Programme : B. Voc. (Information Technology)

PROGRAMME OUTCOMES

After successful completion of the B. Voc. (I. T.) Programme, the students will posses

PO No.	PROGRAMME OUTCOMES
PO1	**Disciplinary Knowledge :** Disseminate and demonstrate appropriate understanding on facts, concepts, principles theories and techniques in the disciplines of study by developing suitable applications.
PO2	**Analytical Reasoning :** Ability to analyze, synthesize and interpret domain specific facts or data accurately to determine the right course of action.
PO3	**Critical Thinking :** Critically think and develop new techniques, evaluate practices and theories by employing scientific approach to knowledge development.
PO4	**Problem Solving Skills :** Apply the acquired competencies to solve diversified real life problems related with the area of study and its interlinked fields.
PO5	**Communication Skills and Digital Literacy :** Able to communicate effectively and appropriately and be able to handle digital devices, tools and applications to accomplish professional responsibilities.
PO6	**Employability and Entrepreneurial Skills :** Possess employability skills acquired through industrial training and internships on the opted NSQF (National Skill Qualification Framework) Job Roles or exhibit entrepreneurial skills to establish own businesses.
PO7	**Team Work and Leadership Qualities :** Able to work effectively with coordinated efforts as a team and be able to facilitate and motivate the members of the team to move forward in the right direction to reach the goal or achieve the target.
PO8	**Ethical, Moral and Social Awareness :** Appreciate and embrace moral values in life and follow ethical practices in every social and professional ventures.
PO9	**Self-Directed and Lifelong Learning :** Aptitude to handle every professional or personal role independently and efficiently by diligent acquisition of knowledge and skills throughout the life.

PROGRAMME SPECIFIC OUTCOMES

After successful completion of the B. Voc. (I. T.) Programme, the students will posses

PO No.	PROGRAMME SPECIFIC OUTCOMES
PSO1	**Foundational Knowledge :** Make use of the fundamental principles of Information Technology, Computing Systems and Database Applications, Software Tools, Data Structures, Algorithms and Mathematical Aptitude to build solutions for real world problems.
PSO2	**Software Design and Application Development Skills :** Utilize the concepts of Database, Networking, Multimedia and Operating Systems to design and develop Software Applications for a variety of environments using programming languages and tools such as C, C++, Java, PHP, MySQL, Python etc. employing Software Engineering principles and practices
PSO3	**Technical Skills :** Able to work with confidence on areas of current technological developments involving Internetworking, Information Security, Mobile Computing, Distributed Computing and Internet of Things along with their standards, protocols, architectures and services.
PSO4	**Personal and Professional Attributes :** Exhibit effectiveness in communicating and promoting services and products and also be able to handle personal and professional responsibilities ethically, restricting all activities within the legal boundaries.

Department of Information Technology
Bishop Heber College (Autonomous), Tiruchirappalli – 620 017

B. Voc. (Information Technology)
(Syllabus for students admitted from 2023 – 2024 Onwards)

Features of the Programme :
- ➢Skill Oriented Curriculum to meet the Industry Requirements.
- ➢Curriculum Aligned to the Qualification Packs specified by the NSDC. ➢ Industry involvement in Training and Development of Skills.
- ➢Academic flexibility with multiple entries and exits.
- ➢Vertical Mobility in higher education leading to Research.
- ➢Awarded with both the University Degree and the NSDC Partner Certification (NASSCOM) on successful completion of the Programme.
- ➢Empowerment to become an Entrepreneur.
- ➢Placement opportunities provided through Industry Partners.

Eligibility : 10 +2 or its equivalent in any stream

Duration	Award	NSQF Level	Credits Earned
1st Semester	Certificate in Information Technology	4	30
1st Year	Diploma in Information Technology	5	60
2nd Year	Advanced Diploma in Information Technology	6	120
3rd Year	B. Voc. Degree in Information Technology	7	180

Bishop Heber College (Autonomous), Tiruchirappalli–620 017
B. Voc. (Information Technology)
(Programme Structure for Students Admitted from 2023 – 2024 onwards)

Semester I – NSQF Level 4
(Qualification Pack : SSC/Q0508 – Junior Software Developer)

Component	Course Type		Course Title	Course Code	Credits	Hours per Week	MARKS		
							CIA	ESE	Total
General Component	Part - I	Language – 1	Language – 1 (Tamil / Hindi / French)	U23TM1L1	03	06	25	75	100
	Part-II	English – 1	English – 1	U23EG1L1	03	06	25	75	100
	Part-III	Core Theory–1	Fundamentals of Information Technology	U23IT101	03	03	25	75	100
		Core Theory–2	Programming with C and C++	U23IT102	03	03	25	75	100
			TOTAL (General Components)		12	18			
Skill Component	Part - III	Core Lab – 1	PC Software Packages Practical	U23IT1P1	04	04	40	60	100
		Core Lab – 2	C and C++ Programming Practical	U23IT1P2	04	04	40	60	100
		Allied – 1	Mathematics for Competitive Examinations – 1	U23ITM01	04	04	40	60	100
		Project Work-1	Project Work – 1	U23IT1PJ	04	-	40	60	100
	Part-IV	Foundation Course	Fundamentals of Web Design	U23IT1N1	02	-	100	-	100
TOTAL (Skill Components)					18	12			
			GRAND TOTAL		30	30			

Semester II – NSQF Level 5
(Qualification Pack : SSC/Q0801 – Infrastructure Engineer)

Component	Course Type		Course Title	Course Code	Credits	Hours per Week	MARKS		
							CIA	ESE	Total
General Component	Part – I	Language – 2	Language – 2 (Tamil / Hindi / French)	U23TM2L2	03	06	25	75	100
	Part – II	English – 2	English – 2	U23EG2L2	03	06	25	75	100
	Part –III	Core Theory – 3	Java Programming and Database Management Systems	U23IT203	03	03	25	75	100
		Core Theory – 4	Computer Networks	U23IT204	03	03	25	75	100
			TOTAL (General Components)		12	18			
Skill Component	Part –III	Core Lab – 3	Java and DBMS Practical	U23IT2P3	04	04	40	60	100
		Core Lab– 4	Computer Hardware and Networking Practical	U23IT2P4	04	04	40	60	100
		Allied – 2	Mathematics for Competitive Examinations – 2	U23ITM02	04	04	40	60	100
		Project Work – 2	Project Work – 2	U23IT2PJ	04	-	40	60	100
	Part-IV	SEC – 1	Personal Effectiveness	U23IT2S1	02	-	100	-	100
			TOTAL (Skill Components)		18	12			
			GRAND TOTAL		30	30			

Semester III – NSQF Level 6
(Qualification Pack : SSC/Q0509 – Master Trainer for Software Developer)

Component	Course Type		Course Title	Course Code	Credits	Hours per Week	MARKS		
							CIA	ESE	Total
General Component	Part – I	Language – 3	Language – 3 (Tamil / Hindi / French)	U23TM3L3	03	06	25	75	100
	Part – II	English – 3	English – 3	U23EG3L3	03	06	25	75	100
	Part – III	Core Theory – 5	.NET Programming	U23IT305	03	03	25	75	100
		Core Theory – 6	Data Structures and Algorithms	U23IT306	03	03	25	75	100
			TOTAL (General Components)		**12**	**18**			
Skill Component	Part – III	Core Lab– 5	.NET Programming Practical	U23IT3P5	04	04	40	60	100
		Core Lab – 6	Data Structures and Algorithms Practical	U23IT3P6	04	04	40	60	100
		Allied – 3	Digital Logic Circuits Practical	U23IT3P7	03	03	40	60	100
		Project Work – 3	Project Work – 3	U23IT3PJ	04	-	40	60	100
	Part-IV	SEC – 2	Entrepreneurial Skill	U23IT3S2	01	-	100	-	100
		SEC – 3	Life Skills	U23IT3S3	02	-	100		100
			Environmental Science	U23EST41	-	01	-	-	-
			TOTAL (Skill Components)		**18**	**12**			
			GRAND TOTAL		**30**	**30**			

Semester IV – NSQF Level 6
(Qualification Pack : SSC/Q0509 – Master Trainer for Software Developer)

Component	Course Type		Course Title	Course Code	Credits	Hours per Week	MARKS		
							CIA	ESE	Total
General Component	Part – I	Language – 4	Language – 4 (Tamil / Hindi / French)	U23TM4L4	03	06	25	75	100
	Part – II	English – 4	English – 4	U23EG4L4	03	06	25	75	100
	Part – III	Core Theory – 7	Operating Systems	U23IT407	03	03	25	75	100
		Core Theory – 8	Mobile Application Development	U23IT408	03	03	25	75	100
			TOTAL (General Components)		**12**	**18**			
Skill Component	Part – III	Core Lab – 7	Operating Systems Practical	U23IT4P8	04	04	40	60	100
		Core Lab – 8	Mobile Application Development Practical	U23IT4P9	04	04	40	60	100
		Allied – 4	Assembly Language Programming Practical	U23ITP10	03	03	40	60	100
			Project Work – 4	U23IT4PJ	04	-	40	60	100
	Part-IV	SEC-4	Service Learning	U23IT4S4	01	-	100	-	100
			Environmental Studies	U23EST41	02	1	100	-	100
			TOTAL (Skill Components)		**18**	**12**			
			GRAND TOTAL		**30**	**30**			

Semester V – NSQF Level 7
(Qualification Pack : SSC/Q0501 –Software Developer)

Component	Course Type		Course Title	Course Code	Credits	Hours per Week	MARKS		
							CIA	ESE	Total
General Component	Part - III	Core Theory – 9	Programming with PHP and MySQL	U23IT509	03	03	25	75	100
		Core Theory – 10	Information Security	U23IT510	03	03	25	75	100
		Elective – 1	(A) Software Engineering / (B) Software Testing / (C) Software Project Management	U23IT5:A U23IT5:B U23IT5:C	02	03	25	75	100
		Elective – 2	(A) Multimedia Technologies / (B) Computer Graphics / (C) Digital Image Processing	U23IT5:D U23IT5:E U23IT5:F	02	03	25	75	100
		VLOE	Value and Life Oriented Education	*U23VLO51/ U23VLO52*	02	02	100	-	100
			TOTAL (General Components)		12	14			
Skill Component	Part - III	Core Lab – 9	PHP and MySQL Practical	U23ITP11	05	06	40	60	100
		Core Lab – 10	Information Security Practical	U23ITP12	05	06	40	60	100
		Core Lab – 11	Multimedia Practical	U23ITP13	04	04	40	60	100
		Project Work - 5	Project Work – 5	U23IT5PJ	04	-	40	60	100
			TOTAL (Skill Components)		18	16			
			GRAND TOTAL		30	30			

Semester VI – NSQF Level 7
(Qualification Pack : SSC/Q0501 –Software Developer)

Component	Course Type		Course Title	Course Code	Credits	Hours per Week	MARKS		
							CIA	ESE	Total
General Component	Part - III	Core Theory – 11	Programming with Python	U23IT611	03	03	25	75	100
		Core Theory – 12	Internet of Things	U23IT612	03	03	25	75	100
		Elective – 3	(i) Weh Service Technologies / (ii) Open Source Technologies / (iii) Distributed Computing Technologies	U23IT6:A U23IT6:B U23IT6:C	03	03	25	75	100
		Elective - 4	(i) User Interface Design / (ii) Artificial Intelligence / (iii) Human Computer Interface	U23IT6:D U23IT6:E U23IT6:F	03	03	25	75	100
			TOTAL (General Components)		12	12			
Skill Component	Part - III	Core Lab-12	Python Programming Practical	U23ITP14	04	06	40	60	100
		Core Lab-13	Internet of Things Practical	U23ITP15	04	06	40	60	100
		Core Lab -14	React JS Practical	U23ITP16	03	04	40	60	100
			Project Work – 6	U23IT6PJ	04	-	40	60	100
			Skills Enhancement for IT Professionals	U23IT6G1	02	02	100	-	100
			Extension Activity	U23ETA61	01	-	-	-	-
			TOTAL (Skill Components)		18	18			
			GRAND TOTAL		30	30			

Core Theory – 1: FUNDAMENTALS OF INFORMATION TECHNOLOGY

COURSE CODE: U23IT101   HOURS PER WEEK :3
SEMESTER:I   CREDITS : 3

COURSE OBJECTIVES:

To understand the concepts and technologies associated with the Computer Hardware, Software, Database Management, Communication Networks, World Wide Web, Information Security, Multimedia and other recent advancements in the fields of Computing, Communication and Information Technologies.

COURSE OUTCOMES:

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

CO. No.	Course Outcomes	Level	Unit
CO1	Illustrate the basic concepts of computers, classification, generations of computers and architecture of computers.	K2	I
CO2	Develop hardware, Software and Database Management system principles.	K3	II
CO3	Discover the recent advancements in the field of computing and telecommunications Internet and Intranet.	K4	III
CO4	Criticize computer Security, virtual reality and Multimedia Content Creation.	K5	IV
CO5	Recommend the techniques of Artificial Intelligence, Business Intelligence and Data warehouse in Information Technology.	K5	V
CO6	Build applications on computers in the field of education, training, science, engineering and other Recent Technologies.	K6	V

UNIT - 1

Introduction to Computer Systems: Introduction to Computers – Generations of Modern Computers – Classification of Digital Computer Systems – Anatomy of a Digital Computer – Computer Architecture – The Number System – Central Processing Unit and Memory Units – Secondary Storage Devices – Input Devices – Output Devices

UNIT - 2

Computer Software and Software Development: Introduction to Computer Software & Software Development – Programming Languages – Operating Systems – General Software Features and Trends.

UNIT - 3

Telecommunications: Introduction–Computer Networks–Communication Systems–Distributed Data Processing–**Internet and Intranets:** Internet & WWW–Overview of Electronic mail–Introduction to Intranets–Introduction to E-Commerce and E-Business–Introduction to Web Design–Overview of Web Technologies

UNIT - 4

Security: Introduction to Computer Security – Cryptography – Computer Viruses, Bombs, and Worms – **Multimedia and Virtual Reality:** Introduction to Multimedia – Multimedia and its applications – Introduction to Virtual Reality

UNIT - 5

New Technologies in Information Technology: Introduction to Hypermedia – Artificial Intelligence and Business Intelligence – Knowledge Discovery in Database – Data Warehouses and Data Marts – Data Mining and OLAP – ERP. **Applications of Information Technology:** Computers in Business and Industry – Home – Education and Training – Entertainment, Science, Medicine and Engineering – Mobile computing and Business on the Internet

TEXT BOOK

1. Alexis Leon, Mathews Leon, "**Fundamentals of Information Technology**", Second Edition, Vikas Publishing House Pvt. Ltd., Chennai, 2009.

REFERENCE BOOK

1. Reema Thareja, **"Fundamentals of Computers",** Oxford University Press, 2014.

Core Theory – 2 : PROGRAMMING WITH C and C++

COURSE CODE :   U23IT102   **HOURS PER WEEK :3**
SEMESTER:I   **CREDITS : 3**

COURSE OBJECTIVES :
To acquire problem solving and programming skills with the facilities in C and C++languages.

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO. No.	Course Outcomes	Level	Unit
CO1	Define the basic structure of program and concepts of programming languages.	K1	I
CO2	Explain the representation of Arrays, Functions, Structures and Unions	K2	II
CO3	Experiment with the usage of pointers and files	K3	III
CO4	Examine the concept of Object Oriented Programming	K3	IV
CO5	Build the object instantiation using constructors and destructors	K4	IV
CO6	Construct the hierarchy and reusability of code	K5/K6	V

UNIT - 1
Overview of C: History-Importance of C–Sample Programs-Basic Structure of C programs-Character Set–C tokens–keywords and Identifiers–Constants–Variables–Data types–Declaration of variables–Assigning values to variables–Symbolic constants.-**Operators and Expressions:** Introduction–Arithmetic Operators–Relational Operators–Logical operators–Assignment Operators–Increment and Decrement operators–Conditional operators-Bitwise Operators–Special Operators–Expressions–**Decision making and Branching:** If statement, Switch Statement – goto Statement – **Decision Making and Looping:** While – Do-while – For loop.

UNIT - 2
Arrays: One, Two and Multidimensional arrays – **Functions :** User defined functions –Mathematical and String Handling functions- Category of functions – Recursion – Scope and life time of variables in functions. - **Structures and Unions:** Introduction – Structure definition – Giving values to members – Structure Initialization – Comparison of Structure variables – Arrays of structures – Arrays within structures – Structures within structures – Structures and functions – Unions.

UNIT - 3
Pointers: Introduction – Understanding pointers – Accessing the address of a variable through input pointer – Pointer expressions – Pointer Increments and Scale factor – Pointers and Arrays – Pointers and character strings **File Management:** Introduction – Defining and opening a file – Closing a file – Input or Output operations on files – Error handling during I/O operations – Random access to files – Command line arguments. Preprocessors.

UNIT - 4
Introduction to Object Oriented Programming: OOP Paradigm - OOP Concepts – Benefits of OOP – OOP Languages – Functions in C++ - Classes and Objects – Constructors and Destructors – Operator Overloading.

UNIT - 5
Inheritance-Virtual Functions – Polymorphism – Managing Console Operations – Working with Files

TEXT BOOKS
1. E. Balagurusamy, "**Programming in ANSI C**", Tata McGraw-Hill Publishing Company Ltd. 2. E. Balagurusamy, "**Object Oriented Programming with C++**", 5th Edition, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2011.

REFERENCE BOOKS
1. Ashok N. Kamthane, "**Programming with ANSI and TURBO C**", Pearson Education, 2004. 2. Herbert Schildt, "**C++ The Complete Reference**", 5th Edition, McGraw Hill Education, 2012.

Core Lab 1: PC SOFTWARE PACKAGES PRACTICAL

COURSE CODE: U23IT1P1   **HOURS PER WEEK :4**
SEMESTER:I   **CREDITS : 4**

COURSE OBJECTIVES :
To acquire hands on training to effectively use MS-Office tools such as MS-Word, MS-Powerpoint, MS-Excel and MS-Access.

COURSE OUTCOMES
COURSE OUTCOMES
After the successful completion of this course, the students will be able to

CO No.	Course Outcomes	Level	Exercise
CO1	Create documents using MS-Word, spreadsheets using MS-Excel, presentations using MS-PowerPoint and database using MS-Access	K3	1,7,11,16
CO2	Develop table, paragraph. and operations.in Ms Word and MS Access	K3	3,4,15,17,18,19
CO3	Examine Mail Merge and Excel chart in MS. Word	K4	5,6
CO4	Determine function, data analysis and manipulation in MS. Excel	K5	8,9,10
CO5	Evaluate Master Slide, graphics and Animations in MS PowerPoint	K5	12,13,14
CO6	Test data, queries, forms and Report in Ms. Access	K6	20,21,22

MS – WORD
1. Creating Documents and Performing the Basic Operations
    (i) Cutting, copying, and Pasting text.
    (ii) Bullets and Numbering
2. Manipulating Documents
    (i) Font Type, Font Size, Font Color.
    (ii) Using Auto Shapes
    (iii)Working with Smart Art and Clip Art
3. Working with Tables
    (i) Table Background Color, Border Color, Border Style.
    (ii) Modifying Table Style, Caption.
    (iii) Merging, Splitting Columns, Inserting, Deleting Rows, Columns.
4. Working with Paragraph
    (i) Paragraph Columns, Drop Cap, Indentation and Underlining Styles.
    (ii) Inserting Pictures, Page Borders and Shading.
    (iii) Using Water mark, Header and Footer
    (iv) Implementing Document Password.
    (v) Setting Page Orientation and Margins.
5. Working with Mail Merge.
6. Employing Excel chart in Ms Word.

MS – EXCEL
7. Creating new Spreadsheet
    (i) Opening, Saving Worksheets.
    (ii) Formatting Cells.
8. Manipulate with Function
    (i) Student Mark List.
    (ii) Electricity Bill.
    (iii) Salary Bill Preparation
    (iv) Perform Sorting (Ascending, Descending, Custom.)
9. Data Analysis
    (i) Splitting Text into Cell.
    (ii) Data Filtering.
    (iv) Data Consolidation.
10. Data Manipulation
    (i) Usage of Dropdown Controls
    (ii) Usage of Line, Column and Pie Charts
    (iii) Importing and Exporting Text Files, Removing Duplicates **MS –**

POWER POINT

11. Creating a new presentation
    (i) Opening and Saving Power Point Presentations.
    (ii) Employing Header and Footer, Slide Number, Pictures (iii)
    Equation and Symbols
    (iv) Colors and Shapes
    (v) Working with Flow Charts
12. Build on Animation and Multimedia to slides
    (i) Transitions and Animations
    (ii) Creating Presentation as Slide Show and Video
    (iii) Usage of Action and Link Buttons
13. Designing the Presentation to slides
    (i) Shapes; Callouts, Stars and Banners
    (ii) Creating Master Slide
    (iii) Using Outline View
14. Applying Graphics
  (i) Employing Smart Art
  (ii) Employing Themes and Variants
  (iii) Word Art and Clip Art
15. Inserting Table using with various types of Charts into presentations

MS – ACCESS

16. Creating a new Database.
    (i) Examine different file format
    (ii) Save in a specified location.
17. Designing a table and performing Operations on table (i)
    Create a field in Design View
    (ii) Change the field properties and delete field.
    (iii) Set the Primary and Foreign Key
    (iv) Switching between the table design view and table datasheet views (v)
    Enter values to a table
18. Importing Data from External Data source
    (i) Import a table from one Database to another Database (ii)
    Import Excel data into Access table
    (iii) Modify imported table's Design
19. Defining Relationship between tables.
    (i) Create tables with required field.
    (ii) Connect table with different relationship
20. Working with Queries
    (i) Create a query using wizard (Insert, Update, Delete and Select) (ii)
    Apply Aggregate functions on table data
    (iii) Perform Logical Operations
    (iv) Perform Join Operations
    (v) Create and Modify multi table query
21. Designing a Form
    (i) Create and Split form
    (ii) Create multiple items form
    (iii) Enter Data via form
    (iv) Modify the layout of a form
22. Creating Report
    (i) Create a report using report wizard
    (ii) Modify a report view
    (iii) Change the sorting in a report
    (iv) Insert a picture in report header
    (v) Add footer to a field
    (vi) Set Validation Rule

Core Lab 2: C and C++ PROGRAMMING PRACTICAL

COURSE CODE: U23IT1P2   **HOURS PER WEEK :4**
SEMESTER:I   **CREDITS : 4**

COURSE OBJECTIVES :
To acquire Programming experience with the facilities available in C and C++.

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Exercise
CO1	Construct the code using operators, mathematical functions with branching and looping statements	K3	1 – 10
CO2	Inspect the array of strings and functions with simple programs	K4	11 – 14
CO3	Determine the usage of structures and unions	K5	15 – 18
CO4	Interpret different operations of file processing	K5	19 , 25
CO5	Create a program to explain the concept of classes and objects using constructors and destructors	K6	20 – 22
CO6	Test the code using inheritance and overloading	K6	23 – 25

C Programming Lab
1. Develop C programs using Operators
2. Create C programs employing Mathematical functions
3. Write a C program to perform Type Conversion
4. Develop C programs employing different types of If statements
5. Create C programs using Switch Statement
6. Write a C program using Conditional Operator
7. Write a C program using Go to Statement
8. Write a C program using While Statement
9. Write a C program using Do-While Statement
10. Develop C programs employing For statements
11. Develop C programs employing Arrays
12. Create a C program to implement String Manipulations
13. Develop C programs employing Functions
14. Create a C program to implement Recursion
15. Develop C programs employing Structures
16. Develop C programs employing Arrays of Structures
17. Develop a C program employing Union
18. Develop a C program employing Array of Pointers
19. Develop C programs employing Input / Output Operations on Files

C++ Lab
1. Develop C++ programs using Classes and Objects
2. Create C++ programs using Constructors and Destructors
3. Write C++ programs to perform Function and Operator Overloading
4. Create C++ programs to implement the use of Inheritance
5. Develop C++ programs employing Virtual Functions.
6. Create C++ programs to implement File Operations

Allied 1: MATHEMATICS FOR COMPETITIVE EXAMINATIONS - I

COURSE CODE: U23ITM01   **HOURS PER WEEK : 4**
SEMESTER:I   **CREDITS : 4**

COURSE OBJECTIVES :
To acquire arithmetic skills required to face competitive examinations.

UNIT - 1
Numbers - HCF & LCM – Decimal Fractions – Simplification.

UNIT - 2
Square roots and Cube roots - Percentage – Average – Ratio and Proportion - Partnership.

UNIT - 3
Profit and Loss - Time and Work- Pipes and Cisterns - Time and Distance

UNIT - 4
Problems on Trains – Problems on Boats and Streams - Problems on Numbers - Problems on ages.

UNIT - 5
Simple interest – Compound interest Area - Volume & Surface Areas.

TEXT BOOK
1. R.S. Aggarwal, **"Objective Arithmetic"**, S. Chand & Company Ltd., New Delhi, 2003.

Foundation Course: Fundamentals of Web Design

COURSE CODE: U23IT1N1   **HOURS PER WEEK : -**
SEMESTER:I   **CREDITS : 2**

Learning Objectives:
To impart basic understanding of Internet and Web Content Creation using HTML and DHTML.

UNIT – 1
Introduction to the Internet : Computers in Business – Networking – Internet – Email – Resource sharing – Gopher – World Wide Web – Usenet – Telnet – Bulletin Board Service - **Internet Technologies :** Modem – Internet Addressing – Physical Connections – Telephone Lines – **Internet Browsers :** Internet Explorer – Netscape Navigator.

UNIT – 2
Introduction to HTML : History of HTML – HTML generations – HTML Documents – Anchor Tag – Hyperlinks – **Head and Body Sections :** Header Section – Title – Prologue – Links – Colorful Web Page – Comments – Sample HTML Documents.

UNIT – 3
Designing the Body Section : Heading Printing – Aligning the Headings – Horizontal Rule – Paragraph – Tab Settings – Images and Pictures – Embedding PNG Format Images – **Ordered and Unordered Lists :** Lists – Unordered Lists – Headings in a List – Ordered Lists – Nested Lists – **Table Handling :** Tables – Table Creation in HTML – Width of the Table and Cells – Cells Spanning Multiple Rows / Columns – Coloring Cells – Column Specifications – Some Sample Tables.

UNIT – 4
DHTML and Style Sheets : - Defining Styles – Elements of Styles – Linking of Style Sheet to a HTML Document – Inline Styles – External Style Sheets – Internal Style Sheets – Multiple Styles – **Frames :** Frameset Definition – Nested Framesets.

UNIT – 5
Web Page Design Project : Frameset Definition **–** Example Projects – **Forms :** Action Attribute – Method Attribute – Enctype Attribute – Drop down list – Sample Forms.

Text Book(s):

1. Xavier C., *“World Wide Web Design with HTML”*, TMH Publishing Company, New Delhi, 2006.

Reference Books:

1. Horton, Sarah and Quesenbery, Whitney. A Web for Everyone, Rosenfeld Media, 2012.
2. Yonaitis, Robert B. Understanding Accessibility, HiSoftware Publishing, 2002.

Web References

1.   https://www.tutorialspoint.com/web_developers_guide/web_basic_concepts.htm
2.   https://www.upi.pr.it/docs/easfg/easvrfgp9.htm
3.   https://www.javascript.com/
4.   https://developer.mozilla.org/en-US/docs/Web/Guide/Introduction_to_Web_development

Core Theory – 3: JAVA PROGRAMMING AND DATABASE MANAGEMENT SYSTEMS

COURSE CODE: U23IT203   **HOURS PER WEEK :3**
SEMESTER:II   **CREDITS : 3**

COURSE OBJECTIVES:
To acquire programming experience and problem-solving expertise with exposure to Object Oriented Programming techniques and other facilities available in JAVA. and also understand the popular Relational Database System concepts and techniques.

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO. No.	Course Outcomes	Level	Unit
CO1	Recall the concepts of Object Oriented Programming.	K1	I
CO2	Illustrate Classes, Objects and explain the Packages and Interfaces.	K2	II
CO3	Develop the methods for handling Events and Exceptions.	K3	III
CO4	Examine the Java Database connectivity.	K4	III
CO5	Explain the popular relational data base system concepts and techniques	K5	IV
CO6	Construct different normal forms and practice with SQL packages.	K6	V

UNIT - 1
Overview of Java- Single and Two dimensional Arrays, - Methods, General form, invoking,- method overloading,- Classes and objects General form, creation,- constructors- constructor overloading, copy constructor,-'this' keyword,- Inheritance –inheriting, abstract classes and final classes- Interfaces– structure implementation,- Interface inheritance.

UNIT - 2
Packages– Package Hierarchy, - Import Statement, - Hiding the Classes, - Access Control Modifiers, - Applets – Life Cycle, - Applet Class, - Syntax of Applet Tag, - Methods in Graphics Class, - Threading, Life Cycle, Creating and Running, - Methods in Thread Class, - Priority Thread, - Synchronization.

UNIT - 3
Events, Listeners,-Event Handling Methods,-Inheritance of Control Classes,-Labels,-Button Control,-Check Box Control,- Radio Button,- Choice Control,- List Control,- Scroll Bars,- Layouts and Panel,- Windows and Frames,- Menus and Dialogs,- Mouse Events and Listeners- Exception Handling– Default Exception– User Defined Exception Handling,- Exception and Error Classes,-Catch Block - Throw and Throws- JDBC– Establishing Connection,- Creating Tables,- Enter Data,- Table Updating.

UNIT - 4
Introduction to Database System- File Management Systems - Database Management Systems - An Overview of Database Management Systems - Data Model -Relational Model: Relational Database Primer - Relational Database Characteristics - Database Integrity – Keys - Entity and Referential Integrity - Views.

UNIT - 5
Database Design- Design Consideration - Functional Dependency - Normalization and Normal Forms (1NF, 2NF, 3NF, 4NF, 5NF) - E/R Modeling- Introduction to SQL-SQL Query language – SQL data definition – Basic, set and aggregate operation –Null values – Nested queries.

TEXT BOOK:
1. Muthu C, **"Programming in Java"**, Thompson Learning, 2004.
2. Atul Kahate, **"Introduction to Database Management Systems"**, 1st Indian Reprint, Pearson Education, Delhi, 2004.
3. Abraham Silberchatz, Henry F. Korth and S. Sudharshan, **"Data Base System concepts"** Mc Graw Hill International – Fourth Edition.(Chapter-3)

REFERENCE BOOKS:
1. Patrick Naughton& Hebert Schildt, **"The Complete Reference JAVA 2",** 3 ed,TMH, Delhi, 2. E. Balagursamy,
 "Programming with Java – A Primer", Third Edition, Tata McGraw-Hill Publishing Company Limited, 2007

Core Theory 4: COMPUTER NETWORKS

COURSE CODE: U23IT204   **HOURS PER WEEK :3**
SEMESTER:II   **CREDITS : 3**

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

CO. No.	Course Outcome	Level	Unit
CO1	Explain Fundamental concepts of Computer Networks, its Architecture, Communication Concepts and Media.	K2	I
CO2	Illustrate Error Detection and Correction techniques, Error Control, Flow Control and Communication Protocols.	K2	II
CO3	Identify the functioning of Integrated Services and Switching techniques such as ISDN, Frame Relay and ATM.	K3	II
CO4	Explain the concepts and working of LAN and WAN networks.	K4	III
CO5	Describe the working of WLANs, Internetworking & Transport Layer Protocols	K5	IV
CO6	Discuss the different aspects of Network Applications & Network Management.	K6	V

UNIT - 1
Introduction: History-Applications–Computer Network Topologies–Categories of Networks–Networks – Network Architecture –OSI Model –TCP/IP Architecture -**Communication Media and Data Transmission:** Analog & Digital Data Transmission–Modulation & Demodulation–Transmission Media –Wireless Communications–Data Transmission Basics-Transmission Modes– Interfacing – Multiplexing.

UNIT - 2
Error Detection and Correction: Types of Errors – Error Detection – Error Correction. - **Data Link Control and Protocol Concepts:** Flow Control – Error Control – Asynchronous Protocols – Synchronous Protocols – HDLC - **Integrated Services and Routing Protocols:** Integrated Services – ISDN Services – ISDN Topology – ISDN Protocols – ATM – Characteristics – Frame Relay – Comparison of ISDN, ATM and Frame Relay.

UNIT - 3
LAN: Types of Network and Topology – LAN Transmission Equipment – Ethernet – Token bus – Token ring – Fibre Distributed Data Interface – Distributed Queue Dual Bus – LAN Operating Systems and Protocols – Ethernet Technologies. **WAN:** Transmission Methods – Carrier Types – Transmission Equipment – Design and Multicast Considerations –Protocols.

UNIT - 4
Wireless LAN: Applications – Requirements – Planning – Architecture – IEEE 802.12 – Protocol Layer – Physical Layer – Designing the Wireless LAN Layout – WAP Services - **Internetworking:** Principles – Routing – Internetwork Protocols – Shortcomings of IPv4 – IP Next Generation - **TCP Reliable Transport Services:** Transport Protocols – The Service TCP Provides to Applications – End-to-End Service and Datagrams – Transmission Control Protocol – User Datagram Protocol.

UNIT - 5
Network Applications: Client-Server Model–DNS–Telnet–File Transfer & Remote File Access–Electronic Mail–World Wide Web-**Network Management:** Goal of Network Management–Standards–Network Management Model–Infrastructure for Network Management–Simple Network Management Protocol.

TEXT BOOK
1. Brijendra Singh, **"Data Communications and Computer Networks"**, 2nd Edition, PHI, 2006.

REFERENCE BOOKS
1. William Stallings, **"Data and Computer Communications"**, 8th Edition, Pearson Education, 2007. 2. Behrouz A. Forouzan, **"Data Communications and Networking"**, 4th Edition, Tata McGraw Hill Publishing Company, 2006.

Core Lab 3 : JAVA AND RDBMS PRACTICAL

COURSE CODE: U23IT2P3   **HOURS PER WEEK :4**
SEMESTER:II   **CREDITS : 4**

COURSE OBJECTIVES :
To obtain hands on experience in working with essential facilities available in Java and popular RDBMS software.

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Exercise
CO1	Identify classes, objects with Inheritance	K3	1 – 2
CO2	Examine Packages and Interfaces	K4	3 – 4
CO3	Evaluate user defined exceptions, multithreading and applets	K5	5 – 7
CO4	Develop database applications with AWT controls	K6	8 – 9
CO5	Explain various SQL commands with nested queries	K3/K4	10 – 12
CO6	Construct form builders and create reports with database operations	K5/K6	13 – 14

JAVA Programs:
1. Develop Java Programs using Classes and Objects
2. Implement Java Programs using different types Inheritance
3. Develop Java Programs using Interfaces
4. Design and develop Packages in Java
5. Write Java Programs to handle Exceptions
6. Develop a Java Program to implement Multithreading
7. Implement Applet Programming in Java
8. Develop Java programs applying the AWT concepts
9. Implement JDBC to handle databases in Java.

RDBMS
1. Creating updating and inserting into databases & simple queries.
2. Usage of select statement – for queries using
    i. AND, OR, NOT Operators, WHERE clause.
    ii. UNION, INTERESECTION, MINUS.
   iii. Aggregate operations
3. Form Nested queries using SOL
    i. Sub queries
4. Implementation of Built–in functions of SQL.
5. Case studies: - Use forms for database manipulations and generate appropriate reports for the following
    i. Student evaluation systems.
    ii. Pay – roll system.
    iii. Income tax calculations
    iv. Seat reservation Problem
    v. Mark sheet Preparation.

Core Lab 4 : COMPUTER HARDWARE AND NETWORKING PRACTICAL

COURSE CODE: U23IT2P4   **HOURS PER WEEK :4**
SEMESTER:II   **CREDITS : 4**

COURSE OBJECTIVES :
To acquire practical training in and Computer Hardware and Networking

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Exercise
CO1	Identify the hardware components in a PC and organize it.	K3	1, 2
CO2	Examine the size of a hard disk and divide the space required to install OS.	K4	3, 4
CO3	Deduct failure in computer components through troubleshooting process.	K5	5
CO4	Construct a network through network cables, network devices and test the connections.	K6	6, 7, 8
CO5	Compare various routing algorithms to communicate with nodes in a network.	K5	9,10,11
CO6	Analyze performance of various communication protocols	K6	12

Computer Hardware Lab:

1. Identifying Computer Components and Assembling a PC

2. Partitioning Hard Disk Drive and Installing Windows OS

3. Installing Linux Operating System

4. Installation of Device Drivers

5. Backing-up and Restoring Operating System

6. Preparing Bootable USB Drives

Networking Lab:

1. Crimping a Straight-Through Cable

2. Crimping a Cross-Connected Cable

3. Peer-to-Peer Network Sharing of Files

4. Wireless Network Sharing
5. Internet Modem Configuration

6. Static Routing

7. Default Routing

8. Dynamic Routing

9. Static Network Address Translation

10. Dynamic Network Address Translation

11. Point-to-Point Authentication Protocols - (PAP)

12. Point-to-Point Authentication Protocols - (CHAP)

Allied 2: MATHEMATICS FOR COMPETITIVE EXAMINATIONS - 2

COURSE CODE: U23ITM02   **HOURS PER WEEK :4**
SEMESTER:II   **CREDITS : 4**

COURSE OBJECTIVES :
To acquire arithmetic skills required to face competitive examinations.

UNIT - 1
Surds & Indices - Allegation or Mixture – True discount – Banker's discount

UNIT - 2
Stocks & Shares - Calendar - Clocks - Races & Games of Skill

UNIT - 3
Linear Equation in Two Variables - Quadratic Equations

UNIT - 4
Arithmetic and Geometric Progressions (A.P. & G.P.) - Geometry - Polygons

UNIT - 5
Number Series - Tabulation - Pie-Chart - Bar-Graphs - Line Graphs

TEXT BOOK

 R.S. Aggarwal, **"Objective Arithmetic"** S. Chand & Company Ltd., New Delhi, 2003

COURSE CODE: U23IT2S1   **HOURS PER WEEK :2**
SEMESTER:II   **CREDITS : -**

COURSE OBJECTIVES :
To acquire skills that will help to be effective in personal and professional life.

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Units
CO1	Illustrate the Paradigms and Principles required for being effective in life.	K2	I
CO2	Develop the habits of being proactive and to begin with the end in mind	K3	I
CO3	Apply the habit of Prioritizing in Life.	K3	II
CO4	Discover the art of being effective with Win-Win and Empathetic Approach.	K4	III
CO5	Influence people and reap professional success by Synergizing	K5	IV
CO6	Maximize effectiveness by renewing and sharpening the skills.	K6	V

UNIT - 1
Paradigms and Principles : Inside-out: – Personality and Character Ethics –Primary and Secondary Greatness – Power of a Paradigm – Power of a Paradigm Shift – The Principle Centered Paradigm – Principles of Growth and Change – The Way we see the Problem is the Problem – A New Level of Thinking - **The Seven Habits-An Overview:** - Habits Definition – The Maturity Continuum – Effectiveness Definition – Three Kinds of Assets – Organizational Production Capacity -
Private Victory (Independence) : -
1   Being Proactive in roles and relationships in life.
2   Beginning with the End in Mind

UNIT - 2
Private Victory (Independence) :
3   Putting First Things First

UNIT - 3
Public Victory (Interdependence)
4   Think Win-Win: Genuine feelings for mutually beneficial solutions or agreements in relationships.
5   Seek First to Understand, Then to be understood - Use empathic listening to be genuinely influenced by a person, who compels them to reciprocate the listening and take an open mind to being influenced by you.

UNIT - 4
Public Victory (Interdependence)
6   Synergize - Combine the strengths of people through positive teamwork, so as to achieve goals that no one could have done alone.

UNIT - 5
Continuous Improvements
7   Sharpen the Saw - Balance and renew your resources, energy, and health to create a sustainable, long-term, effective lifestyle. lt primarily emphasizes exercise for physical renewal, prayer(meditation, yoga, etc.) and good reading for mental renewal. It also mentions service to society for spiritual renewal.

TEXT BOOK
1. R. Stephen Covey, **"Seven Habits of Highly effective people"**, Simon and Schuster Inc., 1989, reprint 2013.

COURSE CODE: U23IT305   **HOURS PER WEEK :3**
SEMESTER:III   **CREDITS : 3**

COURSE OBJECTIVES :
To acquire knowledge on Server Side Programming using .NET framework

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Units
CO1	Define the features of .NET framework, C# language & Visual Studio	K1	I
CO2	Demonstrate the working of ASP.NET	K2	I
CO3	Compare web application, windows application and their controls	K3	II
CO4	Categorize Validation controls, Rich controls and Navigation controls	K4	III
CO5	Explain the directories and class libraries of .NET framework	K5	IV
CO6	Develop ADO.NET data applications	K6	V

UNIT - 1
The .NET Platform and the Web: The Pathway to Web applications - The Web Client/Server model - Components of ASP.NET and the .NET Framework - Overview of Internet Information Server – Overview of ASP.NET - .NET Conmen Language Runtime and Class Library – Managed Components in .NET – Web Services - Language Independence in the .NET Frame Work – **Working with ASP.NET:** - The Features of ASP.NET – The Anatomy of ASP.NET Pages – Introducing Web Forms – VS.NET Web Applications and other IDE Basics – Separating Content and Code-the Code-Behind Feature-Application Configuration.

UNIT - 2
Using HTML Controls – Using Web Controls – Web Controls for Displaying and Formatting Data – Web Control for Creating Buttons – Web Controls for Inputting Text – Web Control for Selecting Choices – Web Controls for Creating Lists – Miscellaneous Basic Controls – Creating a Simple ASP.NET Application – ASP.NET Page Directives.

UNIT - 3
ASP.NET Rich Controls-Validation Controls–Data List Controls–User Controls–ASP.NET Intrinsic Objects.

Unit - 4
Using the .NET Framework Class Library: Common Features of the .NET Framework Class Library – Using Data Collections – Handling File Input/Output and Directories – Using the Windows Events Log – Manipulating XML Data - Sending Internal E-mail.

Unit - 5
Accessing Data with ADO .NET: Overview of Data access on the Web – ADO.NET: The Next Generation of Data Access – ADO.NET Programming Objects and Architecture – Working with Datasets and Data Table Objects – Maintaining Data Integrity with the Data Relation Classes.

TEXT BOOK
1. Matt J. Crouch *"ASP.NET and VB.NET Web Programming"*, Pearson Education. 2010.

REFERENCE BOOK
    1. Matthew Mac Donald, *"ASP.NET:-The Complete Reference"*, TMH, New Delhi, 2002.

<div align="center">**Core Theory-6: DATA STRUCTURES AND ALGORITHMS**</div>

COURSE CODE: U23IT306   **HOURS PER WEEK :3**
SEMESTER:III   **CREDITS : 3**

COURSE OBJECTIVES :
To understand the popular Data Structures and Algorithms involved in Computing.

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Units
CO1	Recall the linear representation of data structures.	K1	I
CO2	Illustrate Non-linear representation of organization of data.	K2	I
CO3	Identify the graph representation of data.	K3	II
CO4	Examine the best and worst cases of searching and sorting techniques.	K4	III
CO5	Determine the greedy method to find optimal solution.	K5	IV
CO6	Adapt back tracking in greedy method for finding solution.	K6	V

UNIT - 1
Arrays and Sequential Representations – Ordered Lists – Stacks and Queues – Evaluation of Expressions – Multiple stacks and queues – Singly Linked Lists – Linked Stacks and Queues – Polynomial Addition – Doubly Linked Lists.

UNIT - 2
Trees – Binary tree representations – Tree traversal – Threaded binary trees – Binary tree representation of trees – Set representations – decision trees – Game Trees and counting Binary Trees – Graphs and Representations – Traversals. – Activity Networks – Topological sort.

UNIT - 3
Algorithms – Conventions – Writing Structured programs – Analyzing algorithms – Sorting – Heap sort – Binary Search – Finding the maximum and minimum – Merge sort – Quick sort – Selection Problem.

UNIT - 4
Greedy Method: The general method – Optimal storage on tapes – Knapsack problem – Job sequencing with deadlines – Optimal merge patterns – Minimum spanning trees – Single source shortest paths.

UNIT - 5
Backtracking: The General method – 8-Queen's problem – Sum of subsets – Graph colouring – Hamiltonian cycles – Knapsack problem.

*N**ote : Theorems on correctness procedures and derivations of time complexity are not expected.**
TEXT BOOKS
 1. Ellis Horowitz, Sartaj Sahni, **"Fundamentals of Data Structures"***,* Galgotia Publications., Delhi, Reprint 2001.
 2. Ellis Horowitz, Sartaj Sahni, **"Fundamentals of Computer Algorithms"**, Galgotia Publications., Delhi, Reprint 2001.

REFERENCE BOOKS
 1. Seymour Lipschutz, "Data Structure", Schaum's Outline, Tata McGrawHill Education Pvt. Ltd., 2005.
 2. Samanta D., "Fundamentals of Data Structures for Students", Shroff Publishers and Distributers. Pvt. Ltd., Mumbai, 2015.
 3. Alfred V. Aho, John E. Hopcroft, Jeffry D. Ullman, "The Design and Analysis of Computer Algorithms", Pearson Education, 2002.

Core Lab 5 : .NET PROGRAMMING PRACTICAL

COURSE CODE: U23IT3P5   **HOURS PER WEEK :4**
SEMESTER:III   **CREDITS : 4**

COURSE OBJECTIVES :
To obtain hands on experience in writing server side programs using ASP.NET
COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Exercises
CO1	Build web pages using Web Server Controls	K3	1, 2
CO2	Make use of Validation Controls to validate user inputs	K3	3
CO3	Examine and retrieve input data using Code Behind feature.	K4	4
CO4	Build database applications to manage and manipulate data.	K5	5, 6,7
CO5	Create Web Portal using Menus and Master Page.	K6	8, 9
CO6	Construct Web Services to distribute data to different platforms.	K6	10

Exercises:

1. Design ASP.NET Web form using Web Server controls to enter job seeker's details.

2. Create an ASP.NET Web form using web control to enter Email Registration form.

3. Apply appropriate validation techniques in Email registration form using validation controls.

4. Write an ASP.NET application to retrieve form data & display it in the client browser in table format.

5. Create a Web application to store the details of the books available for sale in XML format.

6. Create a Web application using ADO.Net that uses which performs basic data manipulations:
(i) Insertion (ii) Updating (iii) Deletion (iv)Selection
7. Create an application using Data grid control to access information's form table in SQL Server.

8. Write an ASP.NET application for registering in on-line courses of Bharathidasan University.

9. Develop a Portal for our College.

10.Display a "HELLO" message using Web Services.

Core Lab 6 : DATA STRUCTURES AND ALGORITHMS PRACTICAL

COURSE CODE: U23IT3P6　　　　　　　　**HOURS PER WEEK :4**
SEMESTER:III　　　　　　　　　　　　**CREDITS : 4**

COURSE OBJECTIVES :
To acquire programming expertise in handling popular Data Structures & Algorithms.

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Exercises
CO1	Identify the linear representation of data structures using arrays.	K3	1,2
CO2	Examine the various applications of stacks and queues.	K4	3,4
CO3	Apply the concepts of linked list.	K3	5-7
CO4	Determine best and worst case of various sorting and searching algorithms.	K5	9-14
CO5	Recommend greedy method to find optimal solution.	K5	15
CO6	Adapt back tracking in greedy method for finding solution.	K6	16,17

1. Develop programs to handle Single Dimensional Array

2. Develop programs to handle Multi-Dimensional Array

3. Create programs to implement Queue Operations.

4. Create programs to implement Stack Operation

5. Create programs to implement Single Linked List

6. Create programs to implement Doubly Linked Lists.

7. Create a program to implement Tree Traversals.

8. Write a program to perform Heap Sort

9. Write a program to perform Quick Sort.

10. Write a program to perform Merge Sort.

11. Write a program to perform Bubble Sort

12. Write a program to perform Selection Sort

13. Write a program to perform Linear search.

14. Write a program to perform Binary search.

15. Create a program to implement Knapsack Algorithm

16. Create a program to implement the Spanning Tree Algorithm

17. Create a program to implement the Single Source Shortest Path Algorithm

Allied 3: DIGITAL LOGIC CIRCUITS LAB

COURSE CODE: U23IT3P7   **HOURS PER WEEK :3**
SEMESTER:III   **CREDITS : 3**

COURSE OBJECTIVES:

To understand the building blocks of a Computer System and to become familiar with the concepts and techniques involved in construction of Digital Logic Circuits.

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Units
CO1	Explain the Digital Logic, Concepts, Numbers Systems and Codes.	K2	I
CO2	Develop Combinational Logic Circuits (Arithmetic and Logical operations)	K3	III
CO3	Construct Data Processing Digital Circuits.	K3	III
CO4	Develop Sequential Logic circuits (Flip Flops)	K3	IV
CO5	Construct Sequential Logic Circuits. (Registers and Counters)	K3	V

Digital Principles: - Definition for Digital Signals – Digital Logic – **Number Systems and Codes:** – Binary Number System – Binary-to-Decimal Conversion – Decimal-to-Binary Conversion – Octal Numbers – Hexadecimal Numbers – ASCII Code – Excess-3 Code – Gray Code – **Digital Logic:** -Logic Gates – Universal Logic Gates – AND-OR-Invert Gates – Positive and Negative Logic.
Exercises:
1. Basic Logic Gates (NOT, OR, AND)
2. Derived Logic Gates (NAND, NOR, EX-OR, EX-NOR)
3. NOR as Universal Gate
4. NAND as Universal Gate

Combinational Logic Circuits: - Boolean Laws and Theorems – SOP Method – Karnaugh Map – Pairs, Quads, Octets – Karnaugh Simplification – Don't Care Conditions – POS Method & Simplification**- Arithmetic Circuits:** - Binary Addition – Binary Subtraction – Unsigned Binary Numbers – Sign Magnitude Numbers – 2's Complement Representation – 2's Complement Arithmetic – Arithmetic Building Blocks – The Adder-Subtractor
Exercises:
5. Boolean Laws (Commutative, Associative and Distributive Laws)
6. De-Morgans Theorems
7. Adder Circuits (Half Adder, Full Adder)
8. Subtractor Circuits (Half Subtractor, Full Subtractor)

Data Processing Circuits: - Multiplexers – Demultiplexers – 1 of 16 Decoder – BCD to Decimal Decoder – Encoder.
Exercises:
9. Multiplexer,
10. Demultiplexers
11. Encoder
12. Decoder

Flip Flops: -RS Flip Flops – Edge Triggered RS Flip Flop – D Flip Flop – JK Flip Flop –Master Slave Flip Flop
Exercises:
13. RS Flip Flops
14. D Flip Flop
15. JK Flip Flop

Registers: - Types of Registers – Serial In Serial Out – Serial In Parallel Out – Parallel in Serial Out – Parallel In Parallel Out – Universal Shift Register – Applications of Shift Registers – **Counters:** Asynchronous Counter –Synchronous Counters – Changing the Counter Modulus – Decade Counters– Pre-settable Counters.

Exercises:

16. Shift Register (Left, Right)

17. Counters (Up, Down)

18. Ring Counters

TEXT BOOKS

1. Donald P Leach, Albert Paul Malvino, Goutam Saha, **"Digital Principles and Applications"**, 7th Edition, TMH Publications, Delhi, 2011.

REFERENCE BOOK

1. A. P. Godse, D. A. Godse, **"Digital Principles and System Design"**, 4th Edition, Technical Publications, Pune, 2020.

Core Theory 7 : OPERATING SYSTEM

COURSE CODE: U23IT407　　　　　　　　　**HOURS PER WEEK :3**
SEMESTER:IV　　　　　　　　　　　　　　　**CREDITS : 3**

COURSE OBJECTIVES :
To know the concepts and functions of Operating Systems used in modern Computing Systems.

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Units
CO1	Interpret basics of Operating system, characteristics and features of modern OS like UNIX, LINUX and WINDOWS etc.	K2	I
CO2	Experiment with the requirement for process synchronization and coordination handled by Operating System.	K3	II
CO3	Examine the various CPU scheduling algorithms and analyze the characteristics of deadlock and recovery of deadlock	K4	III
CO4	Determine memory management techniques and the necessity of virtual memory.	K5	IV
CO5	Evaluate the storage management policies with respect to different storage management technologies	K5	V
CO6	Discuss file system interface, protection and security mechanisms.	K6	V

UNIT - 1
Introduction to Operating System: - Overview of Operating System-The Evolution of Operating System Types of Operating Systems-Functions of Operating System-Characteristics of Modern Operating System Operating System Structure.

UNIT - 2
Processes: Process Concept-Comparison of Process and Programs - Process States-Process Scheduling-Ready Queue vs. Device Queue-Operations on a Process-Cooperating Processes-Threads - Interprocess Communication. **Process Synchronization:** Racing Problem-Avoiding Racing Problem-Requirement for Critical Problem-Critical Section algorithms-OS tools for Process Synchronization-Classical Synchronization Problems-Monitors-Inter Process Communication for Message Communication.

UNIT - 3
Deadlocks: Introduction-System Model-Deadlock Characteristics-Deadlock Detection-Deadlock Prevention Deadlock Avoidance-Deadlock Recovery-Other methods of Deadlock Recovery. - **CPU Scheduling:**
Schedulers-Scheduling Criteria-CPU Scheduling Algorithms-Multiple Processor Scheduling-Real time Scheduling-Performance Comparison.

UNIT - 4
Memory Management: Introduction-Logical versus Physical address space-Program Relocation-Logical Organization-Physical Organization-Dynamic Loading and Dynamic Linking-Memory Allocation Techniques. - **Virtual Memory:** Swapping-Demand Paging-Page Fault-Page Replacement Algorithms-Thrashing-Page replacement policies-Local and Global-Demand Segmentation-OS Software factors.

UNIT - 5
Information Management: Introduction-A Simple File System-File Access Methods-Directory Structure File Protection-I-nodes-Free Space Management Techniques-Record Blocking. - **Secondary Storage Structure:** Introduction-Hard Disk Structure-Hard Disk Performance Parameter-Hard Disk Scheduling Algorithms-Swap Space Management-RAID and its level-Disk Space Allocation Methods-Stable Storage Implementation.

TEXT BOOK
1. S. Rajiv Chopra, **"Operating Systems–A Practical Approach"**, 2nd Edition, S. Chand & Company Pvt. Ltd., New Delhi, 2013.

REFERENCE BOOKS
1. Abraham Silberschatz, Peter B. Galvin, Greg Gange, "Operating System Concept", 9th Edition, Wiley India Pvt. Ltd., 2015.
2. Andrew S. Tanenbaum, Herbert Bos, "Modern Operating Systems", 4th Edition, Pearson Education, 2014.
3. William Stallings, "Operating Systems Internal & Design Principles", 6th Edition, Pearson Education, **2009.**

Core Theory 8 : MOBILE APPLICATION DEVELOPMENT

COURSE CODE: U23IT408   **HOURS PER WEEK :3**
SEMESTER:IV   **CREDITS : 3**

COURSE OBJECTIVES :
To impart knowledge on the working of mobile communication systems and to acquire expertise in application development for Mobile Computing systems.

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Units
CO1	Define Mobile Telecommunication networks and wireless communication system.	K1	I
CO2	Demonstrate the understanding of mobile computing and wireless networking.	K2	II
CO3	Compare mobile databases for the best fit transaction process in mobile environment.	K3	III
CO4	Categorize various Mobile Operating Systems.	K4	IV
CO5	Determine the android application with suitable User Interface and data manipulation.	K5	IV
CO6	Develop Applications for Android Devices includes content providers and networking.	K6	V

UNIT - 1
Basics of Communication Technologies : Types of Telecommunication Networks – Components of a Wireless Communication System – Architecture of Mobile Telecommunication Systems – Wireless Networking Standards – WLAN – Bluetooth Technology – **Introduction to Mobile Computing and Wireless Networking :** Mobile Computing – Mobile Computing Vs. Wireless Networking – Characteristics of Mobile Computing - Structure of Mobile Computing Applications – Cellular Mobile Communication – GSM – GPRS – UMTS.

UNIT - 2
MAC Protocols : Properties – Issues – Taxonomy –Assignment Schemes – MAC Protocols for Ad Hoc Networks. **- Mobile Internet Protocol :** – Mobile IP – Packet Delivery – Overview – Desirable Features – Key Mechanism – Route Optimization – DHCP **- Mobile Transport Layer :** Overview of TCP/IP – Terminologies – Architecture – Operations – Application Layer Protocols of TCP – Adaptation of TCP Window – Improvement in TCP Performance.

UNIT - 3
Operating Systems for Mobile Computing : Mobile OS Responsibilities – Basic Concepts – Special Constraints and Requirements – Commercial Mobile OSs – Comparative Study of Mobile OSs – OS for Sensor Networks – **Mobile Application Development Protocols :** - Mobile Devices as Web Clients – WAP – J2ME – Android SDK.

UNIT - 4
Getting Started with Android –- Activities, Fragments and Intents – Android User Interface – Designing User Interface with views – Displaying Pictures and Menus with Views – Data Persistence.

UNIT - 5
Content Providers – Messaging – Location Based Services – Networking – Developing Android Services – Publishing Android Applications.

TEXT BOOKS
1. Prasant Kumar Pattnaik, Rajib Mall, "Fundamentals of Mobile Computing", PHI Learning 2. Wei Meng Lee, "Beginning Android 4 Application Development", Wiley India Pvt. Ltd.., 2012.

Core Lab 7 : OPERATING SYSTEM PRACTICAL

COURSE CODE: U23IT4P8   **HOURS PER WEEK :4**
SEMESTER:IV   **CREDITS : 4**

COURSE OBJECTIVES :
To obtain hands on experience with LINUX Operating System and Shell Programming
COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Exercises
CO1	Extend basic, directory and VI editor commands of Linux	K2	1-3
CO2	Make use of Linux commands for file handling	K3	5-7
CO3	Experiment with Linux commands with shell programming	K3	8-12
CO4	Examine the use of various grep commands	K4	4,20
CO5	Determine various shell scripts for simple applications	K5	16-19
CO6	Create a User and Group Login permission	K6	14,15

1. Execution of Simple Shell Commands

2. Usage of Directory Commands

3. Employing Vi Editor Commands

4. Searching a word in a file

5. Displaying the content of a file.

6. Displaying Login Greeting Script

7. Displaying the current date, time, username and current directory.

8. Shell Program to print the given number in reverse order.

9. Preparation of Mark list using shell programming
10. Menu driven shell program to create, sort and display a file.

11. Menu driven shell program to copy, edit, rename and delete a file.

12. Shell Program to Sort numbers in ascending and descending order.

13. Shell Program to Sort names in ascending and descending order.

14. User Creation in Linux

15. Group Creation in Linux

16. Menu driven shell program for the following – Passwd, pconfig, ping

17. Shell program to find the number of ordinary files and directory files in the current directory. 18. Shell program to accept the name of the directory as command line argument and display the listing in that directory. By default, the "Home" directory's contents should be displayed. 19. Finding the list of all running processes and redirect the output in a file.

20. Monitoring and managing system log information

Core Lab 8 : MOBILE APPLICATIONS DEVELOPMENT PRACTICAL

COURSE CODE: U23IT4P9   **HOURS PER WEEK :4**
SEMESTER:IV   **CREDITS : 4**

COURSE OBJECTIVES :
To obtain hands-on experience in Mobile Application Development for Android devices.
COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Exercises
CO1	Build Android application with suitable user interface and android controls	K3	1 – 3
CO2	Make use of image controls perform coloring screen & animate bitmap images.	K3	4 – 6
CO3	Examine the user interface with dialog box and countdown timer.	K4	7 – 8
CO4	Interpret the android controls to store contact details and make phone call.	K5	9 – 10
CO5	Build Android Application to access media file from memory and store images from native applications	K5	11-12
CO6	Create Android Application to perform data manipulation such as Insert, update, delete and retrieve from SQLite database	K6	13

1. Create a simple application that displays a text "Hello World" with text and background color.

2. Create sample application for login module.

3. Create an application that changes the color of the screen based on selected options from the menu.

4. Create an application that will display toast (Message).

5. Create an application to change the image displayed on the screen using radio button.

6. Create an application to demonstrate alert dialog box.

7. Create an application to demonstrate countdown timer.
8. Create an application to animate a bitmap.

9. Create an application to demonstrate a simple video view.

10. Create an application to pick contacts using Intent.

11. Create an application to play a media file from the menu card.

12. Create an application to generate a new contact using Intent.

13. Create an application to make database operations

Allied 4 : ASSEMBLY LANGUAGE PROGRAMMING PRACTICAL

COURSE CODE: U23ITP10	HOURS PER WEEK :3
SEMESTER:IV	CREDITS : 3

COURSE OBJECTIVES :

To understand the structure, architecture and applications of microprocessors.

COURSE OUTCOMES

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

CO No.	Course Outcomes	Level
S. No.	1.COURSE OUTCOMES	Level
1.	Construct AL Programs to perform basic Arithmetic Operations	K3
2.	Build AL Programs to perform Logical and Shift Operations	K3
3.	Build AL Programs to cause delay using subroutines and to use look-up tables.	K3
4.	Build AL Programs to find the biggest and smallest numbers in an array	K6
5.	Create AL Programs to sort numbers in ascending and descending orders	K6

Introduction: - Word Length – Evolution of Microprocessors and Digital Computers –CPU – Memory – Busses – Processing Speed – **Microprocessor Architecture:**- Introduction–Intel 8085– Instruction Cycle– Timing Diagram- **Instruction Set of Intel 8085:**- Introduction– Instruction and Data Formats–Addressing Modes–Status Flags–Symbols & Abbreviations–Intel 8085 Instructions. **Assembly Language Programs:** - Introduction – Addition and Subtraction (8 and 16-bits) – Decimal Addition and Subtraction – One's and Two's Complements (8 and 16) – Shifting and Masking – Largest and Smallest Numbers – Ascending and Descending Order – Sum of a Series – Multiplication and Division – Multi-byte Addition and Subtraction – Square-Root of a number – Block Transfer

Exercises:

1. Addition of two 8-bit numbers with 8-bit sum
2. Subtraction of two 8-bit numbers
3. Decimal Addition of two 8-bit numbers with 16-bit sum
4. Addition of two 16-bit numbers with a sum of 16 bits or more.
5. Decimal Subtraction of two 8-bit numbers using 9's Complement.
6. Find the 2's Complement of an 8-bit number
7. Find the 2's Complement of a 16-bit number
8. Shifting an 8-bit number by 2-bit positions
9. Shifting a 16-bit number by 2-bit positions
10. Delay Subroutine with a single 8-bit register.
11. Delay Subroutine with a 16-bit register pair.
12. Finding Square from a look-up table.
13. Finding the largest number in a data array
14. Finding the smallest number in a data array.
15. Arrange a set of numbers in Ascending Order.
16. Arrange a set of numbers in Descending Order.
17. Sum of a series of 8-bit binary numbers with 16-bit sum
18. Sum of a series of 8-bit decimal numbers with 16-bit sum
19. Multi-Byte Binary Addition
20. Multi-Byte Decimal Addition
21. Multiplication of two 8-bit numbers with 16-bit product.
22. Division of two 8-bit numbers

TEXT BOOK

1. B Ram, "Fundamentals of Microprocessors and Microcomputers", 5th Revised and Enlarged Edition, Dhanpat Rai Publications (P) Ltd., New Delhi, 2003.

REFERENCE BOOK

1. Anokh Singh, A. K. Chhabra, "Fundamentals of Microprocessor and its Applications", S. Chand Publishers, 2010.

SEC 4: SMART APPLICATIONS FOR SUSTAINABLE COMMUNITY DEVELOPMENT

COURSE CODE: U23IT4S4
SEMESTER:IV

HOURS PER WEEK : -
CREDITS : 1

Course Outcomes (only five outcomes – unit wise)

CO No.	Course Outcomes	K - Level	Unit
CO1	To comprehend the key concepts of S-L and differentiate the community service and Service-Learning	K2	1
CO2	Identify community problems related to pollution and health issues.	K3	2
CO3	Plan service activities for the stakeholders.	K3	3
CO4	Apply tools, techniques and languages for community services.	K3	4
CO5	Take part in community issues by providing suitable solutions.	K4	5

Unit 1: Concepts of Service-Learning (10 hrs.)

Service Learning – Definition, difference between community service and service learning, Principles; Whole Person Education. Identifying Community Needs Community Partners, Reflection, and Reciprocity. Public Dissemination; Understanding of community dynamics. Project Planning Stages and report preparation.

Classroom Activity:

   i. Group discussion about Civic/Social responsibility (Display of Video/Documentary film Through this activity Students should recognize civic responsibility of the society)
   ii. Conduct a role play/games/drawing to provide problem-solving skill and ignites critical thinking.
   iii. Group activity to frame questionnaire for identify community needs

Reflection on identify the need of the community (Students go to the community for identify the community needs and reflect their experience)

Unit 2: Causes and Effects of Pollution (10 hrs)

Pollution-Sources of pollution – Impact of pollution-Elements of government Framework-Challenges and Opportunities in the context of 2030 Agenda-Sustainable Development goals.

Classroom Activity:

i.   Group discussion about pollution and types of pollution (Display of charts/posters) through these activity students should aware about impacts of pollution.
ii. Learn ways to prevent pollution take a quiz and take ideas from students through these activities for good health.
iii. Transport survey spreadsheet   conduct a Transportation student survey on different form of transportation, collect the data and discuss the direct impact of pollution.
iv. Reflection on knowledge regarding pollution and its effects of pollution in our planet. (Students go to the community to identity the challenges and Opportunities for reducing the pollutions in the target area.

Unit 3: Web Frameworks and Database Management System(10 hrs)

 HTML: Links and Navigation - Images, Audio, and Video – Tables – Forms – Frames. CSS and JavaScript: Sheets - Learning JavaScript - Working with JavaScript. Web Programming: ASP.NET   Web   Programming–Web
Deploying Web Applications-Dynamic web pages using PHP-Web Framework using python-Database: SQL and MySQL.

Classroom Activity:
   i.   Create simple projects to learn ins and outs of HTML.
   ii. Create Survey form to measure the quality of air, which makes the students aware about the amounts of pollutants pose a health risk.
   iii. Create a Fan page using various media like audio, video, animations for sustainable smart cities.

Create a pollution prevention websites includes tips and resources on environmental best practices for small, medium and large scale organizations.

Unit 4: Software Development for Community(8 hrs)

Need for Software Engineering- Practical process modeling- Planning and managing the project - Capturing the requirements - Designing the system - Testing Strategies.

Field Activity
  i.   Identify and addressing the community.
  ii. Collection of basic information from community using field survey form.
  iii. Report on implementation of action going to take to measure the pollution level.
  iv. Group planning meeting held to identify and prioritize the health risk due to pollution
  v.   Create a Document and journal report presentation.

Unit 5: Creating Smart Apps and Community Engagement (7 hrs)

Data Collection from community-Find access to relevant resources -Familiar with the concrete issues to be addressed-Community to approached-Community Profile-Tracking area-Facilitates community with APPs, Websites.

 Field Activity:
  i.   Implementation of Community plan.
  ii. Creating Apps/websites based on problem identified.
  iii. Report generation and documentation.
  iv. Demonstration/Celebration

Text Books

1. *Xavier .C, "World Wide Web Design* with *HTML"*, McGraw-Hill Education, 2017.
2. Richard York, "Beginning JavaScript and CSS Development with JQuery", Wiley Publishing Inc., 2009.
3. Richard Fairley, "Software Engineering Concepts", Tata McGraw-Hill Education, 2008.
4. Daniel A. Vallero "Fundamentals of air pollution" Daniel A. Vallero — 4th edition, Academic Press is an imprint of Elsevier,2008

References

1. Jon Duckett, "Beginning HTML, XHTML, CSS, and JavaScript", Wiley Publishing Inc. 2010
2. Matt J. Crouch "ASP.NET and VB.NET Web Programming", Pearson Education. 2010.
3. Matthew Mac Donald, "ASP.NET:-The Complete Reference", TMH, New Delhi, 2002
4. Douglas Bell, "Software Engineering for Students-A Programming Approach", 4th Edition, Pearson Education, Delhi 2007.

COURSE CODE: U23IT509   **HOURS PER WEEK :3**
SEMESTER:V   **CREDITS : 3**

COURSE OBJECTIVES :
To understand the Client and Server side Web Programming with PHP & MySQL.

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Units
CO1	Define Expressions, Operators, Conditionals, Looping, Implicit and Explicit Casting	K1	I
CO2	Explain the Functions and Objects	K2	I
CO3	Apply the Arrays and File Handling	K3	II
CO4	Classify Indexes, MySQL Functions, Accessing MySQL via phpMyAdmin	K4	III
CO5	Explain Accessing MySQL Using PHP	K5	IV
CO6	Discuss the Functions, Objects, and Arrays using with JavaScript	K6	V

UNIT - 1
Introduction to PHP: Incorporating PHP Within HTML - Examples -The Structure of PHP. **Expressions and Control Flow in PHP:** Expressions - Operators - Conditionals – Looping - Implicit and Explicit Casting - PHP Dynamic Linking.

UNIT - 2
PHP Functions and Objects: PHP Functions - Including and Requiring Files - PHP Version Compatibility - PHP Objects. **PHP Arrays:** Basic Access -The foreach...as Loop- Multidimensional Arrays -Using Array Functions. **Practical PHP:**Using printf - Date and Time Functions - File Handling

UNIT - 3
Introduction to MySQL: MySQL Basics - Summary of Database Terms Accessing MySQL via the Command Line – Indexes - MySQL Functions - Accessing MySQL via phpMyAdmin. **Accessing MySQL Using PHP:** Querying a MySQL Database with PHP - A Practical Example - Practical MySQL - Creating a Table - Preventing Hacking Attempts - Using mysql Procedurally. **Form Handling:**
Building Forms - Retrieving Submitted Data - An Example Program - What's New in HTML5? - Features Awaiting Full Implementation.

UNIT - 4
Cookies, Sessions, and Authentication: Using Cookies in PHP - HTTP Authentication - Using Sessions. **Exploring JavaScript** :Using Comments - Semicolons - Variables - Operators - Variable Typing -Functions - Global Variables - Local Variables- The Document Object Model -About document.write. **Expressions and Control Flow in JavaScript:** Expressions - Literals and Variables -
Operators - The with Statement - Using onerror -Using try...catch –Conditionals - Looping -Explicit Casting

UNIT - 5
JavaScript Functions, Objects, and Arrays: JavaScript Functions - JavaScript Objects - JavaScript Arrays. **JavaScript and PHP Validation and Error Handling:** Validating User Input with JavaScript - Regular Expressions - Redisplaying a Form After PHP Validation. **Using Ajax:** What Is Ajax? - Using XMLHttpRequest

TEXT BOOK
1. Robin Nixon., "Learning PHP, MySQL and JavaScript ", O'reilly Publishers , 2009.

REFERENCE BOOK
1. Huge E Williams and David Lane , "Web Database Applications with PHP and MySQL" ,
   O'reilly Publishers, 2007.

Core Theory 10 : INFORMATION SECURITY

COURSE CODE: U23IT510   **HOURS PER WEEK :3**
SEMESTER:V   **CREDITS : 3**

COURSE OBJECTIVES :
To understand the principles and practices of Internet based Information Security Systems.

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Units
CO1	Define the basics of Cryptography	K1	I
CO2	Compare the working principle of the Symmetric and Asymmetric Cryptographic Algorithms	K2	II
CO3	Make use of the digital certificates in message communication	K3	III
CO4	Examine the security concepts through secure socket layer	K4	IV
CO5	Evaluate security mechanism through Authentication	K5	V
CO6	Discuss the functions of Firewalls, IPSecurity and Virtual Private Networks.	K6	V

UNIT - 1
Need for Security – Security Approaches – Principles of Security – Types of Attacks – **Cryptography:**-Introduction–Plain Text & Cipher Text–Substitution Techniques–Transposition Techniques–Encryption & Decryption–Symmetric & Asymmetric Cryptography–Steganography.

UNIT - 2
Symmetric Key Algorithms:-Algorithm Types and Modes– Overview–DES–IDEA–RC4–RC5– AES–**Asymmetric Key Algorithms**:-Overview–RSA Algorithm–Symmetric and Asymmetric Key Cryptography.

UNIT - 3
Digital Signatures: - Introduction – Message Digests – MD5 – SHA – SHA-512 – Message Authentication Code – HMAC - Digital Signature Techniques – **Digital Certificates and Public Key Infra Structure:** - Digital Certificates – Private Key Management – The PKIX model – Public Key Cryptography Standards

UNIT - 4
Internet Security Protocols: - Basic Concepts – SSL - TLS – SHTTP – TSP – Secure Electronic Transactions (SET)– Electronic Money – Email Security – WAP Security – GSM Security

UNIT – 5
User Authentication and Kerberos: - Authentication Basics – Passwords – Authentication Tokens – Certificate Based Authentication – Biometric Authentication – Kerberos Network **Security, Firewalls and VPN:** - Firewalls – IP Security – Virtual Private Networks- Intrusion

TEXT BOOK
1. Atul Kahate, "Cryptography and Network Security", 2nd Edition, 6th Reprint, TMH   Publications, New Delhi, 2009.

REFERENCE BOOKS

1. William Stallings, "Cryptography and Network Security: Principles and Practices", Fourth   Edition,   Pearson Education, 2005.
2. Charlie kaufman, Radia Perlman, Mike Speciner, "Network Security – Private   Communication in a Public World", 2nd Edition, PHI Publications, 2002.

Elective – 1A : SOFTWARE ENGINEERING

COURSE CODE: U23IT5:A   **HOURS PER WEEK :3**
SEMESTER:V   **CREDITS : 2**

COURSE OBJECTIVES :
To understand the principles and practices used in Software Development.

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Units
CO1	Define size, quality factors and plan organization structure.	K1	I
CO2	Outline the cost estimation of Software.	K2	II
CO3	Identify the requirement specification notations.	K3	II
CO4	Examine the design notations, techniques and considerations.	K4	III
CO5	Determine programming standards and procedures.	K5	IV
CO6	Adapt different testing strategies and quality factors of process models.	K6	V

UNIT - 1
Introduction: Definitions – Size factors – Quality and Productivity Factors – Managerial Issues – **Planning a Software Project:** Introduction – Defining the Problem – Developing a Solution Strategy – Planning and Development Process – Planning an Organizational Structure.

UNIT - 2
Software Cost Estimation: Software Cost Factors – software Cost Estimation Techniques – Staffing Level Estimation – Estimating Software Maintenance Costs – **Software Requirement Definition**: Software Requirement Specification – Formal Specification Techniques – Languages and Processors for Requirements.

UNIT - 3
Software Design: Fundamental Design Concepts – Modules and Modularization Criteria – Design Notations – Design Techniques – Detailed Design Considerations – Real Time and Distributed Systems – Test Plans – Milestones, Walkthroughs and Inspections – Design Guidelines.

UNIT - 4
Implementation Issues: Structured Coding Techniques – Coding Style – Standards and Guidelines Documentation Guidelines. **Modern Programming Language Features:** User-Defined Data Types - Data Abstraction – Exception Handling – Concurrency Mechanisms.

UNIT - 5
Verification and Validation Techniques: Quality Assurance – Walkthroughs and Inspections – Static Analysis – Symbolic Execution – Unit Testing and Debugging – System Testing – Formal Verification – **Software Maintenance**: Enhancing Maintainability During Development – Managerial Aspects – Configuration Management – Source Code Metrics.

TEXT BOOK
1. Richard Fairley, **"Software Engineering Concepts"**, Tata McGraw-Hill Education, 2008.

REFERENCE BOOKS
1. Ian Sommerville, **"Software Engineering"**, 6th Edition, Pearson Education, Delhi, 2005. 2. Douglas Bell, **"Software Engineering for Students-A Programming Approach"**, 4th Edition, Pearson Education, Delhi 2007.

<div align="center">**Elective - IB : SOFTWARE TESTING**</div>

COURSE CODE: U23IT5:B   HOURS PER WEEK :3
SEMESTER:V   CREDITS : 2

COURSE OBJECTIVES :
To acquire knowledge on the principles and practices used in Software Testing

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Units
CO1	Recall the Software Development Life cycle.	K1	I
CO2	Illustrate the need for testing in software development process.	K2	II
CO3	Identify the needs of system testing.	K3	III
CO4	Analyse test phases and formulate tools for testing.	K4	IV
CO5	Build test plan, manage and report the software developed.	K6	V
CO6	Create test automation tools for programming model.	K6	V

UNIT - 1
Software Development Life Cycle Models: –Phases of Software Project –Quality, Quality Assurance and Quality control–Testing, Verification & Validation–Process Model–Life Cycle Models-**White Box Testing:** What is White Box Testing?–Static Testing–Structural Testing–Challenges-**Black Box Testing:** What is Black Box Testing?– Why Black Box Testing?– When to do Black Box Testing?– How to do Black Box Testing?

UNIT - 2
Integration Testing: What is Integration Testing? – Integration Testing as a Type of Testing – Integration Testing as a Phase of Testing– Scenario testing– Defect Bash- **System and Acceptance Testing:** Overview – Why System Testing? – Functional Vs Non Functional Testing – Functional System Testing – Non Functional Testing – Acceptance Testing – Summary of Testing Phases.

UNIT - 3
Performance Testing: Factors governing Performance Testing – Methodology for Performance Testing – Tools for Performance Testing – Process for Performance Testing - **Regression Testing:** – What is Regression Testing – Types of Regression Testing – When to do Regression Testing – How to do Regression Testing – Best Practices in Regression Testing.

UNIT - 4
Internationalization (I$_{18}$n) Testing:- Primer – Test Phases – Enabling Testing – Locale Testing – Validation – Language Testing – Localization Testing – Tools – Challenges and Issues – **Ad hoc Testing:** - Overview – Buddy Testing – Pair Testing – Exploratory Testing – Iterative Testing – Agile and Extreme Testing – Defect Seeding – **Usability and Accessibility Testing:** - What is Usability Testing? – Approach – When to do Usability Testing? – How to Achieve Usability? – Quality Factors – Aesthetics Testing – Accessibility Testing – Tools – Lab Setup – Test Roles

UNIT - 5
Test Planning, Management, Execution and Reporting:-Test Planning-Test Management–Test Process– Test Reporting – Best Practices - **Software Test Automation:** What is Test Automation – Terms used in Automation–Skills Needed for Automation–What to Automate, Scope of Automation–Design & Architecture for Automation– Generic Requirement for Test Tool Framework– Process model for Automation– Selecting a Test tool– Automation for Extreme Programming Model– Challenges in Automation.

TEXT BOOK
1. Srinivasan Desikan, Gopalaswamy Ramesh, **"Software Testing – Principle & Practices"**, Pearson Education, New Delhi, 2006.

REFERENCE BOOKS
1. Ron Patton, **"Software Testing"**, 2nd Edition, Pearson Education, New Delhi, 2006. 2. William E. Perry, **"Effective Methods for Software Testing"**, 3rd Ed., Wiley India, 2006. 3. Renu Rajani, Pradeep Oak, **"Software Testing – Effective Methods, Tools and Techniques"**, TMH Publishing Company Limited, New Delhi, 2004.

Elective -1C: SOFTWARE PROJECT MANAGEMENT

COURSE CODE: U23IT5:C   **HOURS PER WEEK :3**
SEMESTER:V   **CREDITS : 2**

COURSE OBJECTIVES :
To know the basics of Software Project Management, responsibilities of Software Project Manager and Risk Management.

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Units
CO1	Recall steps involved in project planning.	K1	I
CO2	Outline the cost and risk in project.	K2	II
CO3	Plan the project schedule, manage risk and identify hazards in project.	K3	III
CO4	Analyze how to prioritize and manage and controls the contract.	K4	IV
CO5	Determine the team involved in project.	K5	V
CO6	Build the safety and health of the people involved in project.	K6	V

UNIT - 1
Introduction to Software Project Management Project Definition – Contract Management – Activities Covered By Software Project Management – Overview of Project Planning – Stepwise Project Planning.

UNIT - 2
Project Evaluation: Strategic Assessment – Technical Assessment – Cost Benefit Analysis–Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation.

UNIT - 3
Activity Planning Objectives – Project Schedule – Sequencing and Scheduling Activities –Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration –
Activity on Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning And Control.

UNIT - 4
Monitoring and Control: Creating Framework – Collecting The Data – Visualizing Progress – Cost Monitoring – Earned Value – Priortizing Monitoring – Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types Of Contract – Stages In Contract Placement – Typical Terms Of A Contract – Contract Management – Acceptance.

UNIT - 5
Managing People And Organizing Teams : Introduction – Understanding Behavior – Organizational Behaviour: A Background – Selecting The Right Person For The Job – Instruction In The Best Methods – Motivation – The Oldman – Hackman Job Characteristics Model – Working In Groups – Becoming A Team –Decision Making – Leadership – Organizational Structures – Stress –Health And Safety – Case Studies.

TEXT BOOK
1. Bob Hughes, Mike Cotterell, **"Software Project Management"**, 4th edition. TMH, 2009

REFERENCE BOOKS
1. Walker Royce, **"Software Project Management"**, Pearson Education, 1998. 2. Pankaj Jalote, **"Software Project Management in Practice"**, Pearson Education, 2002.

ELECTIVE 2A: MULTIMEDIA TECHNOLOGIES

COURSE CODE: U23IT5:D   HOURS PER WEEK :3
SEMESTER :V   CREDITS : 2

COURSE OUTCOMES

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

CO. No.	Course Outcomes	Level	Unit
CO1	Define the technical aspect of Multimedia Systems.	K1	I
CO2	Demonstrate various Multimedia database applications in real time.	K2	I
CO3	Identify the importance of Compression and decompression techniques and various data and file standards.	K3	II
CO4	List the Multimedia applications design and components of multimedia systems.	K4	III
CO5	Interpret the concepts of Multimedia authoring and user interface.	K5	IV
CO6	Elaborate hypermedia messaging and Integrated multimedia messaging standards	K6	V

UNIT I: Overview of Multimedia Systems Design

Overview of Multimedia Systems Design : - Multimedia Elements - Multimedia Applications - Documenting Imaging - Image Processing and Image Recognition - Full-Motion Digital Video Application - Electronic Messaging - Evolving Technologies for Multimedia Systems:- Multimedia Data Interface Standards - Multimedia Databases:- Multimedia Storage and Retrieval – DBMS for Multimedia Systems – DB Organization for Multimedia Applications - Transaction Management for Multimedia Systems.

UNIT II: Compression and Decompression

Compression and Decompression: - Types of Compression - Lossless Compression - Lossy Compression - Color, Gray Scale and Still-Video Image Compression - Audio Compression - Data and File Format Standards: - Rich-Text Format - TIFF File Format - Resource Interchange File Format - MIDI File Format - JPEG File Format for Still and Motion Images.

UNIT III: Multimedia Application Design

Multimedia Application Design: - Multimedia Applications Classes - Game Systems - Multimedia Repositories - Interactive TV using set-top systems - Types of Multimedia Systems - Virtual Reality Design - Human Factors - Multimedia Inputs and Outputs – Modeling Design Considerations Components of MultimediaSystems:- Input-Output-Storage Systems - Application Workflow Design Issues - Distributed Application Design Issues.

UNIT IV: Multimedia Authoring and User Interface

Multimedia Authoring and User Interface: - Multimedia Authoring Systems - Design Issues for Multimedia Authoring - Approaches to Authoring - Types of MM Authoring - Hypermedia Application Design Considerations: - Integration of Application - Data Exchange – User Interface Design - Navigation Through the Application - Special Metaphors for Multimedia Applications - Information Access.

UNIT V: Hypermedia Messaging

Hypermedia Messaging: - Mobile Messaging - Hypermedia Message Components - Text - Rich-Text - Voice Messages - Full-Motion Video Management - Hypermedia Linking and Embedding - Creating Hypermedia Messages – Integrated Multimedia Message Standards: - Vendor-Independent Messaging - MAPI Support- Telephony API - Internet Messaging - Integrated Document Management.

Text Book(s):
1.   Prabhat K. Andleigh , Kiran Thakrar, "**Multimedia Systems Design**", PHI ,New Delhi,2002.

Reference Books:
1. Ze-Nian Li, Mark S. Drew, "**Fundamentals of Multimedia**", Pearsons Education, New Delhi, 2005.
2. John F. Koegel Bufford, "**Multimedia Systems**", Pearson Education, Delhi, 2005.
3. David Hillman, "**Multimedia Technology & Applications**", Galgotia Publications, New Delhi, 2010.

ELECTIVE 2B: COMPUTER GRAPHICS

COURSE CODE: U23IT5:E   **HOURS PER WEEK :3**
SEMESTER   :V   **CREDITS : 2**

COURSE OUTCOMES

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

CO. No.	Course Outcomes	Level	Unit
CO1	Choose various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling and clipping.	K1	I
CO2	Explain applications, principles, commonly used techniques of computer graphics and algorithms for line drawing, circle and ellipse generating.	K2	I
CO3	Make use of simple 2D graphics with lines, curves and can implement algorithms to rasterize simple shapes, fill and clip polygons.	K3	II
CO4	Analyze the techniques for representing geometrical objects, transformations and 3D viewing.	K4	III
CO5	Determine the concepts of lighting and shading models, textures, ray tracing, hidden surface elimination.	K5	IV
CO6	Build projected objects to naturalized the scene in 2D view and use of illumination methods and color models	K6	V

UNIT I: Output Primitives

Points and Lines - Line Drawing algorithms - Loading frame Buffer - Line function - Circle Generating algorithms - Ellipse – generating algorithms. - Attributes of Output Primitives: Line Attributes - Curve attributes - Color and Grayscale Levels - Area fill attributes.

UNIT II: 2D Geometric Transformations

Basic Transformations – Matrix representations - Composite Transformations-Other Transformations. 2D Viewing: The Viewing pipeline - Viewing coordinate Reference Frame-Window to viewport Coordinate Transformation-2D Viewing Functions-Clipping Operations-Point, Line, Polygon, Curve, Text and Exterior Clippings.

UNIT III: 3D Concepts

3D Display Methods -3D Graphics Packages. 3D Object Representations: Polygon Surfaces- Curved lines and Surfaces-Quadric Surfaces-Super Quadrics-Blobby Objects-Spline representations. 3D Geometric Modeling and Transformations: Translation-Rotation-Scaling-Other Transformations –Composite Transformations - 3D Transformation functions.

UNIT IV: Variable –Surface Detection Methods

Classification of Visible –Surface Algorithms-Back-Face Detection –Depth Buffer Method-A Buffer method –Scan –Line Method-Depth-Sorting Method-BSP- Tree Method-Area-Subdivision Method-Ray casting Methods-Curved Surfaces-Wireframe Methods- Visibility-Detection functions.

UNIT V: Illumination Methods

Properties of Light-Standard Primaries at the Chromaticity Diagram-Intuitive color Concepts-RGB Color Model - YIQ Color Model - CMY Color Model-HSV Color Model-Conversion between HSV and RGB models - Color selection Applications.

Text Book(s):

1.Donald D. Hearn, M. Pauline Baker, **"Computer Graphics"**, 2nd edition, Pearson Education, 2002.
Reference Books:
1.William M. Newman, Robert F. Sproull, **"Principles of Interactive Computer Graphics"**,2nd edition, TMH Publications, 2001.

ELECTIVE 2C: DIGITAL IMAGE PROCESSING

COURSE CODE: U23IT5:F   **HOURS PER WEEK :3**
SEMESTER:V   **CREDITS : 2**

COURSE OUTCOMES

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

CO. No.	Course Outcomes	Level	Unit
CO1	Illustrate the fundamental concepts of a digital image processing system.	K2	I
CO2	Choose images in the frequency domain using various transforms.	K3	II
CO3	Make use of different types of image transforms and their properties.	K3	II
CO4	Analyze the techniques for image enhancement and image restoration.	K4	III
CO5	the need for compression and to learn the spatial and frequency domain techniques of image compression.	K5	IV
CO6	Compose Image Segmentation and Representation.	K6	V

UNIT I : Digital Image Fundamentals

Digital image, applications of digital image processing- elements of digital image processing-digital camera, line scan CCD sensor – display element perception – luminance – brightness, contrast- color models – RGB, CMY, HSI -Fourier transforms.

UNIT II: Image Transform

Properties of Unitary transform – 2D DFT – DCT- Discrete wavelet transform- Hoteling Transform – SVD transform – Slant, Haar transforms.

UNIT III: Image Enhancement and Restoration

Contrast stretching – intensity level slicing – Histogram equalization – spatial averaging – smoothing – Median filtering – nonlinear filters – maximum, minimum, geometric mean – edge detection – degradation model –unconstrained and constrained filtering – removal of blur –Wiener filtering.

UNIT IV: Image Compression

Huffman's coding- truncated Huffman's coding – binary COURSE CODEs, arithmetic coding, run length coding- transform coding – JPEG and MPEG coding.

UNIT V: Image Segmentation

Pixel based approach – Feature threshold – choice of feature – optimum threshold – threshold selecting method- region based approach – region growing – region splitting – region merging.

Text Book(s):
1.   Jayaraman S, Esakkirajan S., Veerakumar T., **"Digital Image Processing"**, Tata McGraw Hill Education Private Limited.
2.   Gonzalez R.C and Woods R. E, **"Digital Image Processing"** Addison Wesley 2. Anil K Jain Fundamentals of Digital image processing, Prentice Hall.

Reference Books:
1.   S. Annadurai, R. Shanmugalakshmi, **"Fundamentals of Digital Image Processing"**, Pearson Education.
2.   Anil. K. Jain, **"Fundamentals of Image Processing"**, PrenticeHall.
3.   Maher A., Sid Ahmad, **"Image Processing-Theory, Algorithms and Architectures"**, McGraw Hill Education Private Limited.

COURSE CODE: U23ITP11   **HOURS PER WEEK :6**
SEMESTER:V   ` **CREDITS : 5**

COURSE OBJECTIVES :
To obtain hands on training in Web Programming with PHP & MySQL.

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Exercises
CO1	Identify the concept to read, understand and the execution of PHP Programming	K3	1-2
CO2	Illustrate the use of operators and expressions to solve the problems	K3	3-4
CO3	Apply the Neural Networks with Supervised Learning	K4	5
CO4	Execute programs with appropriate function statements to solve the problems.	K5	8,9
CO5	Use HTML, hashing function in programs to solve the problems. and Demonstrate accessing MySQL using PHP.	K5	10-15
CO6	Create cookies, sessions and Authentication in PHP	K5	16-20

1. Write a PHP program to compute the number of days in a month.

2. Write a PHP program for sorting numbers.

3. Write a PHP program for sorting names.

4. Write a PHP function to reverse an integer and a string.

5. Write a PHP function to test given character is lower or upper case
6. Write a PHP program to search a word in a given text

7. Write a PHP program to check a given number is Palindrome.

8. Write a PHP program to test the string functions

9. Develop a Home page for College

10. Develop a program and check File System functions, Network functions, Date and time functions. 11.

Develop a program and check message passing mechanism between pages.

12. Write a program and check Regular Expression, HTML functions, Hashing functions. 13.

Write a program to download a file from the server.

14. Develop a web page for user registration with suitable validations

15. Write a program to store the current date and time in a COOKIE and display the 'Last Visited' date and time
on the web page.

16. Write a program to store page views count in SESSION, to increment the count on each refresh and to show
the count on web page.

17. Write a PHP program to maintain student records using files

18. Write an Inventory program to demonstrate Insertion, Updation and Deletion of rows in MYSQL tables. 19.

Write a PHP program using forms to display Employee records stored in MySQL. 20. Develop a college application

form using MYSQL table.

Core Lab 10 : INFORMATION SECURITY PRACTICAL

COURSE CODE: U23ITP12   **HOURS PER WEEK :6**
SEMESTER   :V   **CREDITS : 5**

COURSE OBJECTIVES :
To acquire experience in securing information in store or on move.

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Exercises
CO1	Make use of network programming in Java	K3	1-3
CO2	Develop client sever communication using TCP and UDP	K3	4-10
CO3	Examine the message passing using message window and group window	K4	11-12
CO4	Asses the security level for message passing using substitution techniques	K5	13-14
CO5	Choose the security mechanism using symmetric or asymmetric algorithms	K6	15-16
CO6	Design the security system using One Time Password	K6	17

01. Capturing internet address of local host and remote host using Java Program

02. Write a Java Program to find network ports using port scanner

03. Write a Java Program to implement finger client

04. Implement ping programming using Java.

05. Implement peer to peer communication using UDP

06. Implement socket program for UDP Echo Client and EchoServer

07. Implement Client Server Communication Using TCP
08. Implement Client Server Application for chat

09. Write a Java Program to implement multicasting on a network

10. Write a Java Program to implement Client Server Communication using object stream. 11.

Write a Java Program to perform Message passing using Message Window

12. Write a Java Program to perform Message Passing using Group Window

13. Write a Java Program to implement Caesar Cipher technique

14. Write a Java Program to Implement the Monoalphabetic Cipher

15. Write a Java Program to implement Diffie Hellman Key Exchange Algorithm

16. Write a Java Program to implement RSA Algorithm

17. Write a Java Program to implement basic One Time Password

Core Lab 11 : MULTIMEDIA PRACTICAL

COURSE CODE: U23ITP13   **HOURS PER WEEK :4**
SEMESTER   :V   **CREDITS : 4**

COURSE OBJECTIVES :
To obtain hands on training required to handle various components of Multimedia such as text, graphics, animation, audio and video.

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Exercises
CO1	Design layouts for web pages, Paper Adverts, Broachers Covers and Package designing	K3	1-2
CO2	Use layered Photoshop document from a starting image	K3	3-4
CO3	Test the transforming and retouching images	K4	5
CO4	Create Website, animated graphics, add sound and teractivelyin Adobe Flash	K5	8,9
CO5	Apply Professional audio workstation used to mix, edit and create digital Audio in adobe Audition.	K5	10
CO6	Demonstrate film maker, editors, to combine video audio and still images	K5	10-12

1. Working with Text and Styles.

2. Creating shapes and painting (Using Drawing tool, Pen tool, Painting tools, and Brush tools).

3. Working with Image size and Resolution.

4. Working with Layers.

5. Transforming and Retouching Images (Cropping, Transforming objects, Clone stamping, Retouching).

6. Working with color Adjustments on Image.

7. Creating Frame-by-Frame Animation & Tweened Animation–(motion tween and shape tween).

8. Working with textual effects.

9. Creating buttons and working with scenes.

10. Creating animation with sound.

11. Recording, Editing and Mixing audio clips.

12. Capturing, Editing and Rendering video clips.

Core Theory 11 : PROGRAMMING WITH PYTHON

COURSE CODE: U23IT611   **HOURS PER WEEK :3**
SEMESTER   **:VI**   **CREDITS : 3**

COURSE OBJECTIVES :

To gain knowledge on programming and problem solving using Python.

COURSE OUTCOMES

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

CO No.	Course Outcomes	Level	Units
CO1	Illustrate the basics of computer programming languages	K2	I
CO2	Apply the concepts of user defined functions	K3	II
CO3	Make use of the built in functions	K3	II
CO4	Classify the built in function of string, List, Tuple and Dictionary.	K4	III
CO5	Determine the Importance of file programs and Exceptions handling	K5	IV
CO6	Develop programs using classes and Objects	K6	V

UNIT - 1

Introduction to Python: Introduction–Python Overview–Getting started with python–Comments–Python Identifiers–Reserved Keywords–Variables–Standard Data Types–Operators–Standard and Expressions– String Operations – Boolean Expressions – Control Statements – Iteration – Input from Keyboard.

UNIT - 2

Functions: Introduction – Built-in Functions – Composition of Functions – User Defined Functions – Parameters and Arguments – Function Calls – The return statement – Python Recursive functions – The anonymous functions – Writing python scripts

UNIT - 3

Strings and Lists: Strings – Compound Data type – len Function – String Slices – Strings are Immutable – String Traversal – Escape Characters – String Formatting Operator – String Formatting Functions - Lists
– Values and accessing elements – Lists are Mutable – Traverse – Deleting elements from list – Built-in list operators – Built-in List methods - Tuples and Dictionaries: Tuples – Creating Tuples – Accessing values in Tuples – Basic Tuple Operations – Built-in Tuple Functions - Dictionaries.

UNIT - 4

Files and Exceptions: Text Files– Opening a File– Closing a File– File Object Attributes– Reading from a file– Writing to a file– Renaming a file– Deleting a file– File related methods- Directories– Exceptions– Built-in Exceptions – Handling Exceptions - Exception with arguments – User defined Exceptions

UNIT - 5

Classes and Objects: Overview of OOP – Class Definition – Creating Objects – Objects as Arguments – Objects as Return values – Built-in class attributes – Inheritance – Method Overriding – Data Encapsulation – Data Hiding.

TEXT BOOK

1. Balagurusamy E, "Introduction to Computing and Problem Solving Using Python", 1st Edition, McGraw Hill Education(India) Private Limited, 2017.

REFERENCE BOOKS

1. Reema Thareja, "Python Programming using Problem Solving Approach", Oxford University Press, 2017.
2. Ashok Namdev Kamthane and Amit Ashok Kamthane, "Programming and Problem Solving with Python", McGrawHill Education, November 2017.
3. Mark Lutz, "Learning Python", O'Reilly, Shroff Publishers & Distributors Private Ltd., June 2017.

COURSE CODE: U23IT612 **HOURS PER WEEK : 3**
SEMESTER :VI **CREDITS : 3**

COURSE OBJECTIVES :
To understand the underlying concepts in Internet of Things (IoT) and to acquire knowledge on state of the art in the IoT, its challenges and future directions.

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Units
CO1	Demonstrate the designs and levels of IoT	K2	I
CO2	Identify Domain Specific IoTs	K3	II
CO3	Utilize IoT and M2M	K3	II
CO4	Discover IoT design methodology, Devices and Endpoints	K4	III
CO5	Interpret IoT design using case studies	K5	IV
CO6	Elaborate Data analytics for IoT and Tools for IoT	K6	V

UNIT - 1
Introduction to Internet of Things: Introduction – Physical Design of IoT – Logical Design of IoT – IoT Enabling Technologies – IoT Levels & Deployment Templates.

UNIT - 2
Domain Specific IoTs: –Introduction – Home automation – Cities – Environment – Energy – Retail – Logistics – Agriculture – Industry – Health & Lifestyle – IoT and M2M: Introduction – M2M – Difference between IoT and M2M – SDN and NFV for IoT – Software Defined Networking – Network Function Virtualization.

UNIT - 3
IoT Platforms Design Methodology: Introduction – IoT Design Methodology – IoT Physical Devices and Endpoints: – What is an IoT device – Exemplary Device: Raspberry Pi – About the Board – Linux on Raspberry Pi – Raspberry Pi Interfaces – Programming Raspberry Pi with Python – Other IoT devices.

UNIT - 4
Case Studies Illustrating IoT Design: Introduction – Home Automation – Smart Lighting – Home Intrusion Detection – Cities – Smart Parking – Environment –Weather Monitoring System – Weather Reporting Bot – Air Pollution Monitoring – Forest Fire Detection – Agriculture – Smart Irrigation – Productivity Applications.

UNIT - 5
Data Analytics for IoT: Introduction – Apache Hadoop – Using Hadoop MapReduce for Batch Data Analysis – Apache Oozie – Apache Spark – Apache Storm – Using Apache Storm for Real-time data analysis. Tools for IoT: Introduction – Chef – Chef case studies – Puppet – Puppet case study.

TEXT BOOK:
1. Arshdeep Bahga, Vijay Madisetti, "Internet of Things – A Hands-on Approach", Universities Press(India) Private Limited, 2016.

REFERENCE BOOKS
1. Peter Waher, "Learning Internet of Things", PACKT Publishing, 2015.
2. Cuno Pfister, "Getting Started with the Internet of Things", O'Rielly Publication. 3. Francis DaCosta, "Rethinking the Internet of Things-A Scalable Approach to Connecting Everything", Apress open publication, 2013 Edition.

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COURSE CODE: U23IT6:A   **HOURS PER WEEK :3**
SEMESTER   :VI   **CREDITS : 3**

COURSE OBJECTIVES :
To know the concepts and applications associated with Web Services.

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Units
CO1	Illustrate the importance of web service and fundamentals of XML	K2	I
CO2	Explain the Messages and encoding through Simple Object Access Protocol (SOAP) Web Services Description Language (WSDL) and Universal Description Discovery and Integration (UDDI)	K2	I
CO3	Classify SOAP and WSDL	K2	II
CO4	Develop the Web Services Conversation Language (WSCL) implement the business level conversations or public processes	K6	III4
CO5	Evaluate workflow with Business Process Execution Language (BPEL)	K6	IV
CO6	Build the Organization for the Advancement of Structured Information Standard (OASIS) using Business Transaction Protocol	K3	V

UNIT - 1
Introduction: Overview of web services – SOAP, WSDL, UDDI – Importance of Web Services – Web services and enterprises – **XML Fundamentals:** The Lingua Franca of Web Services - XML Documents - XML Namespaces - XML Schema - Processing XML.

UNIT - 2
SOAP and WSDL: - The SOAP Model – SOAP – SOAP Messages – SOAP Encoding – SPOAP RPC – Using Alternate SOAP Encodings – Document, RPC, Literal, Encoded – SOAP Web Services and the REST Architecture – Looking Back to SOAP 1.1 - WSDL – Using SOAP and WSDL .
UNIT - 3
UDDI: - UDDI at a glance – UDDI Business Registry – UDDI under the covers – Accessing UDDI – How UDDI is Playing Out. **Conversations:** -Overview–Web Services Conversation Language–WSCL Interface Components–Relationship Between WSCL and WSDL.

UNIT - 4
Workflow: -Business Process Management–Workflows and Workflow Management System – Business Processing Language for Web Services (BPEL) **Transactions:**- ACID Transactions – Distributed Transactions and Two Phase Commit – Dealing with Heuristic Outcomes – Scaling Transactions to Web Services.

UNIT - 5
Transactions: OASIS Business Transaction Protocol - Other Web Service Transaction Protocols. **Security :** Everyday Security Basics - Security Is An End-to-End Process - Web Service Security Issues - Types of Security Attacks and Threats - Web Services Security Roadmap - WS-Security. **Real World Web Service Application Development-Foundations:** - Enterprise Procurement – System Functionality and Architecture – Running the EPS Application.

TEXT BOOK
1. Sandeep Chatterjee, James Webber, **"Developing Enterprise Web Services – An Architect's Guide"**, Pearson Education, 2004.

REFERENCE BOOK
1. Frank. P. Coyle, **"XML, Web Services and The Data Revolution"**, Pearson Education, 2002.

<div align="center">**Elective 3B : OPEN SOURCE TECHNOLOGIES**</div>

COURSE CODE: U23IT6:B	**HOURS PER WEEK :3**
SEMESTER :VI	**CREDITS : 3**

JOB ROLE : Software Developer (NSQF Level : 7) COMPONENT : General

COURSE OBJECTIVES :
To acquire knowledge on Open Source Technologies involving Linux, Apache, MySQL and Perl.

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Units
CO1	Explain the Overview of Linux and Unix	K2	I
CO2	Develop the Apache Web Server using with open source Software	K3	II
CO3	Distinguish between Perl and MySQL commands.	K3	III
CO4	Classify the Website META Language for project creations	K4	IV
CO5	Interpret the Common Gateway using with Apache Configuration and programming with Perl	K5	IV
CO6	Build the Mason configuration with the Mason project	K6	V

UNIT - 1
Introduction: - Open Source Software – Web Explained - Working – Security – **Linux:** - Overview – Basic UNIX

UNIT - 2
Apache Web Server: - Introduction – Starting, Stopping and Restarting Apache – Configuration – Securing Apache – Web Site Creation – Apache Log Files.

UNIT - 3
Perl : - Introduction – Perl Documentation – Perl Syntax Rules – Introduction to Object Oriented Programming – **MySQL:** - Introduction – Commands - SHOW DATABASES - CREATE DATABASES – USE – CREATE TABLE – SHOW TABLES – DESCRIBE – INSERT – SELECT – UPDATE –
DELETE – Administrative Details – Database Independent Interface – Table Joins – Loading and Dumping Database.

UNIT - 4
Website META Language: - Introduction – Installation – Basics – Creating a Template – Other Helpful Includes – Diversion – A Better Template – Configuring WML with .wmlrc – MACROS-Creating Custom Tags – Programming Code – eperl – Project Creation – **Common Gateway Interface:** - Introduction – Apache Configuration – First CGI Program – Introduction of CGI.pm – CGI.pm HTML Shortcuts – Information Received by the CGI Program - Form Widget Methods – CGI Security Considerations – die() function – **mod-Perl: -** Introduction – Configuration – Turning CGIs into mod
perl Programs – Pure mod-perl Programming.

UNIT - 5
Server Side Includes: - Introduction – Security Considerations – **Embperl (HTML::Embperl):** – Introduction – Installation – Apache Configuration – Example Program – Embperl Commands – Posted Data and %fdat – Other Embperl Variables - Embperl Project – **Mason (HTML::Mason):** – Introduction – Installation – Apache Configuration – Example Program – Inline Perl Sections – Handling Posted Data with % ARGS and <%args> - Mason Components – Mason Project

TEXT BOOK
1. James Lee and Brent Ware,**"Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP"**, Dorling Kindersley(India) Pvt. Ltd, 2009.

REFERENCE BOOK
1. Eric Rosebrock, Eric Filson, **"Setting up LAMP: Getting Linux, Apache, MySQL, and PHP and working Together"**, Published by John Wiley and Sons, 2004.

Elective 3C : DISTRIBUTED COMPUTING TECHNOLOGIES

COURSE CODE: U23IT6:C   **HOURS PER WEEK :3**
SEMESTER   :VI   **CREDITS : 3**

COURSE OBJECTIVES :
To understand the facilities and technologies available for Distributed Computing.

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Units
CO1	Illustrate characterization of Distributed System	K2	I
CO2	Classify Networks and Apply Ethernet and WiFi Blutooth	K3	I
CO3	Develop Distributed objects and remote Invocation and Java RMI	K3	II
CO4	Test for Sun network File System	K4	III
CO5	Interpret and Evaluate the Global name service	K5	IV
CO6	Discuss Transaction using in distributed computing technology	K6	V

UNIT - 1
Characterization of Distributed Systems – Examples – Resource Sharing and the Web – Challenges – System Models – Architectural and Fundamental Models – Networking and Internetworking – Types of Networks – Network Principles – Internet Protocols – Case Studies: Etherent, WiFi, Bluetooth.

UNIT - 2
Interprocess Communication – The API for the Internet Protocols – External Data Representation and Marshalling – Client– Server Communication – Group Communication – Case Study – Distributed Objects and Remote Invocation – Communication between Distributed Objects – Remote Procedure Call – Events and Notifications– Case Study: Java RMI

UNIT - 3
The OS Layer– Protection– Processes and Threads– Communication and Invocation– OS Architecture– Security– Security Techniques–Cryptographic Algorithms–Digital Signatures–Cryptography Pragmatics– Case Studies – Distributed File Systems – File Service Architecture – Sun Network File System.

UNIT - 4
Name Services – Domain Name System – Discovery Services – Case Study: Global Name Service , X.500 Directory Service – Clocks , Events and Process States – Synchronizing Physical Clocks – Logical Time and Logical Clocks – Global States – Distributed Debugging – Distributed Mutual Exclusion – Elections – Multicast Communication.

UNIT - 5
Transactions – Nested Transactions – Locks – Optimistic Concurrency Control – Timestamp Ordering – Comparison – Flat and Nested Distributed Transactions – Atomic Commit Protocols – Concurrency Control in Distributed Transactions – Distributed Deadlocks – Transaction Recovery – Replication and Distributed Multimedia Systems.

TEXT BOOK
1. George Coulouris, Jean Dollimore, Tim Kindberg, **"Distributed Systems Concepts and Design"**, 4th Edition, Pearson Education, 2009.

REFERENCE BOOK
1. Albert Fleishman, **"Distributed Systems Software Design and Implementation"**, Springer Verlag, 2004.
2. M. L .Liu, **"Distributed Computing Principles and Applications"**, Pearson Education, 2004.

COURSE CODE: U23IT6:D   **HOURS PER WEEK :3**
SEMESTER   :VI   **CREDITS : 3**

Course Objectives: To provide exposure on the application of design learning to real-life situations, where communication and collaboration are vital.

Unit -1: The Tao of UXD

What Is User Experience Design – About UX Designers – Where UX Designers Live? **The Project Ecosystem:** Identify the Type of Site - Choose Your Hats. **Proposals for Consultants and Freelancers:** Proposals - Creating the Proposal - Statements of Work. **Project Objectives and Approach:** Solidify Project Objectives - Understand the Project Approach.

Unit – 2: User Research

Choosing Research Techniques. **Site Maps and Task Flows**: What Is a Site Map? - What Is a Task Flow? - Tools of the Trade - Basic Elements of Site Maps and Task Flows - Common Mistakes - Advanced Site Maps - Breaking the Site Map Mold - Task Flows - Taking Task Flows to the Next Level. **Wireframes and Annotations:** What Is a Wireframe? - What Are Annotations? - Who Uses Wireframes? - Start Simply: Design a Basic Wireframe. **Prototyping:** What Is Prototyping? - How Much Prototype Do I Need? - Paper Prototyping - Digital Prototyping - Prototype Examples.

Unit – 3: Organizing the Content

Information Architecture and Application Structure: The Big Picture - The Patterns. **Getting Around: Navigation, Signposts, and Wayfinding:** Staying Found - The Cost of Navigation - Navigational Models - Design Conventions for Websites - The Patterns. **Organizing the Page: Layout of Page Elements:** The Basics of Page Layout - The Patterns.

Unit – 4: Actions and Commands

Doing Things: Pushing the Boundaries - The Patterns. **Showing Complex Data: Trees, Charts, and Other Information Graphics:** The Basics of Information Graphics - The Patterns. **Getting Input from Users: Forms and Controls:** The Basics of Form Design - Control Choice - The Patterns.

Unit – 5: Using social media

The Basics of Social Media - The Patterns. **Going Mobile**: The Challenges of Mobile Design -The Patterns. **Making It Look Good: Visual Style and Aesthetics:** The Basics of Visual Design - What This Means for Desktop Applications - The Patterns.

Books for Study:

1. Russ Unger and Carolyn Chandler, *"A Project Guide to UX Design - For user experience designers in the field or in the making"*, New Riders is an imprint of Peachpit, a division of Pearson Education, 2009 Edition. (For Units – 1 and 2)
2. Jenifer Tidwell, *"Designing Interfaces"*, Second Edition, Published by O'Reilly Media. (For Units – 3, 4 and 5)

ELECTIVE 4B: ARTIFICIAL INTELLIGENCE

COURSE CODE: U23IT6:E   **HOURS PER WEEK :3**
SEMESTER   :VI   **CREDITS : 3**

Course Objective: To acquire knowledge on various intelligent system techniques and methodologies and to have enriched knowledge on Knowledge representation, problem solving, and learning methods in solving particular engineering problems.

UNIT I
Artificial Intelligence: AI problems-AI technique-Problem Search:-Production Systems – Problem Characteristics – Production system characteristics- Heuristic Search techniques: Generate and Test – Hill Climbing – Constraint Satisfaction, Means-end analysis.

UNIT II
Knowledge representation issues: Representations and mappings – Approaches to Knowledge representations –-Frame problem –. Using Predicate Logic: Representing simple facts in logic - Representing Instance and ISA relationships – Computable functions and predicates – Resolution.

UNIT III
Representing knowledge using rules: Procedural Vs Declarative knowledge – Logic programming – Forward Vs Backward reasoning – Matching – Control knowledge. **Knowledge representation summary**: Syntactic and Semantic spectrum of representation-Logic and slot – and-filler structures-Other representational techniques**.**

UNIT IV
Rule-based expert systems: Introduction- Rules as a knowledge representation technique- players- Structure-Forward chaining and backward chaining inference techniques- **Fuzzy expert systems**: Introduction- Fuzzy sets- Linguistic variables and hedges- Operations - Fuzzy rules- - Building a fuzzy expert system**.**

UNIT V
Artificial neural networks: Neuron- perceptron- Multilayer neural networks- - The Hopfield network-Robotics: Introduction-Robot hardware-Perception-Moving-Robotic software architecture.

Text Books:
1. Elaine rich and Kelvin Knight, "Artificial Intelligence ", Tata McGraw hill Publication, 3ndEdition, 2009. [Unit - I,II,III]
    Unit I   : Chapters 1, 2, 3
    Unit II: Chapters 4, 5
    Unit III: Chapters 6, 11
2. Artificial Intelligence: A Guide to Intelligent Systems, 3rd edition, Michael Negnevitsky, Addison Wesley, 2011. [Unit IV-Chapter 1,2,4,V-Chapter 6]
3. Artificial Intelligence a modern Approach "– Stuart Russell & Peter Norvig, 3rd Edition Pearson Education [Unit V-Chapter 25-Robotics]

Reference Books:
1. "Artificial Intelligence a modern Approach "– Stuart Russell & Peter Norvig, 3rd Edition, Pearson Education.
2. "Artificial Intelligence ", George F Luger , 4thEdition , Pearsons Education Publ, 2002.
3. "Foundations of Artificial Intelligent And Expert Systems", V S Janaki Raman, K Sarukesi, P Gopalakrishnan, Macmillan India Limited

ELECTIVE 4C: HUMAN COMPUTER INTERACTION

COURSE CODE: U23IT6:F   **HOURS PER WEEK :3**
SEMESTER   **:VI**   **CREDITS : 3**

Course Objectives: To provide a vivid understanding on the facilities and technologies available for interaction between Human Beings and Computers.

UNIT – 1: Models, Theories, and Frameworks

A Effective Use and Reuse of HCI Knowledge – Macrotheory for System of Interactors – Design in the MoRAS – Distributed Cognition : Toward a New Foundation for Human-Computer Interaction Research. – User Interface Software and Tools : - Past, Present, and Future of User Interface Software Tools – Creating Creativity : User Interfaces for Supporting Innovations – Interaction Spaces for Twenty-First-Century Computing.

UNIT – 2: Usability Engineering Methods and Concepts

The Strategic Use of Complex Computer Systems – User Interface Evaluation : How Cognitive Models can Help – HCI in the Global Knowledge-Based Economy : Designing to Support Worker Adaptation – A Reference Task Agenda for HCI – The Maturation of HCI: Moving beyond Usability toward Holistic Interaction.

UNIT – 3: Groupware and Cooperative Activity

Computer-Mediated Communications for Group Support : Past and Future – The Intellectual Challenge of CSCW : The Gap between Social Requirements and Technical Feasibility – Social Translucence: Designing Systems That Support Social Processes – Transcending the Individual Human Mind : Creating Shared Understanding through collaborative Design – The Development of Cooperation: Five Years of Participatory Design in Virtual School – Distance Matters.

UNIT – 4: Media and Information

Designing the User Interface for Multimodal Speech and Pen-Based Gesture Applications: State-of- the-Art Systems and Future Research Directions – Technologies of Information : HCI and Digital Library – Interface that Give and Take Advice – Beyond Recommender Systems : Helping People Help Each Other.

UNIT – 5: Integrating Computation and Real Environments

Charting Past, Present, and Future Research in Ubiquitous Computing – Situated Computing : The Next Frontier for HCI Research – Roomware : Toward the Next Generation of Human – Computer Interaction based on an Integrated Design of Real and Virtual Worlds. – Emerging Framework for Tangible User Interfaces – HCI and Society : Learner-Centered Design : Reflections and New Directions – HCI Meets the "Real World" : Designing Technologies for Civic Sector Use – Beyond Blowing Together : Socio Technical Capital.

Text Book:
1. John M. Carroll, "Human Computer Interaction–in the New Millennium", Pearson Education, 2007.
Reference Book:
1. Alan Dix, Janet Finlay, Gregory D. Abowd, Russell Beale, "Human-Computer Interaction", Pearson Education, 2009.

Core Lab 12 : PYTHON PROGRAMMING PRACTICAL

COURSE CODE: U23ITP14	**HOURS PER WEEK :6**
SEMESTER :VI	**CREDITS : 4**

COURSE OBJECTIVES :
To enrich programming and problem solving skills with python programming.

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Exercises
CO1	Apply the basic concepts of programming using Python	K3	1-6
CO2	Construct the program using built in functions of List and String	K3	7-13
CO3	Test for mapping using Dictionary	K4	14-16
CO4	Asses the execution speed of the program using recursion	K5	17-19
CO5	Evaluate the basic operations of file creation	K5	20-22
CO6	Build the program using Object Oriented Concepts	K6	23-25

1. Write a program to calculate the average of numbers in a given list.

2. Write a program to accept three digits and print all possible combinations from the digits. 3. Write a program to count number of digits in a number.

4. Write a program to compute prime factors of an integer.

5. Write a program to find LCM and GCD of two numbers.

6. Write a program to check if a number is a perfect number.

7. Write a program to remove the duplicate items from a list.
8. Write a program to find union and intersection of two lists.
9. Write a program to swap the first and last value of a list.

10. Write a program to count the number of vowels in a string.

11. Write a program to calculate the number of digits and letters in a string.

12. Write a program to form a new string by exchanging the first and the last characters.

13. Write a program to add a key-value pair to the dictionary.
14. Write a program to map two lists into dictionary.

15. Write a program to sum all the items in a dictionary.

16. Write a program to check common letters in two input strings.

17. Write a program to find the Fibonacci series using recursion.

18. Write a program to flatten a nested list using recursion.

19. Write a program to find the length of a list using recursion.

20. Write a program to count the number of words in a text file.

21. Write a program to copy the contents of one file into another.

22. Write a program to read the contents of a file in reverse order.

23. Write a program to append, delete and display elements of a list using classes.

24. Write a program to create a class which performs basic calculator operations.

25. Write a program to create a class and get all possible subsets from a set of distinct integers.

Core Lab 12 : INTERNET OF THINGS PRACTICAL

COURSE CODE: U23ITP15   **HOURS PER WEEK :6**
SEMESTER   :VI   **CREDITS : 4**

COURSE OBJECTIVES :
To gain experience in working with IoT Applications.

COURSE OUTCOMES
After the successful completion of this course, the student will be able to

CO No.	Course Outcomes	Level	Exercises
CO1	Build an interface to toggle LED with delay	K3	1
CO2	Make use of LED dimmer and weather Monitoring	K3	2 – 3
CO3	Examine the temperature data to show in LCD display and controlling DC motor	K4	4 – 5
CO4	Interpret the time in seven segment display and display sensor data in a web application	K5	6 – 7
CO5	Build a home appliances control with IR and send sensor data to cloud	K5	8 – 9
CO6	Create an indoor air quality and garbage monitoring system	K6	10

1. Interfacing LED to Toggle with delay

2. LED Dimmer using Pulse Width Modulation

3. Weather Monitoring using DHT11

4. Display Temperature Data with LCD interfacing

5. DC Motor Controlling.

6. Time Display using 7-Segment Display
7. Display Sensor Data using Web Application

8. Home Appliances control with IR Receiver using IR-Remote.

9. Sending Sensor Data to Thing-Speak Cloud

10. Indoor Air-Quality and Garbage Monitoring System

Core Lab 13 : REACT JS PRACTICAL

Code   : **U23ITP16**   **Hours/Week: 4**
Semester   : **VI**   **Credits: 3**

Learning Objectives:
Create React Components and perform some simple tests. Think in React, add state and props to an application.

Course Outcomes: On successful completion of this course, the students will be able to:

CO1 :	K2	Understand the programming model provided by the React framework.
CO2 :	K3	Identify React components.
CO3 :	K3	Make Use the React framework to handle events and stateful data.
CO4 :	K5	Design GUI application using React JS.
CO5 :	K6	Adopt REST full API in React, including fetching, deleting, and adding data.

1. Build Search filter in React
2. Simple counter exercise
3. Display customer details in HTML table using map function in React
4. Implement React routing navigation.
5. Build Accordion in React
6. Image Slider using React JS
7. Create a Checklist in React
8. Simple Login form in React
9. Print data from REST API
10. Context API in React Components

Skills Enhancement for IT Professionals

Code: U23IT6G1   **Hours/Week: 2**

Semester: VI   **Credits: 2**

Learning objectives:

To develop an understanding of employability, professional and communication skills, by identifying industry trends, required skills, and available opportunities.

UNIT I

Employability Skills-Employability Skills for the current job market and future of work-Employability related GOI and private portals and their usage-Different industries, trends, required skills and the available opportunities-

UNIT II

Becoming a Professional-Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn -Continuous learning mindset for personal and professional development

UNIT III

Listening and speaking skills-basics of communication-elements of communication-barriers of communication-types of communication- active listening- effective speaking-listening and speaking-effective presentation strategies- group communication-

UNIT IV

Reading and writing skills- reading techniques-technical writing-art of condensation- writing letters, memos, emails and reports-resume preparation

UNIT V

Career Development & Goal Setting-Career development plan-Short- and long-term goals **Getting ready for Jobs-**Drafting Curriculum Vitae (CV)-offline and online job search- interviews.

Text Books:

1.Meenakshi Raman and Sangeeta Sharma, "Technical communication: Principles and practice",. 2/e. Oxford university Press India. 2011