BACHELOR OF SCIENCE – INFORMATION TECHNOLOGY
(For students admitted from 2017-18 & onwards)

The curriculum of all programme courses are highlighted with Employability – Pink Color,
Entrepreneurship – Yellow Color and Skill-Development – Red Color

P.K.R ARTS COLLEGE FOR WOMEN
(Accredited with 'A' Grade by NAAC)
An Autonomous Institution – Affiliated to Bharathiar University
Gobichettipalayam – 638 476.
BACHELOR OF SCIENCE – INFORMATION TECHNOLOGY
Course Scheme and Scheme of Examinations
(For students admitted from 2017-18 & onwards)

Part	Category	Course Code	Title of the Course	Contact Hrs/ week	Exam Duration hrs.	CIA	ESE	Total	Credits
			SEMESTER - I						
I	Language: I	17LTU01/ 17LHU01/ 17LFU01/ 17LKU01/ 17LMU01/ 17LSU01	Tamil- I/Hindi-I/French-I/ Kannada-I/ Malayalam-I / Sanskrit-I	6	3	25	75	100	4
II	English: I	17LEU01	English: I	6	3	25	75	100	4
III	Core: I	17ITU01	Computing Fundamentals and C Programming	4	3	25	75	100	4
III	Core :II	17ITU02	Digital Fundamentals and Computer Architecture	4	3	25	75	100	4
III	Core : III	17ITU03	Programming in C- Practical	3	3	40	60	100	4
III	Allied : I	17ITU04	Mathematical Structures for Computer Science	5	3	25	75	100	4
IV	Foundation Course: I	17FCU01	Environmental studies	2	3	-	50	50	2
			TOTAL	30				650	26
			SEMESTER - II						
I	Language: II	17LTU02/ 17LHU02/ 17LFU02/ 17LKU02/ 17LMU02/ 17LSU02	Tamil- II/Hindi-II/French-II/ Kannada-II/ Malayalam-II/ Sanskrit-II	6	3	25	75	100	4
II	English: II	17LEU02	English: II	6	3	25	75	100	4
III	Core: IV	17ITU05	Programming in C++	5	3	25	75	100	4
III	Core : V	17ITU06	Programming in C++- Practical	4	3	40	60	100	4
III	Core : VI	17ITU07	Programming in HTML- Practical	2	3	40	60	100	2
III	Allied : II	17ITU08	Discrete Mathematics	5	3	25	75	100	4

IV	Foundation Course : II	17FCU02	Yoga and Value Education	2	3	-	50	50	2
			TOTAL	**30**				**650**	**24**

SEMESTER - III

III	Core :VII	17ITU09	Data Structures	5	3	25	75	100	4
III	Core : VIII	17ITU10	Java Programming	5	3	25	75	100	4
III	Core : IX	17ITU11	Programming in Java – Practical	5	3	40	60	100	4
III	Core : X	17ITU12	Data Mining	4	3	25	75	100	4
III	Allied : III	17ITU13	Microprocessor and ALP	4	3	25	75	100	4
III	Core :XI	17ITU14	Comprehension in Computer Science-I (Online Exam / Self-Study)	-	1 1/2	-	50	50	1
IV	Skill Enhancement Course : I	17SEU01	Information Security	2	3	100	-	100	2
IV	Non - Major Elective :I	17NMU01A/ 17NMU01B	Indian Women and Society / Basic Tamil	2	3	-	50	50	2
IV	Non - Major Elective :II	17NMU02A/ 17NMU02B	Career Enhancement (Online Exam)/ Consumer Rights	3	-	-	-	-	-
			TOTAL	**30**				**700**	**25**

SEMESTER - IV

III	Core: XII	17ITU15	Operating System	6	3	25	75	100	5
III	Core : XIII	17ITU16	Linux Programming	6	3	25	75	100	5
III	Core : XIV	17ITU17	Programming in Linux - Practical	6	3	40	60	100	4
III	Allied : IV	17ITU18	Customer Relationship Management	5	3	25	75	100	4
III	Core :XV	17ITU19	Comprehension in Computer Science-II (Online Exam / Self-Study)	-	1 1/2	-	50	50	1
IV	Skill Enhancement Course : II	17SEUIT2	R Tool - Practical	4	3	40	60	100	2
IV	Non - Major Elective :II	17NMU02A/ 17NMU02B	Career Enhancement (Online Exam)/ Consumer Rights	3	1 1/2	-	50	50	2
			TOTAL	**30**				**600**	**23**

SEMESTER - V

III	Core : XVI	17ITU20	Relational Database Management System	6	3	25	75	100	4
III	Core : XVII	17ITU21	VB.Net Programming	6	3	25	75	100	4
III	Core : XVIII	17ITU22	Programming in VB.Net and Oracle- Practical	6	3	40	60	100	4
III	Core :XIX	**	Core Optional	3	3	-	-	100	3
III	Core : XX	17ITU23	Institutional Training	-	-	100	-	100	1
III	Elective : I	17ITU24A/ 17ITU24B/ 17ITU24C/	E-Learning / Animation Techniques / Business Intelligence	6	3	25	75	100	4
III	Core :XXI	17ITU25	Comprehension in Computer Science -III (Online Exam / Self-Study)	-	1 1/2	-	50	50	1
IV	Skill Enhancement Course: III	17SEUIT3	FLASH-Practical	3	3	40	60	100	2
V	Proficiency Enhancement	17PEUIT1	Software Project Management(Self Study)	-	3	-	100	100	2
			TOTAL	30				850	25

SEMESTER - VI

III	Core : XXII	17ITU26	Research Methodology	6	3	25	75	100	5
III	Core : XXIII	17ITU27	Computer Graphics and Multimedia	6	3	25	75	100	5
III	Core :XXIV	17ITU28	Programming in 3D Max- Practical	6	3	40	60	100	4
III	Elective : II	17ITU29A/ 17ITU29B/ 17ITU29C/	Network Security / Mobile Computing Techniques / Embedded System	5	3	25	75	100	4
III	Elective : III	17ITU30A/ 17ITU30B/ 17ITU30C	Neural Networks / Green Computing / Artificial Intelligence	5	3	25	75	100	4
III	Core :XXV	17ITU31	Comprehension in Computer Science - IV(Online Exam / Self-Study)	-	1 1/2	-	50	50	1
IV	Skill Enhancement Course : IV	17SEUIT4	Software Testing - Practical	2	3	40	60	100	2
			TOTAL	30				650	25
V	Extension Activity		NSS / YRC / RRC / CCC / PHYSICAL EDUCATION	II – VI SEMESTER					1
			Department Extension Activity	II – VI SEMESTER					1
			Total credits						150

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Head, Department of Computer Science
P.K.R. Arts College for Women (Autonomous)
Gobichettipalayam - 638 476.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE: I	17ITU01	COMPUTING FUNDAMENTALS AND C PROGRAMMING	48	-	4

Preamble

To learn about the Computer fundamentals and the C programming language concepts.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Obtain basic fundamentals of computers	K1,K2
CO2	Learn basics of C language	K1,K2
CO3	Understand the control structure	K2,K5
CO4	Familiarize in functions and structure and unions	K3,K4
CO5	Analyze pointers and file	K4,K5

SYLLABUS

UNIT I (9 Hours)   **Fundamentals of Computers**
Introduction – History of Computers-Generations of Computers- Classification of Computers-Basic Anatomy of a Computer System-Input Devices-Processor-Output Devices-Memory Management – Types of Software- Overview of Operating System- Programming Languages-Translator Programs-Problem Solving Techniques - Overview of C.

UNIT II (10 Hours)   **Overview of C**
Introduction - Character set - C tokens - Keyword & Identifiers - Constants - Variables - Data types - Declaration of variables - Assigning values to variables - Defining Symbolic Constants - Arithmetic, Relational, Logical, Assignment, Conditional, Bitwise, Special, Increment and Decrement operators - Arithmetic Expressions - Evaluation of Expression - Precedence of Arithmetic Operators - Type Conversion in Expression – Operator Precedence and Associativity - Mathematical Functions - Reading and Writing a Character - Formatted Input and Output.

UNIT III (9 Hours)   **Decision Making and Branching Statement**
Introduction – If, If….Else, Nesting of If …Else Statements- Else If ladder – The Switch Statement, The ?: Operator – The Goto Statement. Decision Making and Looping: Introduction- The while Statement- The Do Statement – The For Statement-Jumps in Loops. Arrays – Character Arrays and Strings.

UNIT IV (10 Hours)   **Functions**

User-Defined Functions: Introduction – Need and Elements of User-Defined Functions-Definition-Return Values and their Types - Function Calls – Declarations – Category of Functions- Nesting of Functions - Recursion – Passing Arrays and Strings to Functions - The Scope, Visibility and Lifetime of Variables- Multi file Programs. Structures and Unions.

UNIT V (10 Hours)   **Pointers**

Introduction-Understanding Pointers-Accessing the Address of a Variable-Declaration and Initialization of Pointer Variable – Accessing a Variable through its Pointer-Chain of Pointers- Pointer Expressions – Pointer Increments and Scale Factor- Pointers and Arrays-Pointers and Strings – Array of Pointers – Pointers as Function Arguments- Functions Returning Pointers – Pointers to Functions – Pointers and Structures. File Management in C.

TEXT BOOK:

1.E Balagurusamy,Computing Fundamentals & C Programming ,Tata McGraw-Hill, Second Reprint 2008.

REFERENCE BOOKS:

1. Ashok N Kamthane, Programming with ANSI and Turbo C, Pearson, 2002.
2. Henry Mullish & Hubert L.Cooper, The Sprit of C, Jaico, 1996.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE: II	17ITU02	DIGITAL FUNDAMENTALS AND COMPUTER ARCHITECTURE	48	-	4

Preamble

To learn about Computer Fundamentals and its Architecture.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	To provide a insight of how basic computer components are specified	K1,K2
CO2	Ability to understand the digital logic circuits and their design	K2,K3,K5
CO3	Acquire knowledge of Input-Output interfaces	K3
CO4	Ability to handle interrupts	K4,K5
CO5	Ability to work with memory organization	K4

SYLLABUS

UNIT I (10 Hours)   Number System and Binary Codes
Number System and Binary Codes: Decimal, Binary, Octal, Hexadecimal – Binary Addition, Multiplication, Division – Floating Point Representation, Complements, BCD, Excess3, Gray Code. Arithmetic Circuits: Half Adder, Full Adder, Parallel Binary Adder, BCD Adder, Half Subtractor, Full Subtractor, Parallel Binary Subtractor - Digital Logic: The Basic Gates – NOR, NAND, XOR Gates.

UNIT II (8 Hours)   Logical Circuit
Combinational Logic Circuits: Boolean Algebra – Karnaugh Map – Canonical form1 – Construction and Properties – Implicants – Don't Care Combinations - Product of Sum, Sum of Products, Simplifications. Sequential Circuits: Flip-Flops: RS, D, JK, and T - Multiplexers – Demultiplexers – Decoder Encoder – Shift Registers-Counters.

UNIT III (12 Hours)   Input-Output Organization
Input – Output Organization: Input – Output Interface – I/O Bus and Interface – I/O Bus versus Memory Bus – Isolated versus Memory – Mapped I/O – Example of I/O Interface Asynchronous Data Transfer: Strobe control and Handshaking.

UNIT IV (10 Hours)   Interrupts and DMA
Priority Interrupt: Daisy-Chaining Priority, Parallel Priority Interrupt. Direct Memory Access:DMA Controller, DMA Transfer. Input–Output Processor: CPU-IOP communication.

UNIT V (8 Hours)   Memory Organization
Memory Organization: Memory Hierarchy – Main Memory- Associative Memory: Hardware Organization, Match Logic, Read Operation, Write Operation. Cache Memory: Associative, Direct, Set-Associative Mapping – Writing into Cache Initialization.

TEXT BOOKS:

1. V.K. Puri, Digital Electronics Circuits and Systems, TMH.
2. Albert Paul Malvino, Donald P Leach, Digital principles and applications, TMH, 1996.
3. M. Morris Mano , Computer System Architecture - PHI.

REFERENCE BOOK:

1. M. Carter, Computer Architecture - Schaum's outline series, TMH

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE: III	17ITU03	PROGRAMMING IN C - PRACTICAL	-	36	4

Subject Description: This course provides hands on experience on C Programming

Goal: To enable the students to develop software in C language

Objectives: On successful completion of the course the students will understand the concepts of C language and expertise in using C

Practical List

1. Write a C program to find the sum, average, standard deviation for a given set of numbers.

2. Write a C program to generate n prime numbers.

3. Write a C program to generate Fibonacci series.

4. Write a C program to print magic square of order n where n > 3 and n is odd.

5. Write a C program to sort the given set of numbers in ascending order.

6. Write a C program to check whether the given string is a palindrome or not using pointers.

7. Write a C program to count the number of Vowels in the given sentence.

8. Write a C program to find the factorial of a given number using recursive function.

9. Write a C program to print the students Mark sheet assuming roll no, name, and marks in 5 subjects in a structure. Create an array of structures and print the mark sheet in the university pattern.

10. Write a function using pointers to add two matrices and to return the resultant matrix to the calling function.

11. Write a C program which receives two filenames as arguments and check whether the file contents are same or not. If same delete the second file.

12. Write a program which takes a file as command line argument and copy it to another file. At the end of the second file write the total i)no of chars ii) no. of words and iii) no. of lines.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
FOUNDATION COURSE: I	17FCU01	ENVIRONMENTAL STUDIES	24	-	2

Preamble

To bring about an awareness of a variety of environmental concerns and to create a pro-environmental attitude and a behavioral pattern in society that is based on creating sustainable lifestyle.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	To give information about the environment and the resources to act at our own level to protect them.	K1
CO2	To analyse the roles of organisms as part of interconnected food webs, populations, communities, and ecosystems	K4
CO3	Understand the scale dependence of biodiversity and its measurement	K2
CO4	To learn how to assess pollution sources, study exposure pathways and fate, and evaluate consequences of human exposure to pollution and its impacts to environmental quality.	K1,K3
CO5	To balance our economic, environmental and social needs, allowing prosperity for now and future generations	K5

SYLLABUS

UNIT I (4 Hours)   Multidisciplinary Nature of Environmental Studies

i) Definition, Scope and Importance

ii) Need for Public Awareness

iii) Natural Resources

a) Natural Resources and Associated Problems

- **Forest Resources:** Use and Over-exploitation, Deforestation, Case Studies. Timber Extraction, Mining, Dams and their Effects on Forests and Tribal People.
- **Water Resources:** Use and Over-utilization of Surface and Ground Water, Floods, Drought, Conflicts over Water, Dams – Benefits and Problems.
- **Mineral Resources:** Use and Exploitation, Environmental Effects of Extracting and using Mineral Resources, Case Studies.
- **Food Resources:** World Food Problems, Changes Caused by Agriculture and Overgrazing, Effects of Modern Agriculture, Fertilizer-Pesticide Problems, Water Logging, Salinity, Case Studies.
- **Energy Resources:** Growing Energy Needs, Renewable and Non-Renewable Energy Sources, Use of Alternate Sources, Case Studies.
- **Land Resources:** Land as a Resource, Land Degradation, Man Induced Landslides, Soil Erosion and Desertification.

b)   Role of an Individual in Conservation of Natural Resources

c)   Equitable Use of Resources for Sustainable Lifestyles

UNIT II (5 Hours)   **Ecosystems**
 i) Concept of an Ecosystem
 ii) Structure and Function of an Ecosystem
 iii) Producers, Consumers and Decomposers
 iv) Energy Flow in the Ecosystem
 v) Ecological Succession
 vi) Food Chains, Food Webs and Ecological Pyramids
 vii) Introduction Types, Characteristics Features, Structure and Function of the following
   Ecosystem:
   a) Forest Ecosystem
   b) Grassland Ecosystem
   c) Desert Ecosystem
   d) Aquatic Ecosystems (Ponds, Streams, Lakes, Rivers, Ocean, Estuaries)

UNIT III (5 Hours)   **Biodiversity and its Conservation**

   i) Introduction – Definition – Genetic, Species and Ecosystem Diversity
   ii) Bio-geographical Classification of India
   iii) Value of Biodiversity – Consumptive Use, Productive Use, Social, Ethical, Aesthetic
     and Option Value
   iv) Biodiversity at Global, National and Local Levels
   v) India as a Mega-Diversity Nation
   vi) Hot-Spots of Biodiversity
   vii) Threats to Biodiversity – Habitat Loss, Poaching of Wildlife, Man-Wildlife Conflicts
   viii) Endangered and Endemic Species of India
   ix) Conservation of Biodiversity – In-situ and Ex-situ and Conservation of Biodiversity

UNIT IV (5 Hours)   **Environmental Pollution**

   i) Definition, Causes, Effects and Control Measures of:
         a) Air Pollution
         b) Water Pollution
         c) Soil Pollution
         d) Noise Pollution
         e) Thermal Pollution
   ii) Solid Waste Management – Causes, Effects and Control Measures of Urban and
     Industrial Wastes
   iii) Role of an Individual in Prevention of Pollution
   iv) Pollution Case Studies
   v) Disaster Management – Floods, Earthquake, Cyclone and Landslides

UNIT V (5 Hours)   **Social Issues and the Environment**
   i) Sustainable Development
   ii) Urban Problems Related to Energy
   iii) Water Conservation, Rainwater Harvesting, Watershed Management
   iv) Resettlement and Rehabilitation of People; Its Problems and Concerns, Case Studies
   v) Environmental Ethics – Issues and Possible Solutions
   vi) Climate Change, Global Warming, Ozone Layer, Depletion, acid Rain, Nuclear
       Accidents and Holocaust, Case Studies
   vii) Consumerism and Waste Products
   viii) Environmental Protection Act

ix) Air (Prevention and Control of Pollution) Act
x) Water (Prevention and Control of Pollution) Act
xi) Wildlife Protection Act
xii) Forest Conservation Act
xiii) Issues Involved in Enforcement of Environmental Legislation
xiv) Public Awareness
xv) Human Population and the Environment

- Population Growth and Distribution
- Population Explosion – Family Welfare Programme
- Environment and Human Health
- Human Rights
- Value Education
- HIV/AIDS
- Women and Child Welfare
- Role of Information Technology in Environment and Human Health
- Medical Transcription and Bioinformatics

TEXT BOOK:
1.Environmental Studies, Bharathiar University, Publication Division, 2004

REFERENCE BOOK:
1.R.C.Sharma & Gurbir Sangha, Environmental Studies, Kalyani Publishers, 2005.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE: IV	17ITU05	PROGRAMMING IN C++	60	-	4

Preamble

To learn about Object Oriented Concepts through C++.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Learn basics of OOPS	K1,K2
CO2	Understand functions in C++	K2
CO3	Learn the inheritance concepts	K3,K4
CO4	Ability to learn pointers	K3,K5
CO5	Know about error handling	K4,K5

SYLLABUS

UNIT I (12 Hours)   Introduction to C++
Software Evolution- A look at Procedure-Oriented Programming- Object Oriented Paradigm- Basic concepts of OOP- Benefits of OOP- Object Oriented Languages- Applications of OOP- Beginning with C++ - Tokens- Expressions and Control Structures.

UNIT II (12 Hours)   Function in C++
Main Function- Function Prototyping- Call By Reference- Return By Reference- Inline Function- Function Overloading – Classes and Objects: C Structures Revisited- Specifying a Class- Defining Member Function- C++ Program with Class- Nesting of Member Function- Private Member Function- Memory Allocation for Objects- Static Data Members and Functions- Array of Objects- Objects as Function Arguments- Friendly Functions – Constructors and Destructors: Constructor- Parameterized Constructors- Multiple Constructor in a Class- Copy Constructor- Destructor.

UNIT III (12 Hours)   Operator Overloading
Introduction- Defining Operator Overloading- Overloading Unary Operator- Overloading Binary Operator- Overloading Binary Operator using Friends- Rules for Overloading Operator – Inheritance: Defining Derived Classes- Single Inheritance- Making a Private Member Inheritable- Multilevel Inheritance- Multiple Inheritance- Hierarchical Inheritance- Hybrid Inheritance- Virtual Base Classes- Abstract Classes.

UNIT IV (12 Hours)   Pointers
Introduction- Pointers- Array of Pointers- Pointers to Objects- This Pointer- Pointer to Derived Class- Virtual Functions- Rules for Virtual Function- Pure Virtual Function – Managing Console I/O Operations.

UNIT V (12 Hours)   **Exception Handling and Strings**

Working with Files – Templates: Introduction- Class Templates- Class Templates with Multiple Parameters- Function Template- Function Template with Multiple Parameters - Exception Handling: Introduction- Basics of Exception Handling- Exception Handling Mechanism- Throwing Mechanism- Catching Mechanism – Strings: Introduction- Creating (String) Objects- Manipulating String Objects- Relational Operators- String Characteristics.

TEXT BOOK:
1.E.Balagurusamy, Object Oriented Programming with C++, Fifth Edition, TMH Publication.

REFERENCE BOOKS:
1.John R Hubbard, Programming with C++, 2nd Edition, TMH Publication, 2002.
2.Maria Litvin & Gary Litvin, C++ for you, Vikas Publication, 2002.
3.Yashavant Kanetkar, Let us C++, BPB Publication, 2nd Edition, 2010.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE: V	17ITU06	PROGRAMMING IN C++ - PRACTICAL	-	48	4

Subject Description: This course provides rich experience on C++ Programming
Goal: To enable the students to develop software in C++ language
Objectives: On successful completion of the course the students will understand the concepts of C++ language and expertise in using C++

Practical List

1. a) Write a C++ program to find a factorial for a given number using recursive function.
   b) Write a C++ program to find a Fibonacci series using while loop.

2. Define a class to represent a bank account. Include the following members:
   Data members: Name of the depositor, Account number, Type of account, Balance amount in the account.
   Member functions: To assign initial values, to deposit an amount, to withdraw an amount after checking the balance, to display the name and balance. Write a main program to invoke the member functions.

3. Write a C++ program to read an integer number and find the sum of all the digits until it reduces to a single digit using constructors, destructors and inline member functions.

4. Write a C++ program to swap two numbers using friend function.

5. Write a C++ Program to create class, which consists of EMPLOYEE Detail like E_Number, E_Name, Department, Basic, Salary, Grade. Write a member function to get and display them. Derive a class PAY from the above class and write a member function to calculate DA, HRA and PF depending on the grade. Create array of objects for the derived class.

6. Write a C++ program to add two complex numbers using operator overloading concept.

7. Write a C++ Program to check whether the given string is a palindrome or not using Pointers.

8. Write a C++ Program using virtual function for number conversions to Binary, Octal, Hexa decimal.

9. Write a C++ Program to create a File and to display the contents of that file with line numbers.

10. Write a C++ Program to merge two files into a single file.

11. Write a C++ Program to implement exception handling concept using divide by zero.

12. a) Write a C++ program to implement the concept of class template.
    b) Write a C++ Program to implement any four built in string functions.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE: VI	17ITU07	PROGRAMMING IN HTML-PRACTICAL	-	24	2

Subject Description: This course provide complete knowledge in HTML
Goal: To enable the students to develop HTML web page
Objectives: On successful completion of the course the students will understand the applications of HTML and create web page

Practical List

1. A Program to illustrate body, pre tags, text formatting tags

2. A Program to illustrate text Font tag, comment, h1….h6, and div tag

3. A Program to illustrate all types of list tag

4. A Program to illustrate img tag, Hyper Link tag (Anchor tag)

5. A Program to illustrate image map

6. A Program to illustrate Table tag

7. A Program to illustrate Frame tag

8. A Program to illustrate Form tag

9. A Program to illustrate CSS (cascading style sheet)

10. A Program in HTML using JavaScript

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
FOUNDATION COURSE: II	17FCU02	YOGA AND VALUE EDUCATION	24	-	2

Preamble

 To enable the learners to acquire the knowledge on basic yogasanas and values and practice them in real life.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Acquire the basic knowledge on yoga and value education	K1
CO2	Understand the importance of yoga, mental exercises, principles of life and components of values	K2
CO3	Enhance their physical and mental health by practicing the different types of asanas, kriyas, mental exercises and values	K3
C04	Lead a meaningful life for the fulfillment of the needs of family, workplace, society and country	K4

SYLLABUS

UNIT I (5 Hours)   Yoga And Health
Theory:
Yoga-Meaning-Importance of Yoga- Pancha Koshas - Benefits of Yoga-General Guidelines.
Practice:
Dynamic Exercise- Surya Namaskar-Basic Set of Asanas-Pranayama and Kriya.

UNIT II (5 Hours)   Art of Nurturing the Mind
Theory:
Ten Stages of Mind-Mental Frequency – Methods for Concentration. Eradication of Worries-Benefits of Blessings- Greatness of Friendship- Individual Peace and World Peace.
Practice: Worksheet.

UNIT III (5 Hours)   Philosophy and Principles of Life
Purpose and Philosophy of Life- Introspection – Analysis of Thought - Moralization of Desires- Neutralization of Anger. Vigilance and Anti- Corruption- Redressal Mechanism - Urban Planning and Administration.
Practice: Worksheet.

UNIT IV (5 Hours)   Value Education (Part-I)
Ethical Values: Meaning – Need and Significance- Types - Value Education – Aim of Education and Value Education. Components of Value Education: Individual Values – Self Discipline, Self Confidence, Self Initiative, Empathy, Compassion, Forgiveness, Honesty, Sacrifice, Sincerity, Self-Control, Tolerance and Courage.
Practice: Worksheet.

UNIT V (4 Hours)   **Value Education (Part-II)**

Family Values: Constitutional or National Values – Democracy, Socialism, Secularism, Equality, Justice, Liberty, Freedom and Fraternity. Social Values – Pity and Probity, Self Control, Universal Brotherhood. Professional Values – Knowledge Thirst, Sincerity in Profession, Regularity, Punctuality and Faith. Religious Values – Tolerance, Wisdom, Character.

Practice: Worksheet**.**

REFERENCE BOOKS:

1. Vethathiri Maharishi, Yoga for Human Excellence, Sri Vethathiri Publications, 2015
2. Value Education for Human Excellence- Study Material by Bharathiar University.
3. Value Education - Study Material by P.K.R Arts College for Women.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE: VII	17ITU09	DATA STRUCTURES	60	-	4

Preamble

To learn about the various data structures and algorithms and their applications.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Obtain basics of computer algorithm	K1,K2
CO2	Understand the tree and table structures	K2,K5
CO3	Familiarize in sorting algorithms	K3,K4
CO4	Analyze file organizations and indexing	K4,K5

SYLLABUS

UNIT I (12 Hours)   Introduction to Algorithms

Introduction of Algorithms, Analysing Algorithms. Arrays: Sparse Matrices -Representation of Arrays. Stacks and Queues. Fundamentals -Evaluation of Expression Infix to Postfix Conversion.

UNIT II (12 Hours)   Linked List and Storage Management

Singly Linked List -Linked Stacks and Queues -Polynomial Addition -Doubly Linked List and Dynamic –Storage Management.

UNIT III (12 Hours)   Trees, Symbol Tables and Hash Tables

Trees: Basic Terminology -Binary Trees -Binary Tree Representations **Symbol Tables:** Static Tree Tables -Dynamic Tree Tables -**Hash Tables:** Hashing Functions -Overflow Handling.

UNIT IV (12 Hours)   External Sorting

Storage Devices -Sorting with Disks: K-Way Merging -Sorting with Tapes.

UNIT V (12 Hours)   Internal Sorting and File Organization

Internal Sorting: Insertion Sort -Quick Sort -2 Way Merge Sort -Heap Sort -Shell Sort - Sorting on Several Keys. **Files:** Files, Queries and Sequential Organizations -Index Techniques -File Organizations.

TEXT BOOK:

1 .Ellis Horowitz, Sartaj Shani, Data and File Structures, Galgotia Publication,1999.

REFERENCE BOOKS:

1. Samanta, D. ,Classic Data structure, Ninth edition, Prentice- Hall of India Pvt Ltd, 2007.
2. Trembly & Sorenson, Data Structures with Applications, 2nd Edition, Tata McGraw Hill Company, 1991 (only for Queue application).

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE: VIII	17ITU10	JAVA PROGRAMMING	60	-	4

Preamble

To inculcate knowledge on Java Programming concepts.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Learn basic concepts Java Programming Language	K1,K2
CO2	Acquire knowledge of control structures	K1,K2
CO3	Familiarize in Java Programming	K2,K5
CO4	Create wide range of Applications and Applets using Java	K3,K4
CO5	Ability to work with I/O Streams	K4,K5

SYLLABUS

UNIT I (12 Hours)   Fundamentals of Object-Oriented Programming

Basic Concepts of Object-Oriented Programming – Benefits of Object-Oriented Programming –Application of Object-Oriented Programming. Java Evolution: Features – How Java differs from C and C++. Overview of Java: Simple Java Program –Structure –Java Tokens –Statements –Java Virtual Machine.

UNIT II (12 Hours)   Control Structures

Constants, Variables, Data Types -Operators and Expressions –Decision Making and Branching: If, If..Else, Nested If, Switch, ? : Operator -Decision Making and Looping: While, Do, For –Jumps in Loops -Labeled Loops –Classes, Objects and Methods.

UNIT III (12 Hours)   JAVA Programming

Arrays, Strings and Vectors –Interfaces: Multiple Inheritance –Packages: Putting Classes together –Multithreaded Programming.

UNIT IV (12 Hours)   Programming with JAVA

Applet Programming – Graphics Programming.

UNIT V (12 Hours)   Managing Input / Output Files in Java

Concepts of Streams-Stream Classes –Byte Stream Classes –Character Stream Classes – Using Streams –I/O Classes –File Class –I/O Exceptions -Creation of Files.

TEXT BOOK:

1.E. Balagurusamy, Programming With Java a Primer, 3rd Edition, TMH.

REFERENCE BOOKS:

1. Patrick Naughton &Hebert Schildt, The Complete Reference Java 2, 3rd Edition, TMH
2. John R. Hubbard ,Programming With Java, 2nd Edition, TMH

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE: IX	17ITU11	PROGRAMMING IN JAVA-PRACTICAL	-	60	4

Subject Description: This course provides hands on experience on Java Programming.

Goal: Enable to create wide range of Applications and Applets using Java.

Objective: On successful completion of the course the students will understand the concepts of Java Programming language and expertise in using Java.

Practical list

1. Write a Java Program to define a class, define instance methods for setting and Retrieving values of instance variables and instantiate its object.

2. Write a Java Program to demonstrate use of subclass.

3. Write a Java Program to implement array of objects.

4. Write a Java program to practice using String class and its methods.

5. Write a Java program to practice using String Buffer class and its methods.

6. Write a Java Program to implement multilevel inheritance by applying various access controls to its data members and methods.

7. Write a program to demonstrate use of implementing interfaces.

8. Write a program to Implementing Thread based applications.

9. Write a program using Applet to display a message in the Applet.

10. Write an applet program working with Colors and Fonts.

11. Write a program using Applet for configuring Applets by passing parameters.

12. Write programs for using Graphics class
    - to display basic shapes and fill them.
    - draw different items using basic shapes.
    - set background and foreground colors.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE: X	17ITU12	DATA MINING	48	-	4

Preamble

To learn about Data Mining and its techniques.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand basics of Data Mining concepts	K1,K2
CO2	Know about techniques of Data Mining	K1,K2
CO3	Understand classification algorithms	K2,K5
CO4	Familiarize in clustering techniques	K3,K4
CO5	Acquire Knowledge about association rules	K4,K5

SYLLABUS

UNIT I (10 Hours)   **Basic of Data Mining**

Basic Data Mining Tasks – Data Mining Versus Knowledge Discovery in Data Bases – Data Mining Issues – Data Mining Matrices – Social Implications of Data Mining – Data Mining from Data Base Perspective.

UNIT II (9 Hours)   **Data Mining Techniques**

Data Mining Techniques – a Statistical Perspective on data mining – Similarity Measures – Decision Trees – Neural Networks – Genetic Algorithms.

UNIT III (10 Hours)   **Classification Techniques**

Introduction – Statistical Based Algorithms – Distance Based Algorithms – Decision Tree Based Algorithms – Neural Network Based Algorithms – Rule Based Algorithms – Combining Techniques.

UNIT IV (9 Hours)   **Clustering**

Introduction –Similarity and Distance Measures – Outliers – Hierarchical Algorithms. Partitional Algorithms.

UNIT V (10 Hours)   **Association Rules**

Introduction - Large Item Sets – Basic Algorithms – Parallel and Distributed Algorithms – Comparing Approaches – Incremental Rules – Advanced Association Rules Techniques – Measuring the Quality of Rules.

TEXT BOOK:

1. Margaret H.Dunbam, Data Mining Introductory and Advanced Topics, Pearson Education, 2003.

REFERENCE BOOK:

1. Jiawei Han & Micheline Kamber, Data Mining Concepts & Techniques, Academic Press,

2001.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
ALLIED:III	17ITU13	MICROPROCESSOR AND ALP	48	-	4

Preamble

To introduces the details about basic concepts of data communication and networking.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Obtain basics of the processors	K1,K2
CO2	Familiarize with assembly level language programming	K2,K3
CO3	Understand the Architecture & Memory management	K1,K4
CO4	Familiarize the external devices to the processor according to the user requirements	K3,K4
CO5	Analyze and create novel products and solutions for the real time problems Communication protocols	K4,K5

SYLLABUS

UNIT I (10 Hours)   Introduction to Microprocessor
Introduction to Microprocessors : Evolution of Microprocessors – Single-Chip Microcomputer – Embedded Microprocessors – Bit- Slice processors – Microprogramming – RISC and CISC Processors – Scalar and Superscalar Processors – Vector Processors – Array Processors – Symbolic Processors – Digital Signal Processors Intel 8086 – Pin Description of Intel 8086 – Operating Modes of 8086 – Register Organization of 8086 – BIU and EU – Interrupts – 8086 Based Computer System – Addressing Modes of 8086 .

UNIT II (10 Hours) Instruction Set and Simple Programs in Microprocessor
8086 Instruction Set – Instruction Groups – Addressing Mode Byte – Segment Register Selection – Segment Override – 8086 Instructions Assembly Language Programs for 8086: Largest Number, Smallest Number in a Data Array – Numbers in Ascending and Descending order – Block Move or Relocation – Block Move using REP instruction – Sum of a series – Multibyte Addition.

UNIT III (10 Hours)   Intel Architecture and Memory Management
Intel 386 and 486 Microprocessors: Intel 386 and 486 Microprocessor – 486DX Architecture – Register Organization of 486 Microprocessor – Memory Organization – Operating Modes of Intel 486 – Virtual Memory – Memory Management Unit – Gates – Interrupts and Exceptions – Addressing Modes of 80486 – Pin Configuration.

UNIT IV (9 Hours)   Addressing Modes , Microprocessor and its Types
Input devices – Output devices – Memory and I/O addressing – 8086 Addressing and Address Decoding – Programmable I/O Ports – DMA Data Transfer. Other Microprocessors – PowerPC Microprocessors – Pentium Microprocessors – Pentium Pro microprocessor – Alpha Microprocessor – Cyrix Microprocessor – MIPS Microprocessor – AMD Microprocessor.

UNIT V (9 Hours)   MOTOROLA and Applications of Microprocessor
MOTOROLA 68000, MOTOROLA 68020, MOTOROLA 68030, MOTOROLA 68040
Interfacing of A/D Converter and Applications: Introduction – Interfacing of ADC 0808 or
ADC 0809 to Intel 8086 – Bipolar to Unipolar Converter – Sample and Hold Circuit, LF 398
– Microprocessor-Based Measurement and Control of Physical Quantities.

TEXT BOOK:
1. Badri Ram, Advanced Microprocessors and Interfacing, Tata McGraw-Hill Publishing
   Company Limited, Fourteenth reprint, 2007.

REFERENCE BOOK:
1. A.K. Ray, K.M. Bhurchandi, Advanced Microprocessors and Peripherals, Tata McGraw-
   Hill Publishing Company Limited, Second Edition, 2007.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
SKILL ENHANCEMENT COURSE:I	17SEU01	INFORMATION SECURITY	24	-	2

Preamble

To learn about the basics of Information Security.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Obtain fundamental knowledge of Information Security	K1,K2
CO2	Learn basic concepts of Risks in Information Security	K1,K2
CO3	Familiarize the ideas of security planning and policies	K2,K3
CO4	Understand with Privacy and Ethical Issues in Information Security	K3,K4
CO5	Learn about Cryptography	K4, K5

SYLLABUS

Unit I (5 Hours)   Introduction to Information Security
Information Security: Principles, Concepts and Definitions - The need for Information Security - Benefits of Information Security. The Security Problem in Computing: The Meaning of Computer Security - Computer Criminals.

Unit II (4 Hours)   Information Risk
Information Risk: Threats and Vulnerabilities of Information Systems – Introduction to Risk Management. Information Security Management Policy, Standards and Procedures.

Unit III (5 Hours)   Security Planning
Administering Security: Security Planning - Security Planning Team Members - Assuring Commitment to a Security Plan - Business Continuity Plan - Incident Response Plan - Organizational Security Policies, Physical Security.

Unit IV (5 Hours)   Privacy and Ethical Issues in Information Security
Legal Privacy and Ethical Issues in Information Security: Protecting Programs and Data - Information and the Law - Rights of Employees and Employers - Software Failures - Computer Crime - Ethical Issues in Information Security.

Unit V (5 Hours)   Cryptography
Cryptography: Introduction to Cryptography - What is Cryptography – Plain Text – Cipher Text – Substitution Ciphers - Transposition Ciphers.

TEXT BOOK:

1. Sumitra Kisan and D.Chandrasekhar Rao,Information Security Lecture Notes, Department of Computer Science and Engineering & Information Technology, Veer Surendra Sai University of Technology (Formerly UCE,   Burla) urla, Sambalpur, Odisha .

REFERENCE BOOK:

1. Andy Taylor (Editor) ,David Alexander, Amanda Finch & David Sutton, Information Security Management Principles An ISEB Certificate , The British Computer Society. 2008

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
NON-MAJOR ELECTIVE:I	17NMU01A	INDIAN WOMEN AND SOCIETY	24	-	2

Preamble

To familiarize students with the specific cultural contexts of women in India

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate knowledge of the history of women's studies as an academic discipline	K1,K2
CO2	Analyze the various roles of women and the challenges faced by them in the society	K3
CO3	Assimilate and evaluate the importance of women health	K3,K5
CO4	Identify the different issues related to women in general	K4
CO5	Assessing the Women Empowerment and the role of Central & State Government in developing Women	K5

UNIT I (5 Hours)   Historical Background
History of Women's status from Vedic times, Women's participation in India's Pre and Post Independence movement and Economic Independence, fundamental rights and importance of women in Modern Society.

UNIT II (5 Hours)   Role of Women (Challenges & remedies)
Women in Family, Agriculture, Education, Business, Media, Defense, Research and Development, Sports, Civil Services, Banking Services, Social Work, Politics and Law.

UNIT III (5 Hours)   Women and Health
Women and health issues, Malnutrition, Factors leading to anemia, Reproductive maternal health and Infant mortality, Stress.

UNIT IV (5 Hours)   Issues of Women
Women's issues, Dowry Related Harassment and Dowry Deaths, Gender based violence against women, Sexual harassment, Loopholes in Practice to control women issues.

UNIT V (4 Hours)   Women Empowerment
Meaning, objectives, Problems and Issues of Women Empowerment, Factors leading to Women Empowerment, Role and Organization of National Commission for Women, Central and State Social Welfare Board for Women Empowerment, Reality of women empowerment in the era of globalization.

REFERENCE BOOKS:

S.No	Authors	Title	Publishers	Year of Publication
1	Mala Khullar	Writing the Women's Movement: A Reader	Zubaan	2005
2	IAWS	The State and the Women's Movement in India	IAWS, Delhi	1994
3	Kosambi, Meera	Crossing Thresholds: Feminist Essays in Social History	Permanent Black	2007
4	T Rowbotham, Sheila	Hidden from History: Women's Oppression and the Fight against It	Pluto Press, London	1975
5	Susheela Mehta	Revolution and the Status of Women	Metropolitan Book co.pvt ltd, New Delhi	1989

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE:XII	17ITU15	OPERATING SYSTEM	72	-	5

Preamble

To learn about basic operating system abstractions, mechanisms and their implementations.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand Operating System	K1,K2,K4
CO2	Learn process handling	K2,K3,K4
CO3	Analyze how multi program is handled	K2,K3,K4
CO4	Obtain knowledge in storage	K2,K3
CO5	Learn scheduling algorithms	K2,K3,K4.K5

SYLLABUS

Unit I (14 Hours)   Introduction
Introduction: What is an Operating System? - Distributed Computing - The Key Architectural Trend: Parallel Computation- Open Systems - UNIX. Hardware- Software- Firmware.

Unit II (15 Hours)   Process
Process Concepts: Introduction-Definitions of Process- Process States- Process State Transitions- The Process Control Block- Operations on Processes- Suspend and Resume- Interrupt Processing. Asynchronous Concurrent Processes: Introduction- Parallel Processing- A Control Structure for Indicating Parallelism: Parbegin/Parend- Mutual Exclusion- Critical Sections- Mutual Exclusion Primitives- Implementing Mutual Exclusion Primitives- Semaphores-Process Synchronization with Semaphores.

Unit III (15 Hours)   Deadlock and Multiprogramming
Deadlock and Indefinite Postponement: Introduction - Examples of Deadlock - A Related Problem: Indefinite Postponement - Resource Concepts- Four Necessary Conditions for Deadlock- Major Areas of Deadlock Research- Deadlock Prevention- Deadlock Avoidance and the Banker's Algorithm- Deadlock Detection- Deadlock Recovery. Real Storage: Introduction- Storage Management Strategies- Contiguous vs. Noncontiguous Storage Allocation- Single User Contiguous Storage Allocation--Fixed Partition Multiprogramming –Variable Partition Multiprogramming.

Unit IV (14 Hours)   Virtual Storage Organization
Introduction - Evolution of Storage Organizations- Virtual Storage: Basic Concepts- Multilevel Storage Organization- Block Mapping- Paging: Basic Concepts- Segmentation- Paging/Segmentation Systems. Virtual Storage Management: Page Replacement Strategies.

Unit V (14 Hours)   **Job and Processor Scheduling**

Introduction - Scheduling Levels- Scheduling Objectives- Scheduling Criteria- Preemptive vs. Nonpreemptive Scheduling- The Interval Timer or Interrupting Clock- Priorities- Deadline Scheduling- First-In-First-Out (FIFO) Scheduling- Round Robin (RR) Scheduling- Quantum Size- Shortest-Job-First (Si F) Scheduling- Shortest-Remaining-Time (SRT) Scheduling- Highest-Response-Ratio-Next (HRN) Scheduling- Multilevel Feedback Queues- Fair Share Scheduling.

TEXT BOOK:

1.H.M.Deitel,Operating System,2nd Edition, Addison Wesley Publishing Company.

REFERENCE BOOKS:

1.William Stallings, Operating System: Internals and Design Principals, 6th Edition, Pearson Publication.

2.Flynn, McHoes, Operating System, India Edition

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE:XIII	17ITU16	LINUX PROGRAMMING	72	-	5

Preamble

To learn about Linux programming languages, tools and concepts.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Learn fundamentals of Linux	K1,K2
CO2	Obtain knowledge in files	K2,K3
CO3	Gain information about how Linux environment works	K2,K3,K4
CO4	Learn basics of terminal communication	K1,K2
CO5	Learn about curses	K2,K3,K4

SYLLABUS

UNIT I (14 Hours)　　　　　　Introduction

An Introduction to UNIX, Linux, and GNU -Programming Linux. Shell Programming **:**Why Program with a Shell? -A Bit of Philosophy -What is a Shell? -Pipes and Redirection -The Shell as a Programming Language -Going Graphical -The dialog Utility.

UNIT II (15 Hours)　　　　　Working with Files

Linux File Structure -System Calls and Device Drivers -Library Functions -Low-Level File Access -The Standard I/O Library -Formatted Input and Output -File and Directory Maintenance -Scanning Directories -Errors -The /proc File System -Advanced Topics: fcntl and mmap.

UNIT III (14 Hours)　　　The Linux Environment

Program Arguments -Environment Variables -Time and Date -Temporary Files -User Information -Host Information -Logging -Resources and Limits.

UNIT IV (14 Hours)　　　　　　Terminals

Reading from and Writing to the Terminal -Talking to the Terminal -The Terminal Driver and the General Terminal Interface -The termios Structure -Terminal Output -Detecting Keystrokes.

UNIT V (15 Hours)　　　　　　Curses

Managing Text-Based Screens with curses :Compiling with curses -Curses Terminology and Concepts -The Screen -The Keyboard -Windows -Subwindows -The Keypad -Using Color. Development Tools**:** Problems of Multiple Source Files -The make Command and Makefiles.

TEXT BOOK:

1. Neil Mathew,Richard stones,Begining Linux Programming,4th Edition,Wiley India Pvt Ltd,2007.

REFERENCE BOOK:
1. N.B.Venkateswarlu, Introduction to LINUX:Installation and Programming, BS Publication

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE:XIV	17ITU17	PROGRAMMING IN LINUX - PRACTICAL	-	72	4

Subject Description: This course provides programming knowledge in Linux
Goal: To enable the students to gain skills in shell programming
Objectives: On successful completion of the course the students will understand the concepts of Operating System through Linux

Practical List

1. Simple shell script for basic arithmetic and logical calculations.

2. Write a shell program to find out reverse string of the given string and check the given string is palindrome or not

3. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.

4. Write a shell script to implement menu driven program to display list of users who are currently working in the system, copying files (cp command), rename a file, list of files in the directory and quit option.(Hint: use case structure)

5. Write awk script that uses all of its features

6. Write a shell script to search an element from an array using binary searching

7. Write a C program that illustrates how to execute two commands concurrently with a command pipe. Ex: - ls –l | sort

8. Write a C program to illustrate concurrent execution of threads using pthreads Library

9. Write a Shell script to demonstrate Terminal locking.

10. Write a Shell script to accept the valid login name, if the login name is valid then print its home directory else an appropriate message.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
ALLIED:IV	17ITU18	CUSTOMER RELATIONSHIP MANAGEMENT	60	-	4

Preamble

To enable the students to learn the basics of Customer Relationship Management

Course Outcomes

On successful completion of the course the students should have:

CO Number	CO Statement	Knowledge Level
CO1	Understood relationship marketing	K1,K2,K4
CO2	Learn customer relationship management	K2,K3,K4
CO3	Learnt sales force automation	K2,K3,K4
CO4	Acquire knowledge of business management	K3
CO5	Learn database marketing	K2,K3,K4,K5

SYLLABUS

UNIT I (12 Hours)   Introduction to Customer Support
Product and Customer – Overview - Importance of a Customer – Consumer Behavior.

UNIT II (12 Hours)   CRM Basics
CRM – Meaning and Definition - Dimensions of CRM - Nature of CRM - Goals of CRM - Advantages of CRM.

UNIT III (12 Hours)   Customer Support Methodology
Customer Centric approach - External Layers Vs Internal Layers - Need of Customer Support Methodologies for Customer Support.

UNIT IV (12 Hours)   Introduction to ERP
Introduction: ERP-An Overview – Enterprise an Overview - Benefits of ERP - ERP and Related Technologies.

UNIT V (12 Hours)   Implementation of CRM
CRM Implementation – A comprehensive Model - Developing CRM Vision and Strategy Management Support**.**

TEXTBOOKS:
1. Balasubramaniyan, K., Essence of Customer Relationship Management, Learn Tech press.
2. For Sugar-CRM & Microsoft Dynamic CRM - Refer Internet

REFERENCE BOOKS:
1. Kaushik Mukerjee – Customer Relationship Management – PHI.
2. M.Peeru Mohamed – Customer Relationship Management – Vikas

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
SKILL ENHANCEMENT COURSE:II	17SEUIT2	R TOOL - PRACTICAL	-	48	2

Subject Description: This course provides hand on experience to Data Mining Using R.
Goal: Candidates pursuing this course will be aligned with the current market job requirements.
Objectives: This course is designed to imbibe the best practice programming skills in Data Mining with R with real world Machine Learning case studies.

Practical List

1. Implement a priori algorithm to extract association rule of data mining.

2. Implement k-means clustering technique.

3. Implement any one Hierarchal Clustering.

4. Implement Classification algorithm.

5. Implementation of Page Rank algorithm

6. Implement Decision Tree.

7. Linear Regression.

8. Data Visualization.

9. Implementation of CART algorithm

10. Time series classification and clustering

Career Enhancement (Online Examination):

This course in one of the compulsory courses stipulated under Part- IV. This course is offered

to facilitate the students to know and get prepared for the public service commission related examinations and other similar examinations. A Question bank in the format of MCQs would be uploaded in the computer and the candidate would be given $1_{1/2}$ Hours with randomly selected 50 questions for a maximum of 50 marks. The passing minimum is 40% of 50 marks ie. 20 marks

Course	No. of Questions	Marks	Total Marks
Non-Major Elective II Career Enhancement (Online Exam)*	50	50 X 1 = 50	50

* Online Exams are conducted in the computer laboratory at the end of each semester

With one credits each.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE:XVI	17ITU20	RELATIONAL DATABASE MANAGEMENT SYSTEM	72	-	4

Preamble

To enable the students to learn about the concepts of database system and manipulation of data.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of database system	K1,K2
CO2	Ability to implement the relational database concepts	K3,K5
CO3	Acquire the deep knowledge on normalization techniques	K2,K3,K4
CO4	Understand the detailed knowledge on PL/SQL	K3,K4,K5
CO5	Ability to work with PL/SQL statements	K5

SYLLABUS

UNIT I (12 Hours)   Introduction to Database System
Purpose of Database Systems – View of Data – Database Languages – Transaction Management – Database Architecture – Database Users and Administrators. Relational Model: Structure of Relational Databases – Database Design – ER Model – Overview of the Design Process – The Entity-Relationship Model – Constraints – Entity Relationship Diagrams.

UNIT II (15 Hours) Relational Algebra Operations – Relational Languages
The Tuple Relational Calculus – The Domain Relational Calculus – SQL: Background – Data Definition – Basic Structure of SQL Queries – Set Operations – Aggregate Functions – Null Values – Nested Sub-Queries – Views – Modification of the Database.

UNIT III (15 Hours)   Data Normalization
Pitfalls in Relational Database Design – Decomposition – Functional Dependencies – Normalization – First Normal Form – Second Normal Form – Third Normal Form – Boyce-Codd Normal Form – Fourth Normal Form – Fifth Normal Form – Denormalization – Database Security: Data Security Requirements – Protecting the Data within the Database – Granting and Revoking Privileges – Data Encryption.

UNIT IV (15 Hours)   PL/SQL
History – Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Declaration – Assignment operation – Bind variables – Substitution Variables – Printing – Arithmetic Operators. Control Structures and Embedded SQL: Control Structures – Nested Blocks – SQL in PL/SQL – Data Manipulation – Transaction Control Statements. PL/SQL Cursors and Exceptions: Cursors – Implicit & Explicit Cursors and Attributes –FOR Loops –

SELECT…FOR UPDATE – WHERE CURRENT OF clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions.

UNIT V (15 Hours)   PL/SQL Composite Data Types
Records – Tables – Arrays. Named Blocks: Procedures – Functions – Packages –Triggers – Data Dictionary Views.

TEXT BOOKS:
1.Abraham Silberschatz, Henry F.Korth, S.Sudarshan, Database System Concepts, 5th
  Edition, TMH   (UNIT - I, II,)
2.Alexis Leon, Mathews Leon , Fundamentals of Database Management Systems, Vijay
  Nicole Imprints Private Limited. (UNIT – III)
3.Nilesh Shah, Database Systems Using Oracle‖, 2nd edition, PHI. UNIT -IV: Chapters 10 &
  11 UNIT -V: Chapters 12, 13 & 14)

REFERENCE BOOK:
1.Majumdar & Bhattacharya, Database Management Systems, 4th Edition, TMH, 2007.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE:XVII	17ITU21	VB.NET PROGRAMMING	72	-	4

Preamble

To enable the students to learn about the .NET Framework and VB.NET programming.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the .NET framework programming	K1,K2
CO2	Acquire the deep knowledge on data types, operators and control statements in VB.NET	K2,K3,K4
CO3	Implement the concept of arrays, procedures and structures using various VB.NET controls	K3,K5
CO4	Ability to work with menus and dialog boxes in VB.NET	K4,K5
CO5	Ability to handle exceptions and effectively work with database connectivity using ADO.NET	K3,K5

SYLLABUS

UNIT I (12 Hours)   Introducing .NET

.NET Framework Overview – Namespace – Languages in .NET – Visual Studio .NET – Why VB.NET? – Objects and Properties – Constructors and Destructors – Interfaces – Free Threading – Delegates – Winforms - Console Applications – ADO.NET – VB.NET Program: The Solution Explorer Window – The Class View Window – Toolbox – Output Window – The Task List Window.

UNIT II (15 Hours) Data Types, Operators and Control Statements

Literals – Variables – Data Types – Declaration of Variables – Constant – Statements – Operators – Arithmetic Operators – Concatenation Operators – Relational Operators – Compound Assignment Operator – Logical Operators – Bitwise Operators – Control Statements: IF Statement – Block-If – Nested If – Looping – Select-Case Statement – Goto Statement – Early Exit from Control Statements – Intrinsic Control List – Events – Label – Textbox – Group Box - Check Box – Radio Button – Scroll Bar – Timer – Picture Box – Working with Mouse Input – Date Time Picker – Month Calendar.

UNIT III (15 Hours)   Arrays, Procedures and Structures

One-Dimensional Array – Array Initialisation – Printing array elements using For Each..Next Loop – Redim Statement – Multi-dimensional array – Initialization of Two-dimensional array – Arrays of array – List Box Control – Checked List Box – Combo Box Controls – Procedures and Structures: Subroutine Procedures – Function Procedure – Property Procedure – Functions – Sub Procedure – Structures – Message Box Function – Input Box Function.

UNIT IV (15 Hours)   Creating Menus and Using Dialog Boxes

Menu – MDI Forms – Context Menu – Rich TextBox – Color Dialog Control – Font Dialog Control – Object Oriented Concepts in VB.NET: Boxing and Unboxing – Read-Only and Write-Only Properties – Adding Methods to Classes – Classes with Constructor – Assemblies

– Namespaces – Inheritance – Overriding Properties and Methods – Shadows Statement – Polymorphism.

UNIT V (15 Hours)   Events Delegates Exception Handling and ADO.NET
Events in Class – Delegates – Singlecast Delegate – Multicast Delegates – Exceptions – Try – Catch – Finally – End Try – Try-Catch – Multiple-Catch – Nested Try Statements – Try-Finally – Data Access with ADO.NET: Database – Relational Database – Table Creation – Record Insertion – Displaying Data – Deleting Data – Modifying – Drop Table – Special Features of ADO.NET – Differences between ADO and ADO.NET – Connection – Commands – Data Reader – Data Set – Using Data Grid – Using Data Adapter Configuration Wizard – XML and ADO.NET – Filtering Data using Data View – Complex Data Binding – Command Parameters Property and using Stored Procedures with a Command.

TEXT BOOK:
1.P.Radhaganesan,VB.NET , 1st Edition, Scitech Publications(India) Pvt Ltd, 2014

REFERENCE BOOKS:
1. Jefrey R.Shapiro, The Complete Reference – Visual Basic .NET, Tata McGraw-Hill, 2002
2. Stevem Holzner, Visual Basic .Net Programming Black Book, Dreamtech Press, Reprint 2011

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE:XVIII	17ITU22	PROGRAMMING IN VB. NET AND ORACLE – PRACTICAL	-	72	4

Subject Description: This course provides hands on experience on VB.NET Programming and Oracle

Goal: To enable the students to work effectively with VB.NET and Oracle

Objectives: On successful completion of the course the students will be able to build real world applications using VB.NET and Oracle

Practical List

VB.NET PROGRAMS

1. Write a simple VB.NET program to develop a calculator with basic operation.

2. Demonstrate the looping statements in VB.NET using a console application.

3. Develop an application for deploying various built-in functions in VB.NET.

4. Develop a windows application with Menus and Dialog Boxes

5. Develop a simple project for Student Database Management System using VB.NET as
   front end and Oracle as back end.

6. Develop a simple project for Employee Database Management System using VB.NET as
   front end and Oracle as back end.

ORACLE:

1. Create a table for Employee details with Employee Number as primary key and following fields: Name, Designation, Gender, Age, Date of Joining and Salary. Insert at least ten rows and perform various queries using any one Comparison, Logical, Set, Sorting and Grouping operators.

2. Create tables for library management system which demonstrate the use of primary key and foreign key. Master table should have the following fields: Accno, Title, Author and Rate.Transaction table should have the following fields: User id, Accno, Date of Issue and Date of Return. Create a Report(Select verb) with fields Accno, Title, Date of Issue for the given Date of Return with column formats.

3. Write a PL/SQL to update the rate field by 20% more than the current rate in inventory table which has the following fields: Prono, ProName and Rate. After updating the table a new field (Alter) called for Number of item and place for values for the new field without using PL/SQL block.

4. Write a PL/SQL to split the student table into two tables based on result (One table for Pass and another for Fail). Use cursor for handling records of student table. Assume necessary fields and create a student details table.

5. Create a database trigger to implement on master and transaction tables which are based on inventory management system for checking data validity. Assume the necessary fields for both tables.

6. Write a PL/SQL to raise the following Exception in Bank Account Management table when deposit amount is zero.

Core Optional

A student shall take up one **CORE OPTIONAL** course offered by other departments under Part: III to complete the programme. The score obtained in this course will be accounted for CGPA calculation. The enrollment is based on first come first served basis depending upon the available strength. The following is the list of optional papers offered by each department.

UG PROGRAMME 2017-18 ONWARDS

S.No.	Course Code	Department	Course
1.	17TAUC01	Tamil	jd;dk;gpf;if ,yf;fpak; (ngz;Nz eP tho;f)
2.	17ENUC01	English	English for Effective Communication
3.	17MAUC01	Mathematics	Mathematics for Business
4.	17PHUC01	Physics	Physics in day to day life
5.	17CSUC01	Computer Science	Desktop Publishing Practicals
6.	17CGUC01	Commerce :B.Com	Basics of Accounting
	17CCUC01	B.Com (CA)	Elements of Costing
	17CPUC01	B.Com (PA)	Investment Portfolio
	17CFUC01	B.Com (A&F)	Accounting for Managerial Decision Making
7.	17BAUC01	Management	Start up Business

CATERGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE :XIX	**	CORE OPTIONAL	-	36	3

Subject description: This course provide complete knowledge in Adobe Pagemaker and Coreldraw
Goal: To enable the students to develop and design with creativity
Objectives: To learn how to create and design real-time applications

Practical List

DESKTOP PUBLISHING PRACTICAL

ADOBE PAGEMAKER:

1. Design a Visiting Card for your own business
2. Design a Pamphlet for a Textile Showroom
3. Design a Brochure for a seminar conducted by your department
4. Design a Newsletter for your department activities

5. Design a Student Identity card

ADOBE CORELDRAW:

1. Create a button with help of interactive blend tool
2. Create a lotus flower with help of transparency tool
3. Create a Birthday card
4. Create a logo of RADIO MIRCHI
5. Create a banner for a political function

CATERGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE : XX	17ITU23	INSTITUTIONAL TRAINING	-	-	1

Institutional / Industrial Training:

     A student shall visit an institution / organisation and learn its operations according to the nature of her discipline of study after approval from the Department for a period of 15 days during her summer vacation between IV and V semesters. Work carried out during this period will have to be recorded in a work diary provided by the department. An institutional training report should be submitted by the student at the end of the fifth semester (ESE) to complete the programme.

     Institutional Training reports are evaluated at the end of semester- V by the **Internal Examiners** only as appointed By COE. Following weightages shall be used to evaluate the institutional training report:

COMPONENTS*	MARKS	TOTAL MARKS
Understanding and articulation of concepts	30	
Clarity and comprehensiveness of presentation in the report	30	**100**
Structure and neatness of the report	40	

- Different metrics may be evaluated depending on the nature of the work carried out during the training period and is left to the discretion of the department.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
ELECTIVE:I	17ITU24A	E-LEARNING	72	-	4

Preamble

To understand the basic concepts of E-Learning and its tools.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the evolution of E-Learning and its tools	K1,K2
CO2	Obtain the knowledge about Flash and its tools	K3,K4
CO3	Gain the deep knowledge on animation and its effects	K3,K4
CO4	Acquire the knowledge on sound and video effects in flash	K3,K4,K5
CO5	Ability to develop a video using adobe premiere	K5,K6

SYLLABUS

UNIT I (15 Hours)   **E-Learning Evolution**
Advantages and Disadvantages of E-Learning - Instructional Design Models for E-Learning - Applying User - Centered Design to E-Learning - E-Learning Tools – What is an E-Learning Tool?

UNIT II (15 Hours)   **Flash Tools**
Geometric Shape Tools – Drawing Tools - Creating Precise Lines with the Pen Tool - Fill and Stroke Controls - Selection Tools - Designing and Aligning Elements.

UNIT III (12 Hours)   **Creating Animation and Effects**
Animation Strategies – TimeLine Animation – Applying Layer Types - Character Animation Techniques.

UNIT IV (15 Hours)   **Sound and Video**
Sound: Import and Export Formats – Importing Sound to Flash – Adding Sound to Timeline –Synchronizing Audio to Animations - Stopping Sounds. Video: Integrating and Importing Video.

UNIT V (15 Hours)   **Adobe Premiere**
Starting Movie Projects: Starting New Projects -Reviewing and Changing Project Settings - Saving a Project. Adding Special Effects to Your Movies: Surveying Effects -Introducing the Effect Controls Window -Using Key Frames -Removing Effects -Working with Effect Presets.

TEXT BOOKS:
1. Pamela Berman, E-Learning Concepts and Techniques, Institute for Interactive
   Technologies, Bloomsburg University of Pennsylvania, USA e-book, 2006.
2. Robert Reinhardt and Snow Dowd. Macromedia Flash 8 Bible, 1st Edition, New Delhi.

Wiley India (P) Ltd, 2006,

3. Keith Underdahl, Adobe Premiere Elements for Dummies, Wiley Publishing Inc.

REFERENCE BOOKS:
1. Dinesh Maidasani, Flash 8, Firewall Media Publications, New Delhi. 2006.
2. Fred T.Hofstetter,MultiMedia Literacy, Tata McGraw Hill, New Delhi, 2001.
3. Tay Vaughan., Multimedia Making it Work, 7th Edition, Tata McGraw-Hill, New Delhi, 2008.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
ELECTIVE:I	17ITU24B	ANIMATION TECHNIQUES	72	-	4

Preamble

To understand the basic concepts of animation and Flash.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of animation	K1,K2
CO2	Obtain the knowledge about creating animation in Flash	K2,K3,K4
CO3	Obtain the knowledge about 3D animation and its types	K3,K4
CO4	Acquire the knowledge to work effectively with 3D motion capture	K4,K5
CO5	Ability to develop a video, Audio using 3D animation	K5,K6

SYLLABUS

UNIT I (15 Hours)   Introduction to Animation
What is Meant by Animation – Why We Need Animation – History of Animation – Uses of Animation – Types of Animation – Principles of Animation – Some Techniques of Animation – Animation on the WEB – 3D Animation – Special Effects - Creating Animation.

UNIT II (15 Hours)   Creating Animation in Flash
Introduction to Flash Animation – Introduction to Flash – Working with the Timeline and Frame-Based Animation - Working with the Timeline and Tween-Based Animation – Understanding Layers - Actionscript.

UNIT III (12 Hours)   3D Animation and its types
Types of 3D Animation – Skeleton & Kinetic 3D Animation – Texturing & Lighting of 3D Animation – 3D Camera Tracking – Applications and Software of 3D Animation.

UNIT IV (15 Hours)   Motion Caption
Motion Caption - Formats – Methods – Usages – Expression – Motion Capture Software – Script Animation Usage – Different Language of Script Animation among the Software.

UNIT V (15 Hours)   Concept Development
Concept Development –Story Developing –Audio and Video – Color Model – Device Independent Color Model – Gamma and Gamma Correction - Production Budgets - 3D Animated Movies.

TEXT BOOKS:
1. Ranjan Parekh, Principles of Multimedia, TMH, 2007. (Unit I, Unit V)
2. Ashok Banerji, Ananda Mohan Ghosh, Multimedia Technologies, McGraw Hill Publication. (Unit II: Chapter 10)

3. Text for Unit III, IV & V is appended.

REFERENCE BOOK:
1. William M. Neuman, Robert R. Sprout, Principles of interactive Computer Graphics,
   McGraw Hill International Edition

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
ELECTIVE:I	17ITU24C	BUSINESS INTELLIGENCE	72	-	4

Preamble

To understand the basic concepts of Business Intelligence and Data mining

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of Business Intelligence	K1,K2
CO2	Obtain the knowledge about Decision Making	K2,K3
CO3	Gain thorough knowledge on Decision Support System and Knowledge based Management	K3,K4,K5
CO4	Understand and apply the concepts of Data Mining and its Applications	K3,K4
CO5	Acquire the knowledge on Data Warehousing and its architecture	K2,K3

SYLLABUS

UNIT I (15 Hours)   Business Intelligence
Changing Business Environments and Computerized Decision Support - Managerial Decision Making - Computerized Support for Decision Making - Frame Work for Computerized Decision Support - Frame Work for Business Intelligence - Definition of BI – History of BI – Architecture of BI - Benefits of BI - The Major Tools and Techniques.

UNIT II (15 Hours)   Decision Making
Decision Making – Definition – Characteristics – Models - Benefits of Models - Phases of Decision Making Process.

UNIT III (15 Hours)   Decision Support system
Decision Support System Description – DSS - Characteristics and Capabilities - DSS Classifications - Components of DSS - The User Interface System - Knowledge Based Management.

UNIT IV (12 Hours)   Data mining
Data Mining Concepts and Applications - Definition, Characteristics and Benefits of Data Mining - Data Mining Applications - Data Mining Process.

UNIT V (15 Hours)   Data Warehousing
Data Warehousing – Definition - Characteristics- Data Marts - Meta Data – Data Warehousing Process Overview - Data Warehousing Architecture- ETL.

TEXT BOOK:
 1. Efraim Turban, Ramesh Sharda, Dursun Delen, Decision Support and Business
    Intelligence Systems, 9th Edition, Pearson 2013.

REFERENCE BOOKS:

1. M.Raisinghani, Business Intelligence in the Digital Economy - Opportunities, Limitations and Risks, Idea Group Publications, 2004.
2. Sumathy, Sivanandam, Introduction to Data Mining and its Applications, Springer Verlag, 2006.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
SKILL ENHANCEMENT COURSE:III	17SEUIT3	FLASH – PRACTICAL	-	36	2

Subject Description: This course provides hands on experience on Flash
Goal: To enable the students to create animation, game, video and movie
Objective: On successful completion of the course the students will understand the concepts of Animation techniques using Flash

Practical List

1. Create Shapes and Drawings in Flash.

2. To change from one shape to another using shape animation.

3. Create a Walking man with the help of Key Frame Animation.

4. Draw a Bird with Flash tools and make it fly with key Frame Animation.

5. Change the Color of an object with the help of Animation.

6. Animate a Bouncing Ball with the help of Guide line Animation.

7. Create a story with the help of Movie Clip.

8. Create Buttons & Link with other Frames.

9. Create Morphing between two images in Flash.

10. Create a Simple game with the help of Action Script.

Proficiency Enhancement - Self Study: (Part: V)

No lecture hours are provided for self study courses and the students are expected to prepare the courses on the prescribed syllabi by their own. Students have to appear for the ESE that would be conducted as per the curriculum specification of each department and scoring a passing minimum is mandatory for completion of the programme. The score obtained in these courses will also be accounted for CGPA calculation.

CATERGORY	COURSE CODE	TITLE	C	P	CREDIT
PROFICIENCY ENHANCEMENT	17PEUIT1	SOFTWARE PROJECT MANAGEMENT	-	-	2

Preamble

To inculcate the knowledge on how to manage a Software Project.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the importance of software product life cycle	K1,K2
CO2	Obtaining the knowledge thoroughly on software requirements gathering	K2, K3,K4
CO3	Gain detailed understanding on estimation concepts	K3,K5
CO4	Acquire familiarity on design and development phases	K4,K5
CO5	Accumulate and apply the knowledge on project testing phase	K4,K5

SYLLABUS

UNIT I   Introduction to Software Product Life cycle

Product Life Cycle: Introduction –Idea Generation- Prototype Development Phase- Alpha Phase –Beta Phase- Protection Phase- Maintenance and Obsolescence Phase. Project Life Cycle Models: What is Project Life Cycle Model - A Frame Work for Studying Different Life Cycle Models - The Waterfall Model - The Prototype Model- The Rapid Application Development Model- The Spiral Model and its Variants.

UNIT II   Software Requirements Gathering

Inputs and Start Criteria for Requirements Gathering- Dimensions of Requirements Gathering-Steps to be Followed During Requirements Gathering Outputs and Quality Records from the Requirements Phase- Skill Sets Required During the Requirements Phase- Differences for a Shrink-Wrapped Software- Challenges During the Requirements Management Phase- Metrices for the Requirement Phase.

UNIT III   **Estimation**

What is Estimation - When & Why is Estimation Done – The Three Phases of Estimation - Estimation Methodology - Formal Models for Size Estimation –Translation Effort Estimated into Schedule Estimates – Common Challenges During Estimation – Metrices for the Estimation Processes.

UNIT IV   **Design and Development phases**

Some Difference in our Chosen Approach - Salient Features of Design- Evolving an Architecture Blueprint –Design for Reusability- Technology Choices/Constraints – Design to Standards –Design for Portability- User Interface Issues- Design for Testability - Design for Diagnosability- Design or Maintainability- Design for Installability – Inter-Operability Design - Challenges During Design and Development Phases - Skill Sets for Design and Project Management.

UNIT V   **Testing Phase**

Introduction- What is Testing- What are the Activities that make up Testing- Test Scheduling and Types of Tests-People Issues in Testing Management Structures for Testing in Global Teams –Metrics for Testing Phase.

TEXT BOOK:
1.Gopalaswamy Ramesh, Managing Global Software Projects, Tata McGraw Hill.

REFERENCE BOOKS:
1.S.A. Kelkar, Software Project Management –A concise study, PHI, 2003
2.Milk Cotterel, Bob Hughes, Software Project Management, Inclination / Thomas computer press, 1955.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE:XXII	17ITU26	RESEARCH METHODOLOGY	72	-	5

Preamble

To enhance the ethical conduct of research and to learn about its techniques

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of Research	K1,K2
CO2	Acquire the deep knowledge on Research problem and its design	K1,K2
CO3	Familiarize on sampling design	K2,K3
CO4	Give detailed understanding about data collection	K3,K4,K5
CO5	Ability to work with interpretation and writing reports	K5

SYLLABUS

UNIT I (12 Hours)   Introduction to Research Methodology
An Introduction-Meaning of Research-Objectives of Research-Motivation in Research-Types of Research-Research Approaches-Significance of Research-Research Methods versus Methodology-Research and Scientific Method-Importance of Knowing How Research is Done-Research Process-Criteria of Good Research-Problems Encountered by Researchers in India.

UNIT II (18 Hours)   Research Problem and Research Design
What is a Research Problem?-Selecting the Problem-Necessity of Defining the Problem-Techniques Involved in Defining a Problem-Research Design: Meaning of Research Design-Need for Research Design-Important Concepts Relating to Research Designs-Different Research Designs.

UNIT III (18 Hours)   Sampling Design
Census and Sample Survey-Implications of a Sample Design-Steps in Sampling Design-Criteria of Selecting a Sampling Procedure-Characteristics of a Good Sample Design-Different Types of Sample Designs-How to Select a Random Sample?- Random Sample from an Infinite Universe-Complex Random Sampling Designs.

UNIT IV (12 Hours)   Methods of Data Collection
Collection of Primary Data-Observation Method-Interview Method-Collection of Data through Questionnaires-Collection of Data through Schedules-Difference Between Questionnaires and Schedules-Some Other Methods of Data Collection-Collection of Secondary Data-Selection of Appropriate Method for Data Collection-Case Study Method.

UNIT V (12 Hours)   Interpretation and Report Writing
Meaning of Interpretation-Why Interpretation?-Technique of Interpretation-Significance of Report Writing –Difference Steps in Writing Report-Layout of the Research Report-Types of

Reports-Oral Presentation-Mechanics of Writing a Research Report-Precautions for Writing Research Reports.

TEXT BOOK :
1. C.R.Kothari, Research Methodology Methods and Techniques, New Age International
   Publishers

REFERENCE BOOK:
1. John W.Creswell, Research Design: Qualitative, Qualtitative and Mixed Methods
   Approaches.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE:XXIII	17ITU27	COMPUTER GRAPHICS AND MULTIMEDIA	72	-	5

Preamble

To learn about reconstruction and visualization framework and to give introduction on basic algorithms and its techniques.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Provide a insight of computer graphics and algorithms	K1,K2
CO2	Ability to understand the Transformations and its types	K2,K3,K4
CO3	Acquire knowledge on window transformations	K3,K4
CO4	Learn about Multimedia basics	K1,K2
CO5	Obtain basic fundamentals of image, audio and video	K5

SYLLABUS

UNIT I (12 Hours)   Introduction to Computer Graphics
Introduction, Applications, Pixel, Frame Buffer, Raster and Random Scan display, Display Devices -CRT, Color CRT Monitors, Scan Conversion of Line - DDA Algorithm of Line Drawing, Scan Conversion of Circle-Bresenham's Circle and Ellipse Generating Algorithms.

UNIT II (18 Hours)   2D and 3DTransformations
2-Dimensional Transformation, Translation, Rotation, Scaling, Homogeneous Coordinates, Reflection, Shear. 3-Dimensional Transformation, Translation, Rotation, Scaling, Reflection, Shear.

UNIT III (18 Hours)   Window Transformation
Window to View Port Transformation, Clipping, Line Clipping, Cohen –Sutherland Line Clipping, Polygon Clipping, Sutherland and Gary Hodgman Polygon Clipping Algorithm.

UNIT IV (12 Hours)   Introduction to Multimedia
Multimedia in Use: Introducing Multimedia for Today and Tomorrow – What is Multimedia – Using Multimedia: Applications, Benefits and Problems– Technology: System Components – Multimedia Platforms.

UNIT V (12 Hours)   Multimedia Tools
Development Tools – Image – Audio – Video.

TEXT BOOKS:
1. Donald Hearn and M.Pauline Baker, Computer Graphics C Version, Second Edition ,

Pearson Education, 2006.
2. Judith Jeffcoate, Multimedia in Practice : Technology and Practice, Pearson Education, 2007.

REFERENCE BOOKS:

1. William M. Neuman, Robert R. Sprout, Principles of interactive Computer Graphics, McGraw Hill International Edition.
2. Buford J. F Koegel, Multimedia Systems, Twelth Indian Reprint, Pearson Education.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE:XXIV	17ITU28	PROGRAMMING IN 3D MAX-PRACTICAL	-	72	4

Subject Description: This course provides hands on experience on 3D Max Programming
Goal: To enable the students to equip them with graphics and multimedia skills
Objectives: On successful completion of the course the students will understand the concept of 3D Max and expertise in using graphics and multimedia

Practical List

1. Create a Flag animation with 3ds max

2. Create a realistic winter scene with motion blurred snow particles and a night render as well

3. Polygon :- Selection, Creation, combining, separating, Splitting and Editing

4. Working with Nurbs Modeling

5. Nurbs :- Creating curves, Creating Surfaces, Editing , Trimming, Stitching and

   Sculpting surface meshes

6. Subdivision :-surface conversion, Editing surface, Editing Uvs

7. Create Various Basic 3D geometrical shapes

8. Create Basic Polygon inorganic objects (lamp, Mobile, computer, Bike, Car)

9. Create basic architectural polygon modeling

10. Create Interior with polygon and Subdivision

11. Create Cartoon and semi cartoon characters with poly

12. Create environment modeling (tree, Mountain, road, Planet, forest)

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
ELECTIVE:II	17ITU29A	NETWORK SECURITY	60	-	4

Preamble

To provide grounding in basic and advanced methods in network security and its effective algorithms

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Obtain the basics of network security	K1,K2
CO2	Acquire the knowledge on symmetric key algorithms	K2,K3
CO3	Learn about Asymmetric Key Algorithms and Digital Signatures	K2,K3,K4
CO4	Provide the insight on digital certificates	K2,K3
CO5	Understand about Network Security, Firewalls and Virtual Private Networks	K1,K2

SYLLABUS

UNIT I (12 Hours)   **Introduction to Network Security**
Introduction, Need for Security, Principles of Security, Types of Attacks Cryptography :Plain Text and Cipher Text, Substitution Techniques, Caesar Cipher, Mono-alphabetic Cipher, Polygram, Polyalphabetic Substitution, Polyfair, Hill Cipher, Transposition Techniques, Encryption and Decryption, Symmetric and Asymmetric Key Cryptography, Steganography, Key Range and Key Size, Possible Types of Attacks.

UNIT II (12 Hours)   **Symmetric Key Algorithms**
Algorithms Types and Modes, Overview of Symmetric Key Cryptography, Data Encryption Standard (DES), International Data Encryption Algorithm (IDEA), RC4, RC5, Blowfish.

UNIT III (12 Hours)   **Asymmetric Key Algorithms and Digital Signatures**
Brief History of Asymmetric Key Cryptography, Overview of Asymmetric Key Cryptography, RSA Algorithm, Symmetric and Asymmetric Key Cryptography together, Digital Signatures, Knapsack Algorithm.

UNIT IV (12 Hours)   **Digital Certificates**
Digital Certificates, Private Key Management, Hash functions, Key Predistribution, Blom's Scheme, Diffie-Hellman Key Predistribution, Kerberos, Diffie-Hellman Key Exchange, The Station-to-Station Protocol.

UNIT V (12 Hours)   Network Security, Firewalls and Virtual Private Networks
Brief Introduction to TCP/IP, Firewalls, IP Security, Virtual Private Networks (VPN), Intrusion.Internet Security Protocols: Basic concepts, Secure Socket Layer (SSL), Transport Layer Security (TLS), Secure Hyper Text Transfer Protocol (SHTTP), Time Stamping

Protocol (TSP), Secure Electronic Transaction (SET), SSL vs SET, 3-D Secure Protocol, Electronic Money, E-mail Security.

TEXT BOOK:
1. Atul Kahate, Cryptography and Network Security, 2nd Edition, Tata McGrawHill (Unit I: Chapter 1,2, Unit II: Chapter 3, Unit III: Chapter 4, Unit IV: Chapter 5, Unit V: Chapter 6)

REFERENCE BOOKS:
1. William Stallings, Cryptography and Network Security, Fifth Edition, Pearson Education.
2. Douglas Stinson, Cryptography: Theory and Practice, CRC Press, CRC Press LLC

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
ELECTIVE:II	17ITU29B	MOBILE COMPUTING TECHNIQUES	60	-	4

Preamble

To learn about the mobile computing basics and advanced techniques.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the emergence of Mobile technology and its architecture	K1,K2
CO2	Acquire the knowledge on mobile computing through telephony	K2,K3
CO3	Learn about emerging technologies	K2,K3
CO4	Provide the insight on GPRS	K3,K4
CO5	Acquire the knowledge on CDMA and 3G	K4,K5

SYLLABUS

UNIT I (12 Hours)   Introduction to Mobile Computing and its Architecture

Mobility of Bits and Bytes –Wireless The beginning –Mobile Computing –Dialogue Control –Networks –Middleware and Gateways –Application and Services-Developing Mobile Computer Applications –Security in Mobile Computing –Standards _ Why is it Necessary – Standard Bodies. Mobile Computing Architecture: History of Computers and Internet – Architecture for Mobile Computing –Three-tier Architecture –Design Considerations for Mobile Computing –Mobile Computing through Internet –Making Existing Applications Mobile Enabled.

UNIT II (12 Hours)   Mobile Computing through Telephony

Evaluation of Telephony – Multiple Access Procedures – Mobile Computing through Telephone – IVR Application – Voice XML – TAPI.

UNIT III (12 Hours)   Emerging Technologies

Blue Tooth – RFID – WiMAX – Mobile IP – IPv6 –Java Card. GSM : Global System for Mobile Communications – GSM Architecture – GSM Entities – Call routing in GSM – PLMN Interfaces – GSM Addresses and Identifiers – Network Aspects in GSM – GSM Frequency Allocations – Authentications and Security.

UNIT IV (12 Hours)   GPRS

GPRS – GPRS and Packet Data Network –GPRS Network Architecture –GPRS Network Operations –Data Services in GPRS –Application for GPRS-Limitations –Billing and Charging. WAP : MMS –GPRS Applications.

UNIT V (12 Hours)   CDMA and 3G

Spread Spectrum Technology –Is 95 –CDMA vs GSM –Wireless Data –Third Generation Networks –Applications on 3G.

TEXT BOOK:
1. Mobile Computing, Asoke K Talukder , Roopa R Yavagal, TMH, 2005

REFERENCE BOOK:
1. Mobile Computing, KumkumGarg, Pearson Education, 2010.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
ELECTIVE:II	17ITU29C	EMBEDDED SYSTEMS	60	-	4

Preamble

To learn about the Embedded systems and its important concepts.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Obtain the introduction to embedded systems	K1,K2
CO2	Acquire the knowledge on processor and memory organization	K2,K3
CO3	Learn about programming concepts and about threads	K2,K3
CO4	Provide the insight on Real time operating system	K3,K4
CO5	Work with case study	K5,K6

SYLLABUS

UNIT I (12 Hours) Introduction to Embedded System
An Embedded System – Processor in the System – Other Hardware Units – Software Embedded into a System – Exemplary Embedded Systems.

UNIT II (12 Hours) Processor and Memory Organization
Structural Units in a Processor – Processor Selection for an Embedded System – Memory Selection for an Embedded system – Direct Memory Access – Devices and Buses for Device Networks: I/O Devices – Timer and Counting Devices – Serial Communication and Parallel Communication – Device Drivers and Interrupts Servicing Mechanism: Device Drivers – Device Drivers for Internal Programmable Timing Devices – Interrupt Servicing (Handling) Mechanism – Context, Latency and Deadline.

UNIT III (12 Hours) Programming Concepts and Embedded Programming in C and C++
Software Programming in Assembly Language (ALP) and in High Level Language C – Embedded Programming in C++ - Embedded Programming in Java – Optimisation of Memory Needs – Inter-Process Communication and Synchronisation of Processes, Tasks and Threads: Multiple Processes in an Application – Problem of Sharing Data by Multiple Tasks and Routines – Inter Process Communication.

UNIT IV (12 Hours) Real Time Operating Systems
Real-Time and Embedded System Operating Systems – Interrupt Routines in RTOS Environment: Handling of Interrupt Source Call by the RTOSs - RTOS Task Scheduling Models, Interrupt Latency and Response Time of the Tasks as Performance Metrics –

Performance Metric in Scheduling model for Periodic, Sporadic and a Periodic Tasks – List of Basic Actions in a Preemptive Scheduler and Expected Times taken at a Processor.

UNIT V (12 Hours)   Case Study of an Embedded System for a Smart Card
Hardware-Software Co-Design in an Embedded System: Embedded System Project Management – Embedded System Design and Co-Design Issues in System Development Process – Design Cycle in the Development Phase for an Embedded System – Users of Target System or its Emulator and In-Circuit Emulator (ICE) – Use of Software Tools for Development of an Embedded System – Use of Scopes and Logic Analysers for System Hardware Tests – Issues in Embedded System Design.

TEXT BOOK:
1. Raj Kamal, Embedded Systems – Architecture, Programming and Design, Tata McGraw-Hill,2003.

REFERENCE BOOKS:
1. David E. Simson, An Embedded Software Primer, Addisons-Wesley-2001.
2. Steve Heath, Embedded Systems Design, Elsevier, 2003.
3. Frank Vahid and Tony Givargis, Embedded System Design, John Wiley And Sons, Inc, 2002.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
ELECTIVE:III	17ITU30A	NEURAL NETWORKS	60	-	4

Preamble

To learn about the concepts of biological Neural Network, Artificial neural network and its applications.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Obtain the introduction to Artificial neural networks and its models	K1,K2
CO2	Acquire the knowledge on Backpropagation networks	K1,K2
CO3	Learn about activation and synaptic dynamics	K1,K2,K3
CO4	Study different pattern recognition task using ANN	K3,K4
CO5	Learn about feedforward networks and ANN applications	K4,K5

SYLLABUS

UNIT I (12 Hours)   Introduction
Introduction to ANN Features , structure and Working of Biological Neural Network . Trends in Computing Comparison of BNN and ANN. Basics of Artificial Neural Networks - History of Neural Network Research, Characteristics of Neural Networks Terminology, Models of Neuron Mc Culloch – Pitts Model, Perceptron, Adaline Model, Basic Learning Laws, Topology of Neural Network Architecture.

UNIT II (12 Hours)   Back Propagation Networks
Backpropagation Networks: (BPN) Architecture of Feed Forward Network, Single Layer ANN, Multilayer Perceptron, Back Propagation Learning, Input - Hidden and Output Layer Computation, Backpropagation Algorithm, Applications, Selection of Tuning Parameters in BPN, Numbers of Hidden Nodes, Learning.

UNIT III (12 Hours)   Activation and Synaptic Dynamics
Introduction, Activation Dynamics Models, Synaptic Dynamics Models, Stability and Convergence, Recall in Neural Networks.

UNIT IV (12 Hours)   Basic Functional Units of ANN for Pattern Recognition Task
Basic Feedforward, Basic Feedback and Basic Competitive Learning Neural Network. Pattern Association, Pattern Classification and Pattern Mapping Tasks.

UNIT V (12 Hours)   **Feed Forward Neural Networks**

Feedforward Neural Networks - Linear Responsibility X-OR Problem and Solution. Analysis of Pattern Mapping Networks Summary of Basic Gradient Search Methods. Feedback Neural Networks Pattern Storage Networks, Stochastic Networks and Simulated Annealing, Boltzmann Machine and Boltzmann Learning- Applications of Neural Networks.

TEXT BOOKS:

1. B. Yegnanarayana , Artificial neural Networks , PHI
2. Neural networks, Fuzzy logic and Genetic Algorithms, ,PHI
3. Neural Networks, Satish Kumar

REFERENCE BOOK:

1.Jeffheaton, Introduction to Math of Neural Networks

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
ELECTIVE:III	17ITU30B	GREEN COMPUTING	60	-	4

Preamble

To acquire knowledge to adopt green computing practices to minimize negative impacts on the environment, skill in energy saving practices in their use of hardware, examine technology tools that can reduce paper waste and carbon footprint by user, and to understand how to minimize equipment disposal requirements.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Obtain the fundamentals of green computing and its IT strategies	K1,K2
CO2	Learn about green assets, modeling and information systems	K2,K3
CO3	Acquire knowledge on grid framework	K2,K3
CO4	Understand the concept of green compliance	K2,K3
CO5	Work with case studies	K5,K6

SYLLABUS

UNIT I (12 Hours)   **Fundamentals of Green Computing**
Green IT Fundamentals: Business, IT, and the Environment – Green computing: carbon foot print, scoop on power – Green IT Strategies: Drivers, Dimensions, and Goals – Environmentally Responsible Business: Policies, Practices, and Metrics.

UNIT II (12 Hours)   **Green Assets and Modeling**
Green Assets: Buildings, Data Centers, Networks, and Devices – Green Business Process Management: Modeling, Optimization, and Collaboration – Green Enterprise Architecture – Environmental Intelligence – Green Supply Chains – Green Information Systems: Design and Development Models.

UNIT III (12 Hours)   **Grid Framework**
Virtualizing of IT systems – Role of electric utilities, Telecomputing, teleconferencing and teleporting – Materials recycling – Best ways for Green PC – Green Data center – Green Grid framework.

UNIT IV (12 Hours)   **Green Compliance**
Socio-cultural aspects of Green IT – Green Enterprise Transformation Roadmap – Green Compliance: Protocols, Standards, and Audits – Emergent Carbon Issues: Technologies and Future.

UNIT V(12 Hours)   **Case Studies**

The Environmentally Responsible Business Strategies (ERBS) – Case Study Scenarios for Trial Runs – Case Studies – Applying Green IT Strategies and Applications to a Home, Hospital, Packaging Industry and Telecom Sector.

TEXT BOOKS:

1. Bhuvan Unhelkar: Green IT Strategies and Applications-Using Environmental Intelligence, CRC Press, June 2011
2. Woody Leonhard, Katherrine Murray, Green Home computing for dummies, August 2009.

REFERENCE BOOKS:

1. Alin Gales, Michael Schaefer, Mike Ebbers, Green Data Center: steps for the Journey, Shoff/IBM rebook, 2011.
2. John Lamb, The Greening of IT, Pearson Education, 2009.
3. Jason Harris, Green Computing and Green IT- Best Practices on regulations & industry, Lulu.com, 2008.
4. Carl speshocky, Empowering Green Initiatives with IT, John Wiley & Sons, 2010.
5. Wu Chun Feng (editor), Green computing: Large Scale energy efficiency, CRC Press, 2012.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
ELECTIVE:III	17ITU30C	ARTIFICIAL INTELLIGENCE	60	-	4

Preamble

To learn about the concepts of artificial intelligence and expert systems.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Obtain the introduction to Artificial intelligence	K1,K2
CO2	Acquire the knowledge on game playing algorithms and predicate logic	K2,K3
CO3	Learn about knowledge representation	K2,K3
CO4	Study about expert systems	K2,K3
CO5	Learn about the basics of semantic networks	K3,K4

SYLLABUS

UNIT I (12 Hours)   **Introduction**
The AI Problems – AI Techniques – Problems, Problems Space and Search – Defining the Problem as a State Search – Production Systems – Problem Characteristics – Heuristic Search Techniques – Generate and Test – Hill Climbing – Best First Search. Problem Reduction – Constraint Satisfaction – Means – Ends Analysis.

UNIT II(12 Hours)   **Game Playing and Predicate Logic**
Mini – Max Procedure – Adding Alpha – Beta Cutoffs – Additional Refinements – Searching And/Or Graphs – Iterative Deepening. using Predicate Logic – Representing Simple Facts and Logic – Representing Instance and Isa Relationships – Computable Functions and Predicates – Use of the Predicate Calculus in AI – Resolution – Natural Deduction.

UNIT III (12 Hours)   **Knowledge Representation**
Representing Knowledge Using Rules – Procedural versus Declarative Knowledge Logic Programming – Forward versus Backward Reasoning – Resolving Within AND/OR Graphs Matching – Control Knowledge – Symbolic Reasoning under Uncertainty – Non – Monotonic Reasoning – Implementation Issues – Augmenting a Problem Solver - Implementation of Depth First and Breadth First Search. Statistical Reasoning – Bayee's Theorem – Certainity Factors and Rule Based Systems – Bayesian Networks – Dempston – Shafer Theory – Fuzzy Logic.

UNIT IV (12 Hours)   **Expert Systems**
Expert Systems – Architectural Components – Explanation Facilities – Knowledge Acquisition.

UNIT V (12 Hours)   **Semantic networks**

Expert System Development Process – Non – Formal Representation of Knowledge –
Semantic Networks – Frames – Scripts – Production Systems – Expert Systems tools.

TEXT BOOKS:

1. Elain Rich & Kevin Kaight, Artificial Intelligence - Tata McGraw Hill – Second Edition,
   1991 (For units – I , II , & III :Chapter 1,2,3,5,6,7,9).
2. David W. Roltson , Principles of Artificial Intelligence & Expert Systems Development –
   McGraw Hill (For units – IV & V: Chapters 1,4,7,8,9).

REFERENCE BOOK:

1.Stuart Russeil,Peter Norwig,Artificial Intelligence :A Modern Approach,3rd Edition

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
SKILL ENHANCEMENT COURSE:IV	17SEUIT4	SOFTWARE TESTING - PRACTICAL	-	24	2

Subject Description: This course provides an opportunity to develop testing skills and to learn different kinds of testing.

Goal: To enable the students to equip them with testing the software after development phase.

Objectives: On successful completion of the course the students will understand the concept of software testing and expertise in using testing in software.

Write at least 10 TEST CASES for the following programs. Test cases can be for Input data, Conditional expressions, control transfer, output, etc. Run-Test-Debug-until all the test cases are in success status. Marks distribution as follows:

1. List of Test Descriptions (at least 10) for the Program. (20%)

2. Test Cases (40%)

3. Program with all test case results success (30%)

4. Record (10%)

TEST CASE EXAMPLE:

Test-Id	Test Description	Test Steps	Expected Output	Actual Output	Status
TC-01	Acceptance of 10 digit input data	Input 10 Digit Number	Accepting 10 digit number	Accepted 10 digit number	Success
TC-02	Non-acceptance of character data	Input a character data X	Character X should not be accepted	Accepting Character data	Failure

TC-02	Non-acceptance of character data	Input a character data X	Character X should not be accepted	Character data not accepted	Success
TC-03	Digit sum of 10 digit is in single digit	Output data	Single digit sum	Single digit Sum	Success

1. Test the C program: Finding the sum of individual digits of a 10-digit number until a single digit is produced.

2. Test the C Program: Accept the inputs student name, marks in five subjects and declare the result as PASS if the student gets minimum 40 in each subject; otherwise declare the result as FAIL.

3. Test the C program: Accept two numbers from the user find the biggest and smallest.

4. Test the C program: Sort and store the elements of two arrays of integers into the third list.

5. Test the C program: Experiment the operations of a stack using array implementation.

6. Test the C program: Menu-driven option for queue operations like add, remove and display.

7. Test the C++ program: Palindrome string checking program (using pointers).

8. Test the C++ program: Generate Fibonacci series and check it.

(For those admitted in June 2017-18 & onwards)

The Comprehension in Computer Science examination will be conducted at the end of each semester III, IV, V, VI for a maximum of 50 marks which consists of

Comprehension (Multiple Choice Questions) (50x1=50)   50 marks

The students are examine on Core, Core Allied, Core Elective papers studied in I, II, III, IV, V & VI Semester. In the comprehension component, the students are tested on their grasping ability of the subjects of study.

Extension Activity:

Participation of a student in the extension activities conducted by the department between I and VI semesters evaluated under Part :V is mandatory for completion of the programme.