and efficient applications.	K3
CO5	Improved the knowledge about correctness, completeness, efficiency, flexibility, consistency and maintainability.	K4

Relationship Matrix for CO, PO, PSO

Course Name: INTERNSHIP						Course Code : U5R3ITINT					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	2	2	2	2	2	2	2	2	2
CO2	3	2	3	2	3	2	3	3	3	2	2.6
CO3	2	2	3	2	3	2	3	3	2	3	2.5
CO4	3	2	2	3	3	2	2	3	3	2	2.5
CO5	3	2	3	2	2	2	3	2	2	3	2.4
	Mean Overall Score										2.4
Mean Overall Relationship is 2.4 which is HIGH											

SEMESTER - VI

CORE COURSE: 13

PHP PROGRAMMING (U6R3ITCC13)

Hours/Week: 05

Max. Marks: 100 (CIA:25+Ext.:75)

Total Hours: 75

Credits: 04

Nature of the Course: Skill Development

Objective:

1. To teach the basics of PHP programming.
2. To make a crisp understanding about Arrays and Functions in PHP.
3. To understand the concept of string functions.
4. To know the concept of handling functions.
5. To give a detailed instruction about cookies and sessions

UNIT I : INTRODUCTION

(12 Hours)

Introduction - Variables: Creating variables – creating constants – Data Types – Operators – if statement – else if statement – if else ladder statement – for loop – while loop – do while loop.

UNIT II : ARRAYS

(17 Hours)

Arrays The PHP array Functions – Extracting data from arrays – Sorting arrays. String functions – Formatting text strings – Creating Functions in PHP – using default arguments – Passing functions some data

UNIT III : OOPs

(16 Hours)

OOPs: Class-object-constructors-destructors-inheritance-interface.

UNIT IV : READING DATA IN WEB PAGES

(15 Hours)

Reading data in web pages. Handling Text Fields – Handling Checkboxes – Handling Radio button – Handling List box – Reset Button – Submit button - Handling password controls – File Upload control.

UNIT V : SESSION AND COOKIES

(15 Hours)

Session and Cookies Setting a cookie – Reading a cookie – Setting cookies' expiration – Deleting cookies – Storing data in session – Hit counter using sessions.

TEXT BOOK:

1. PHP COMPLETE REFERENCE by Steven Holzner Publication 2012, McGraw Hill Education private limited.

REFERENCE BOOK:

1. PHP&MySQL: Server –side Web Development 1st Edition – Jon Duckett, Wiley Publications, 2019

Course Outcomes:

Upon Completion of the Course Students would be able to		Knowledge level
CO1	Understood the PHP Programming.	K1
CO2	Created the knowledge of PHP Array and String functions.	K2
CO3	Gained the knowledge of string functions.	K3
CO4	Performed on handling functions.	K3
CO5	Learned an instruction about cookies and sessions.	K4

Relationship Matrix for CO, PO, PSO

Course Name: PHP PROGRAMMING						Course Code: U6R3ITCC13					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	3	3	3	2	2	3	2	2	2.4
CO2	3	2	3	2	3	2	3	2	3	2	2.5
CO3	2	2	3	2	2	3	3	2	2	3	2.4
CO4	2	2	2	3	2	3	2	3	2	2	2.3
CO5	2	2	2	3	2	3	2	3	2	2	2.3
	Mean Overall Score										2.38
Mean Overall Relationship is 2.38 which is HIGH											

CORE COURSE: 14

PHP PROGRAMMING PRACTICAL (U6R3ITCC14P)

Hours/Week: 05

Max. Marks: 100 (CIA:40+Ext.:60)

Total Hours: 75

Credits: 04

Nature of the Course: Skill Development

Objectives:

1. To develop simple programs in PHP expressions and operators.
2. To demonstrate control structures
3. To implement arrays and string functions
4. To design programs using OOPS concepts
5. To create web pages with data validation and cookies

Program List:

1. Write and Execute a PHP Program to create a student mark sheet.
2. Write and Execute a PHP Program to create a EMP payroll.
3. Write and Execute a PHP Program to change the background color
4. Write and Execute a PHP Program to format the text color, bold, underline, italic and change font style.
5. Write and Execute a PHP Program to perform String processing using functions.
6. Write and Execute a PHP Program to perform Array Processing using functions.
7. Write and Execute a PHP Program to create the Cookies.
8. Write and Execute a PHP Program to create Session.
9. Write and Execute a PHP Program to display student details from MYSQL.
10. Write and Execute a PHP Program to display employee particulars from MYSQL

TEXT BOOKS:

1. Head First PHP & MySQL: A Brain-Friendly Guide- 2009-Lynn mighley and Michael Morrison.
2. The Joy of PHP: A Beginner's Guide to Programming Interactive Web Applications with PHP and MySQL- Alan Forbes

Course Outcomes:

Upon Completion of the Course Students would be able to		Knowledge level
CO1	Developed simple programs in PHP expressions and operators.	K2
CO2	Demonstrated control structures.	K2
CO3	Gained the knowledge of Implement arrays and string functions.	K2
CO4	Developed the programs using OOPS concept.	K3
CO5	Created web pages with data validation and cookies.	K4

Relationship Matrix for CO, PO, PSO

Course Name: PHP PROGRAMMING PRACTICAL						Course Code: U6R3ITCC14P					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	3	3	2	2	2	2	2	3	2.3
CO2	3	2	3	2	3	2	3	2	3	2	2.5
CO3	2	2	3	2	2	2	3	2	2	3	2.3
CO4	2	2	2	3	2	3	2	2	2	2	2.2
CO5	2	3	2	2	2	3	3	2	2	2	2.3
	Mean Overall Score										2.32
Mean Overall Relationship is 2.32 which is HIGH											

CORE COURSE: 15**PROJECT WORK (U6R3ITCC15PW)****Hours/Week: 06****Max. Marks: 100****Total Hours: 90****Credits: 05****Nature of the Course: Employability****Objective:**

1. To understand and prepare the problem statement.
2. To design and construct programs can run to complete complex computations.
3. To gain the knowledge of development tools and coding languages.
4. To create user friendly and efficient applications that are visually appealing and easy to navigate.
5. To improve the knowledge about correctness, completeness, efficiency, flexibility, consistency and maintainability.

Front End: WEB Design Tools**Middle End: Server Side Scripting Languages****Back End: RDBMS Packages****Course Outcomes:**

Upon Completion of the Course Students would be able to		Knowledge level
CO1	Students can have improved the analysing and designing knowledge.	K1
CO2	Talented individual with in-depth knowledge of designing and developing tools.	K2
CO3	Improved development tools and coding languages.	K3
CO4	Developed user friendly and efficient applications.	K3
CO5	Improved the knowledge about exactness.	K4

Relationship Matrix for CO, PO, PSO

Course Name: PROJECT WORK						Course Code : U6R3ITCC15PW					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	3	3	2	2	2	2	2	2	2.2
CO2	3	2	3	2	3	2	2	2	3	2	2.4
CO3	2	2	3	2	2	2	2	2	3	3	2.3
CO4	2	2	2	2	3	3	2	3	2	2	2.3
CO5	2	3	2	3	2	3	2	2	2	3	2.4
	Mean Overall Score										2.32
Mean Overall Relationship is 2.32 which is HIGH											

DISCIPLINE SPECIFIC ELECTIVE: 7

SOFTWARE ENGINEERING (U6R3ITDSE7:1)

Hours/Week: 05

Max. Marks: 100 (CIA: 25+Ext.:75)

Total Hours: 75

Credits: 03

Nature of the Course: Skill Development

Objectives:

1. To teach the students the basic concepts of software engineering.
2. To know the concept of cost estimation.
3. To impart inbound knowledge about software life cycle.
4. To understand the concept of design notations and techniques.
5. To give them proper guidelines to implementation, verification and validation.

UNIT-I : INTRODUCTION

(14 Hours)

Software engineering – The software process – Process models: A generic process model – Process assessment and improvement – Prescriptive process models – Specialized process models.

UNIT-II : REQUIREMENTS MODELLING

(17 Hours)

Requirements modelling: Requirements analysis – Scenario-based modelling – UML models that supplement the use case – Data modelling concepts – Class based modelling – Creating a behavioural model – Patterns for requirements modelling.

UNIT-III : DESIGN CONCEPTS

(16 Hours)

Design concepts: The design process – Design concepts – The design model.

UNIT-IV : TESTING CONVENTIONAL APPLICATIONS

(13 Hours)

Testing conventional applications: Software testing fundamental – Internal and external views of testing – White box testing – Basis path testing – control structure testing – block box testing.

UNIT-V : SOFTWARE CONFIGURATION MANAGEMENT

(15 Hours)

Software configuration management: Software configuration management – The SCM repository - The SCM process – Configuration management for webapps

Text Book:

1. Software Engineering concepts, Richard E.Fairley, Tata McGraw Hill Publishing company Limited.2003 Reprint.

Reference Book:

1. Pressman, Roger S., Software engineering, A practitioner's approach, Sixth edition, McGraw-Hill International edition, 2005 (ISBN 007-124083-7)

Course Outcomes:

Course Outcomes:		
Upon Completion of the Course Students would be able to		Knowledge level
CO1	Understood the basic concepts of software engineering	K1
CO2	Understood the various cost estimation technique.	K2
CO3	Gained the knowledge of software life cycle models.	K2
CO4	Developed the design notation and techniques.	K3
CO5	Understood and implemented, verification and validation method.	K4

Relationship Matrix for CO, PO, PSO

Course Name SOFTWARE ENGINEERING						Course Code : U6R3ITDSE7:1					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	2	3	2	2	2	2	2	2	2.1
CO2	3	2	3	2	3	2	2	2	3	2	2.4
CO3	2	2	3	2	2	2	2	2	2	3	2.2
CO4	2	2	2	2	2	3	2	2	2	2	2.1
CO5	2	3	2	2	2	3	2	2	2	2	2.2
	Mean Overall Score										2.20
Mean Overall Relationship is 2.20 which is HIGH											

DISCIPLINE SPECIFIC ELECTIVE: 7

ARTIFICIAL INTELLIGENCE (U6R3ITDSE7:2)

Hours/Week: 05

Max. Marks: 100 (CIA:25+Ext.:75)

Total Hours: 75

Credits: 03

Nature of the Course: Skill Development

Objectives:

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

(16 Hours)

Introduction: 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

(13 Hours)

Search

Algorithms: 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

(16 Hours)

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

UNIT IV : MARKOV DECISION PROCESS

(14 Hours)

Markov Decision process: MDP formulation, utility theory, utility functions, value iteration, policy iteration and partially observable MDPs.

UNIT V : REINFORCEMENT LEARNING

(16 Hours)

Reinforcement Learning: Passive reinforcement learning, direct utility estimation, adaptive dynamic programming, temporal difference learning, active reinforcement learning- Q learning

TEXT BOOK

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

REFERENCE BOOKS

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

Web Resources

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

Course Outcomes:

Upon Completion of the Course Students would be able to		Knowledge level
CO1	Gained the knowledge about problem formulation and state space representation.	K2
CO2	Understood the various searching Methods	K2
CO3	Gained the knowledge about Reasoning for Probabilistic and Networks	K2
CO4	Developed the Markov Decision process concept.	K3
CO5	Learned the concept of Reinforcement Learning.	K4

Relationship Matrix for CO, PO, PSO

Course Name: ARTIFICIAL INTELLIGENCE						Course Code: U6R3ITDSE7:2					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	3	2	3	3	2	2	2	2	2	2.3
CO2	3	2	3	2	3	2	2	2	3	3	2.5
CO3	2	2	3	2	2	2	3	2	2	3	2.3
CO4	2	2	2	2	2	3	3	2	2	2	2.2
CO5	2	3	2	2	2	3	2	3	2	2	2.3
	Mean Overall Score										2.32
Mean Overall Relationship is 2.32 which is HIGH											

DISCIPLINE SPECIFIC ELECTIVE: 8

BIG DATA ANALYTICS (U6R3ITDSE8:1)

Hours/Week: 05

Max. Marks: 100 (CIA: 25+Ext.:75)

Total Hours: 75

Credits: 03

Nature of the Course: Skill Development

Objectives:

1. To understand the concept of digital data.
2. To identify and understand the basics of big data analytics.
3. To study about the Big data technology.
4. To learn about the concept of Hadoop
5. To understand the concepts of Hadoop Eco system.

UNIT I : INTRODUCTION

(14 Hours)

Introduction – types of digital data – Classification of digital data – Introduction to big data – Characteristics of data Evolution of Big data – Definition of Big data – Challenges with Big data.

UNIT II : BIG DATA ANALYTICS

(16 Hours)

Big data Analytics: What is Big data analytics? – Classification of analytics – Data science – Data scientist – Terminologist used in Big data environmental.

UNIT III : BIG DATA TECHNOLOGY

(14 Hours)

Big data technology: NoSQL – Types of NoSQL – Advantages of NoSQL – Use of NoSQL in Industry – NoSQL vendors – SQL Vs NoSQL – NEWSQL – Comparison of SQL, NoSQL and NEWSQL.

UNIT IV : HADOOP

(16 Hours)

Hadoop: Feature of Hadoop – Hadoop Distribution – Hadoop Vs SQL – Hadoop overview – HDFS – Processing data with Hadoop.

UNIT V : HADOOP ECO SYSTEM

(15 Hours)

Hadoop Eco system: Pig, Hive, Sqoop, Hbase – Introduction to MongoDB – Introduction to Cassandra.

Text Book

1. Seema Acharya, Big Data Analytics – Biley 2015.

Reference Books

1. David Loshin, “Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph”, Morgan Kaufmann/El sevier Publishers, 2013
2. EMC Education Services, “Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data”, Wiley publishers, 2015.
3. AnandRajaraman and Jeffrey David Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2012.

Web Resources:

1. <https://www.simplilearn.com>
2. https://www.sas.com/en_us/insights/analytics/big-data-analytics.html

Course Outcomes:

Upon Completion of the Course Students would be able to		Knowledge level
CO1	Understood the concept of digital data and its types.	K1
CO2	Identified and understood the basics concept of classification of big data analytics and terminology.	K2
CO3	Learned the concept for NoSQL and NEWSQL.	K2
CO4	Gained the knowledge about Hadoop Concept.	K3
CO5	Learned the concept of Hadoop Eco System.	K4

Relationship Matrix for CO, PO, PSO

Course Name: BIG DATA ANALYTICS						Course Code: U6R3ITDSE8:1					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	2	2	3	2	2	2	2	2	2.3
CO2	3	2	3	2	3	2	3	2	3	3	2.6
CO3	2	2	3	2	2	2	3	2	2	3	2.3
CO4	2	2	2	3	2	3	2	2	2	2	2.2
CO5	2	3	2	2	3	2	3	3	2	2	2.4
	Mean Overall Score										2.36
Mean Overall Relationship is 2.36 which is HIGH											

DISCIPLINE SPECIFIC ELECTIVE: 8
IMAGE PROCESSING (U6R3ITDSE8:2)

Hours/Week: 5
Total Hours: 75

Max. Marks: 100 (CIA: 25+Ext.:75)
Credit: 3

Nature of the Course: Skill Development

Objectives

1. To provide complete knowledge on Digital Image Processing method.
2. To gain knowledge about processing methods in spatial domain.
3. To gain knowledge about frequency domain
4. To understand the concepts of color image processing.
5. To understand the concept of representation and description

UNIT I : INTRODUCTION

(16 Hours)

Introduction – digital image processing – origins of digital image processing – Examples of fields that use digital image processing – fundamental steps in digital image processing – components of an image processing systems.

UNIT II: DIGITAL IMAGE FUNDAMENTALS

(15 Hours)

Digital image fundamentals: Elements of visual perception – light and the electromagnetic spectrum. Image enhancement in the spatial domain: Background – Some basic gray level transformations – Histogram processing – enhancement using arithmetic / logic operation.

UNIT III: IMAGE ENHANCEMENT IN THE FREQUENCY DOMAIN (14 Hours)

Image enhancement in the frequency domain: Background – smoothing frequency – domain filters – sharpening frequency domain filters – Homomorphic filtering.

UNIT IV: COLOR IMAGE PROCESSING

(13 Hours)

Color image processing: color fundamentals – color models – smoothing and sharpening – color segmentation – noise in color images – color image compression.

UNIT V: REPRESENTATION AND DESCRIPTION

(17 Hours)

Representation and description: Representation – Boundary descriptors – Regional descriptors – Relational descriptors.

Text Book:

1. Rafael C. Gonzalez, Richard E. Woods – “Digital Image Processing”, Second Edition, Prentice – Hall India, 2005.

Reference Books:

1. B. Chanla, D. Dutta Majumder, "Digital Image Processing and Analysis", PHI 2003.
2. Todd R. Reed, "Digital Image Sequence Processing Compression and analysis", CRC press, 2015.

Course Outcomes:

Upon Completion of the Course Students would be able to		Knowledge level
CO1	Developed simple programs in PHP expressions and operators.	K1
CO2	Demonstrated control structures.	K2
CO3	Gained the knowledge of Implement arrays and string functions.	K2
CO4	Developed the programs using OOPS concept.	K3
CO5	Created web pages with data validation and cookies.	K4

Relationship Matrix for CO, PO, PSO

Course Name: IMAGE PROCESSING						Course Code: U6R3ITDSE8:2					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	2	3	2	2	2	2	2	2	2.1
CO2	3	3	2	2	2	3	2	3	2	2	2.4
CO3	2	2	2	2	2	3	2	2	2	2	2.1
CO4	2	2	3	2	2	2	2	3	2	2	2.2
CO5	2	2	2	2	2	2	3	2	3	3	2.3
	Mean Overall Score										2.22
Mean Overall Relationship is 2.22 which is HIGH											

SKILL ENHANCEMENT COURSE: 7

RUBY PROGRAMMING (U6R3ITSEC7:1)

Hours/Week: 02

Max. Marks: 100 (CIA:25+Ext.:75)

Total Hours: 30

Credits: 02

Nature of the Course: Skill Development

Objectives:

1. To understand the basic concept of Ruby programs.
2. To gain the knowledge in data types, arrays and Hashes.
3. To know the concept of objects.
4. To understand the concept of statements and control structures.
5. To gain the knowledge about classes and modules.

Unit – I: INTRODUCTION

(5 Hours)

Introduction – Ruby is object oriented – blocks and Iterations – The structure and execution of Ruby programs: Lexical structure – comments – literals – Identifiers- Keywords – White space – Syntactic structure – File Structure – Program encoding – Program execution.

Unit – II: DATATYPES

(5 Hours)

Data types: Numbers – Text – Arrays – Hashes – Ranges – Symbols.

Unit – III: OBJECT

(7 Hours)

Objects: Object references – Object life time – Object Identity – Object class and Object types – Object equality – Object order – Object conversion.

Unit – IV: STATEMENTS AND CONTROL STRUCTURES

(6 Hours)

Statements and control structures: Conditionals – Loops- Iterations and enumerable objects – Blocks

Unit – V: CLASSES AND MODULES

(7 Hours)

Classes and Modules: Defining a simple class – Method visibility: Public, Product, Private – Sub classing and Inheritance.

Text Book:

1. David Flanagan and Yukihiro Matsumoto, “Ruby Programming Language, O’REILLY Publication, First Edition, 2008.

Reference Book:

1. Michael Hartl’s, Ruby on Rails Tutorial, Third edition, Addison wesley.
2. Sandi Metz, Practical Object-Oriented Design in Ruby, First Edition, Addison wesley.

Web Recourses:

1. https://www.tutorialspoint.com/ruby/ruby_overview.htm
2. <https://rubyonrails.org/>

Course Outcomes:

Upon Completion of the Course Students would be able to		Knowledge level
CO1	Understood the basic concept of Ruby programs.	K1
CO2	Improved knowledge in data types, arrays and Hashes.	K1
CO3	Improved knowledge in OOPs	K2
CO4	Understood the concept of statements and control structures.	K3
CO5	Gained the knowledge about classes and modules.	K4

Relationship Matrix for CO, PO, PSO

Course Name: RUBY PROGRAMMING						Course Code: U6R3ITSEC7:1					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	3	2	2	2	2	2	2	3	2.2
CO2	3	2	2	3	2	2	3	2	3	2	2.4
CO3	2	2	2	3	3	2	3	2	2	2	2.3
CO4	2	2	2	2	3	2	2	3	2	2	2.2
CO5	3	2	2	2	2	2	2	2	2	3	2.2
	Mean Overall Score										2.26
Mean Overall Relationship is 2.26 which is HIGH											

SKILL ENHANCEMENT COURSE: 7

CLOUD COMPUTING (U6R3ITSEC7:2)

Hours/Week: 02

Max. Marks: 100 (CIA: 25+Ext.:75)

Total Hours: 30

Credits: 02

Nature of the Course: Skill Development

Objectives:

1. To impart fundamental concepts in the area of cloud computing.
2. To impart knowledge in applications of cloud computing.
3. To understanding the systems, protocols and mechanisms to support cloud computing.
4. To understanding the hardware necessary for cloud computing.
5. To know the concept of cloud infrastructure and services.

UNIT I: CLOUD COMPUTING BASICS AND BENEFITS (5 Hours)

Overview: Applications- Intranet and the cloud – First Movers in the cloud – Organization and Cloud Computing: Benefits – Limitations – Security concerns –Regulatory issues.

UNIT II: CLOUD COMPUTING WITH THE TITANS (7 Hours)

Google - EMC – NetApp – Microsoft – Amazon – Salesforce.com - IBM.

UNIT III: BUSINESS CASE FOR THE CLOUD (6 Hours)

Cloud Computing Services - How those applications help our Business – Deleting the Data Centre – Salesforce.com – Thomson Reuters – Hardware and Infrastructure: Clients – Security – Network – Services.

UNIT IV: ACCESSING THE CLOUD (7 Hours)

Platforms – Web applications – Web API – Web Browsers - Cloud storage – Storage Providers.

UNIT V: BEST PRACTICES (5 Hours)

Standards: Application – Client – Infrastructure – Service- Best practices and the cloud computing: Analyze the service- Best practices – How cloud computing might evolve.

TEXT BOOK

1. Cloud Computing - A Practical Approach by Anthony T. Velte, Toby J.Velte , Robert Elsenpeter, Tata McGraw-Hill Edition-2010.

REFERENCE BOOK

1. Cloud Computing by Kris Jamsa, Jones & Bartlett student edition .

WEB RESOURCES:

1. www.eduonix.com/courses/Software-Development/Learn-Cloud-Computing-from-Scratch-for-Beginners
2. www.udemy.com/course/introduction-to-cloud-computing
3. explore.skillbuilder.aws/learn/public/learning_plan/view/82/cloud-foundations-learning-plan

Course Outcomes:

Upon Completion of the Course Students would be able to		Knowledge level
CO1	Understood the fundamental concept of Cloud computing.	K1
CO2	Created the knowledge of cloud applications.	K2
CO3	Understood the systems, protocols and mechanisms to support cloud computing.	K2
CO4	Learned the different types of browsers.	K3
CO5	Learned a detailed about infrastructure and services.	K4

Relationship Matrix for CO, PO, PSO

Course Name: CLOUD COMPUTING						Course Code: U6R3ITSEC7:2					
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	3	2	3	3	2	2	2	2	2	2.3
CO2	3	2	3	2	3	2	2	2	3	3	2.5
CO3	2	2	3	2	2	2	3	2	2	3	2.3
CO4	2	2	2	2	2	3	3	2	2	2	2.2
CO5	2	3	2	2	2	3	2	3	2	2	2.3
	Mean Overall Score										2.32
Mean Overall Relationship is 2.32 which is HIGH											