

## BACHELOR OF COMPUTER APPLICATIONS

(For students admitted from 2019-20 & 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

(An Autonomous Institution, Accredited with 'A' Grade by NAAC)  
Gobichettipalayam – 638476.

### BACHELOR OF COMPUTER APPLICATIONS

Course Scheme and Scheme of Examinations

(For students admitted from 2019-20 & onwards)

Part	Category	Course Code	Title of the Course	Contact Hrs/ week	Exam Duration hrs.	Max.Marks			Credits
						CIA	ESE	Total	
<b>SEMESTER – I</b>									
I	Language: I	19LTU01/ 19LHU01/ 19LFU01/ 19LKU01/ 19LMU01/ 19LSU01	Tamil- I/Hindi-I/French-I/ Kannada-I/ Malayalam-I / Sanskrit-I	6	3	25	75	100	4
II	English: I	19LEU01	English: I	6	3	25	75	100	4
III	<b>Core: I</b>	<b>19CAU01</b>	<b>Programming in C</b>	4	3	25	75	100	4
III	Core :II	19CAU02	Programming in C-Practical	3	3	40	60	100	4
III	Core : III	19CAU03	Digital Fundamentals and Computer Architecture	4	3	25	75	100	4
III	Allied :I	19CAU04	Mathematical Structures for Computer Science	5	3	25	75	100	3
III	Core: IV	19CAU05	Comprehension in Computer Science -I (Online Exam / Self- Study)	-	1 1/2	-	50	50	1
IV	Foundation Course: I	19FCU01	Environmental studies	2	3	-	50	50	2
<b>TOTAL</b>				<b>30</b>				<b>700</b>	<b>26</b>
<b>SEMESTER – II</b>									
I	Language: II	19LTU02/ 19LHU02/ 19LFU02/ 19LKU02/ 19LMU02/ 19LSU02	Tamil- II/Hindi-II/French- II/ Kannada-II/ Malayalam- II/ Sanskrit-II	6	3	25	75	100	4
II	English: II	19LEU02	English: II	6	3	25	75	100	4
III	Core: V	19CAU06	Programming in C++	5	3	25	75	100	4
III	<b>Core : VI</b>	<b>19CAU07</b>	<b>Programming in C++- Practical</b>	4	3	40	60	100	4
III	Core : VII	19CAU08	Programming in HTML- Practical	2	3	40	60	100	2
III	Allied : II	19CAU09	Discrete Mathematics	5	3	25	75	100	3

III	Core: VIII	19CAU10	Comprehension in Computer Science-II (Online Exam / Self-Study)	-	1 1/2	-	50	50	1
IV	Foundation Course : II	19FCU02	Yoga and Value Education	2	3	-	50	50	2
<b>TOTAL</b>				<b>30</b>				<b>700</b>	<b>24</b>

SEMESTER – III									
III	Core :IX	19CAU11	Internet of Things	5	3	25	75	100	4
III	Core : X	19CAU12	Java Programming	5	3	25	75	100	4
III	Core : XI	19CAU13	Programming in Java – Practical	5	3	40	60	100	4
III	Core : XII	19CAU14	Web Programming with PHP	4	3	25	75	100	4
III	Allied : III	19CAU15	Operation Research	4	3	25	75	100	4
III	Core: XIII	19CAU16	Comprehension in Computer Science-III (Online Exam / Self-Study)	-	1 1/2	-	50	50	1
IV	Skill Enhancement Course : I	19SEU01	Information Security	2	3	100	-	100	2
IV	Non - Major Elective : I	19NMU01A/ 19NMU01B	Indian Women and Society / Basic Tamil	2	3	-	50	50	2
IV	Non - Major Elective : II	19NMU02A/ 19NMU02B	Career Enhancement(Online Exam)/ Consumer Rights	3	-	-	-	-	-
<b>TOTAL</b>				<b>30</b>				<b>700</b>	<b>25</b>
SEMESTER – IV									
III	Core: XIV	19CAU17	Data Structures	6	3	25	75	100	5
III	Core : XV	19CAU18	Advanced Operating System	6	3	25	75	100	5
III	Core : XVI	19CAU19	Operating System - Practical	6	3	40	60	100	4
III	Allied : IV	19CAU20	Business Accounting	5	3	25	75	100	4
III	Core: XVII	19CAU21	Comprehension in Computer Science-IV (Online Exam / Self-Study)	-	1 1/2	-	50	50	1
IV	Skill Enhancement Course : II	19SEUCA2	Programming in PHP – Practical	4	3	40	60	100	2
IV	Non - Major Elective : II	19NMU02A/ 19NMU02B	Career Enhancement(Online Exam)/ Consumer Rights	3	1 1/2	-	50	50	2
<b>TOTAL</b>				<b>30</b>				<b>600</b>	<b>23</b>



SEMESTER – V									
III	Core : XVIII	19CAU22	Relational Database Management System	6	3	25	75	100	4
III	Core : XIX	19CAU23	Programming in Python	6	3	25	75	100	4
III	Core : XX	19CAU24	Programming in Python and Oracle - Practical	6	3	40	60	100	4
III	Core : XXI	19CAU25	Mini Project	-	-	100	-	100	1
III	Elective : I	19CAU26A/ 19CAU26B/ 19CAU26C/	Data Mining / Introduction to Compiler Design / Introduction and Role of ICT in Agriculture	6	3	25	75	100	4
III	Core: XXII	19CAU27	Comprehension in Computer Science-V (Online Exam / Self-Study)	-	1 1/2	-	50	50	1
IV	Skill Enhancement Course: III	19SEUCA3	Tally- Practical	3	3	40	60	100	2
IV	**	**	Open Elective	3	3	-	-	100	3
V	Proficiency Enhancement	19PEUCA1	Software Project Management (Self Study)	-	3	-	100	100	2
<b>TOTAL</b>				<b>30</b>				<b>850</b>	<b>25</b>
SEMESTER – VI									
III	Core : XXIII	19CAU28	Research Methodology	6	3	25	75	100	5
III	Core : XXIV	19CAU29	Programming in VB.Net	6	3	25	75	100	5
III	Core : XXV	19CAU30	Programming in VB.Net - Practical	6	3	40	60	100	4
III	Elective : II	19CAU31A/ 19CAU31B/ 19CAU31C/	Network Security / Big Data Analytics / E-Agriculture	5	3	25	75	100	4
III	Elective : III	19CAU32A/ 19CAU32B/ 19CAU32C/	Graphics and Multimedia/Green Computing/Web Services	5	3	25	75	100	4
III	Core: XXVI	19CAU33	Comprehension in Computer Science -VI (Online Exam / Self-Study)	-	1 1/2	-	50	50	1
IV	Skill Enhancement Course : IV	19SEUCA4	Programming in 3D Max - Practical	2	3	40	60	100	2
<b>TOTAL</b>				<b>30</b>				<b>650</b>	<b>25</b>
V	Extension Activity		NSS / YRC / RRC / CCC / PHYSICAL EDUCATION	II – VI SEMESTER				1	
			Department Extension Activity	II – VI SEMESTER				1	
<b>Total Credits</b>									<b>150</b>

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CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE: I	19CAU01	PROGRAMMING IN C	48	-	4

#### Preamble

To learn about 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	Learn basics of C programming language	K1, K2
CO2	Understand the concept of control structures	K1, K2
CO3	Understand the implementation of arrays and Strings	K3, K5
CO4	Disseminate in functions, structures and unions	K3, K4
CO5	Familiar with Pointers and file concepts	K4, K5

## SYLLABUS

### UNIT I (10 Hours)

#### Overview of C

History of C – Importance of C – Constants, Variables and Data Types – Character Set – C Tokens – Keywords and Identifiers – Constants - Variables – Data Types – Declaration of Variables – Declaration of Storage Class – Assigning values to Variables – Defining Symbolic Constants – Declaring Variable as Constant – Operators and Expressions – Managing Input and Output Operations.

### UNIT II (6 Hours)

#### Control structures

Decision Making and Branching – Decision Making and Looping – Sample programs.

### UNIT III (10 Hours)

#### Arrays and Strings

Introduction – One Dimensional Arrays – Declaration of One Dimensional Arrays - Initialization of One Dimensional Arrays - Two Dimensional Arrays – Initialization of Two Dimensional Arrays – Character Arrays and Strings – Declaring and Initializing String Variables – Reading and Writing Strings – String Handling Functions.

### UNIT IV (10 Hours)

#### Function, Structure and Union

User Defined Functions – Structure and Unions – Defining a Structure – Declaring a Structure Variables – Accessing Structure Members – Structure Initialization – Arrays of Structures – Unions.

### UNIT V (12 Hours)

#### Pointers and Files

Understanding Pointers – Accessing the Address of Variables – Declaring the Pointer Variable – Accessing a Variable Through its Pointer – Pointer Expression – Pointer and

Arrays – Array of Pointer – Pointer as Function Arguments - File Management in C – Defining and Opening a File - Closing the File – Input and Output Operations on Files – Sample Programs.

**TEXT BOOK:**

1. E.Balagurusamy, Programming in ANSI C, 3rd Edition, Tata McGraw-Hill, 2004.

**REFERENCE BOOKS:**

1.Ashok N Kamthane, Programming with ANSI and Turbo C, Pearson, 2002.

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

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE :II	19CAU02	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. Evaluate the expression which performs all arithmetic operations in mixed mode.
2. Program to solve Binomial coefficient.
3. Check the given number is odd or even - using if else/switch case/conditional operator methods.
4. Print all prime numbers between any two given limit.
5. Program to find the sum of the digits of a number.
6. Program to calculate gross salary of an employee [using formula : gross\_sal = basic\_sal+hra+da].
7. Finding area of a square, rectangle, circle using switch case.
8. Arrange the given set of numbers in ascending and descending order.
9. Matrix addition.
10. Mark list processing using Structure.
11. Calculate the factorial value using recursive function.
12. Program to perform various file operations – Add/Delete/Update/Finding no of records in the file.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE : III	19CAU03	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 an insight of how basic computer components are specified	K1, K2
CO2	Understand the digital logic circuits and their design	K2, K3, K5
CO3	Acquire knowledge of Input-Output interfaces	K3
CO4	Gain an ability to handle interrupts	K4, K5
CO5	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 (10 Hours)                      Logical Circuit

Combinational Logic Circuits: Boolean Algebra – Karnaugh Map – Canonical Form 1 – Construction and Properties – Don't Care Combinations - Product of Sum, Sum of Products, Simplifications. Sequential Circuits: Flip-Flops: RS, D, JK, and T - Multiplexers – Demultiplexers – Decoder- Encoder – Introduction to Shift Registers and Counters.

### UNIT III (15 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 (15 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 (10 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
FOUNDATION COURSE:I	19FCU01	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.



- 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 and Gurbir Sangha, Environmental Studies, Kalyani Publishers, 2005.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE: V	19CAU06	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 –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++, 2<sup>nd</sup> Edition, TMH Publication, 2002.
2. Maria Litvin & Gary Litvin, C++ for you, Vikas Publication, 2002.
3. Yashavant Kanetkar, Let us C++, BPB Publication, 2<sup>nd</sup> Edition, 2010.



CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE : VI	19CAU07	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. Write a C++ program to find a factorial for a given number using recursive function.
2. Write a C++ program to find a Fibonacci series using while loop.
3. 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.
4. 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.
5. Write a C++ program to swap two numbers using friend function.
6. Write a C++ Program to create class, which consists of EMPLOYEE details like E\_Number, E\_Name, Department, Basic, Salary, and 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.
7. Write a C++ program to add two complex numbers using operator overloading concept.
8. Write a C++ Program to check whether the given string is a palindrome or not using Pointers.
9. Write a C++ Program to merge two files into a single file.
10. Write a C++ Program to implement exception handling concept using divide by zero.
11. Write a C++ program to implement the concept of class template.
12. Write a C++ Program to implement any four built in string functions.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE : VII	19CAU08	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	19FCU02	YOGA & 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
CO4	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 & 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 (5Hours)

### 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 (2015), 'Yoga for human excellence' - Sri Vethathiri Publications.
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 :IX	19CAU11	INTERNET OF THINGS	60	-	4

#### Preamble

To learn about the basics of Internet of Things 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 fundamental knowledge of IoT	K1,K2
CO2	Learn basic concepts of design methodology	K1,K2
CO3	Understand the ideas of building with Raspberry pi and Arduino	K2,K3
CO4	Familiarize with Raspberry pi and Arduino.	K3,K4
CO5	Apply & analyze IoT with cloud	K4, K5

### SYLLABUS

#### UNIT I (12 Hours)

#### Fundamentals of IoT

Introduction – Characteristics - Physical Design - Protocols – Logical Design – Enabling technologies – IoT Levels – Domain Specific IoTs – IoT vs M2M.

#### UNIT II (12 Hours)

#### IoT Design Methodology

IoT Systems Management – IoT Design Methodology – Specifications Integration and Application Development.

#### UNIT III (12 Hours)

#### Building IoT With Raspberry Pi

Physical device – Raspberry Pi Interfaces – Programming – APIs / Packages – Web Services.

#### UNIT IV (12 Hours)

#### Building IoT With Galileo/Arduino

Intel Galileo Gen2 with Arduino- Interfaces - Arduino IDE – Programming - APIs and Hacks.

#### UNIT V (12 Hours)

#### Case Studies And Advanced Topics

Various Real time applications of IoT- Connecting IoT to cloud – Cloud Storage for IoT – Data Analytics for IoT – Software & Management Tools for IoT.

#### TEXT BOOK:

1. Arshdeep Bahga, Vijay Madiseti, Internet of Things – A hands-on approach, Universities press, 2015.

#### REFERENCE BOOKS:

1. Manoel Carlos Ramon, Intel® Galileo and Intel® Galileo Gen 2: API Features and Arduino Projects for Linux Programmers, Apress, 2014.
2. Marco Schwartz, Internet of Things with the Arduino Yun, Packt Publishing, 2014.



CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE : X	19CAU12	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 BOOKS:

1. E. Balagurusamy, Programming With Java –A Primer - 3rd Edition, TMH.

#### REFERENCE BOOKS:

1. Patrick Naughton &Hebert Schildt, The Complete Reference Java 2 , 3<sup>rd</sup> ed, TMH.
2. John R. Hubbard ,Programming With Java, 2ndEdition, TMH.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE : XI	19CAU13	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 : XII	19CAU14	WEB PROGRAMMING WITH PHP	48	-	4

### Preamble

To learn about the various Web Programming techniques and their applications.

### Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Learn basics of PHP	K1,K2
CO2	Acquire knowledge about control structures	K1,K2
CO3	Working with arrays	K2,K5
CO4	Analyze about OOPS and file concepts	K3,K4,K5
CO5	Learn connectivity and XML	K2,K3,K5

## SYLLABUS

### UNIT I (9 Hours)

#### Introduction to PHP

Introducing PHP – Basic Development Concepts – Creating First PHP Scripts – Using Variable and Operators – Storing Data in Variable – Understanding Data Types – Setting and Checking Variables Data Types – Using Constants – Manipulating Variables with Operators.

### UNIT II (10 Hours)

#### Control Structures

Controlling Program Flow: Writing Simple Conditional Statements - Writing More Complex Conditional Statements – Repeating Action with Loops – Working with String and Numeric Functions.

### UNIT III (10 Hours)

#### Arrays

Working with Arrays: Storing Data in Arrays – Processing Arrays with Loops and Iterations – Using Arrays with Forms - Working with Array Functions – Working with Dates and Times.

### UNIT IV (9 Hours)

#### OOPS and File Concepts

Using Functions and Classes: Creating User-Defined Functions - Creating Classes – Using Advanced OOP Concepts. Working with Files and Directories: Reading Files-Writing Files-Processing Directories.

### UNIT V (10 Hours)

#### Database and XML

Working with Database and SQL : Introducing Database and SQL- Using MySQL - Adding and Modifying Data - Handling Errors – Using SQLite Extension and PDO Extension. Introduction XML - Simple XML and DOM Extension.

### TEXT BOOKS:

1. Vikram Vaswani, PHP A Beginner's Guide, Tata McGraw-Hill.

### REFERENCE BOOKS:

1. Steven Holzner, The PHP Complete Reference, Tata McGraw-Hill Edition.
2. Julie Meloni, Matt Telles, PHP 6, 3<sup>rd</sup> Edition, Cengage Learning India Edition, 2009.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
<b>SKILL ENHANCEMENT COURSE : I</b>	<b>19SEU01</b>	<b>INFORMATION SECURITY</b>	<b>24</b>	<b>-</b>	<b>2</b>

#### **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) Burla, Sambalpur, Odisha.

**REFERENCE BOOK:**

1. Andy Taylor (Editor), David Alexander, Amanda Finch and 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	19NMU01A	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:**

<b>S.No</b>	<b>Authors</b>	<b>Title</b>	<b>Publishers</b>	<b>Year of Publication</b>
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: XIV	19CAU17	DATA STRUCTURES	72	-	5

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

#### UNIT II (15 Hours)

#### Linked List and Storage Management

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

#### UNIT III (15 Hours)

#### Trees, Symbol Tables & 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 (15 Hours)

#### External Sorting

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

#### UNIT V (15 Hours)

#### Internal Sorting & 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,Prentice- Hall of India Pvt Ltd, Ninth edition, 2007.

2.Tremblay & Sorenson, Data Structures with Applications, Tata McGraw Hill Company, 2nd Edition, 1991 (only for Queue application).

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE : XV	19CAU18	ADVANCED OPERATING SYSTEM	72	-	5

### Preamble

To learn about advanced Operating System and its 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 Operating System	K1,K2
CO2	Obtain knowledge about processes and deadlock	K2,K3
CO3	Gain information about memory management	K2,K3,K4
CO4	Attain knowledge about storage management	K1,K2,K3
CO5	Learn about Linux and Windows	K2,K3,K4

## SYLLABUS

### UNIT I (14 Hours)

#### Introduction

Introduction-What Operating Systems Do – Computer System Organization – Computer System Architecture- Operating System Operations- Resource Management- Security and Protection – Virtualization – Distributed Systems - Kernel Data Structures- Computing Environments- Free and Open-Source Operating Systems.(Pages:04-52).

### UNIT II (15 Hours)

#### Process Management and Deadlock

**Processes Management:** Process Concept- Process Scheduling- Operations on Processes- Interprocess Communication- IPC in Shared Memory Systems – IPC in Message Passing Systems - Examples of IPC Systems- Communication in Client–Server Systems (Pages:106-152)

**Deadlocks:** System Model- Deadlock in Multithreaded Applications - Deadlock Characterization- Methods for Handling Deadlocks- Deadlock Prevention- Deadlock Avoidance- Deadlock Detection- Recovery from Deadlock(Pages:318-342)

### UNIT III (14 Hours)

#### Memory Management

**Main Memory:** Background- Contiguous Memory Allocation- Segmentation- Paging- Structure of the Page Table – Swapping (Pages:349-378)

**Virtual Memory:** Background- Demand Paging- Copy-on-Write - Page Replacement- Allocation of Frames-Thrashing- Memory Compression - Allocating Kernel Memory(Pages:389-429)

### UNIT IV (14 Hours)

#### Storage Management

**Mass Storage Structure:** Overview of Mass-Storage Structure- HDD Scheduling – NVM Scheduling- Error Detection and Correction – Storage Device Management – Swap-Space Management – Storage Attachment- RAID Structure (Pages:449-484)

**File –System Interface:** File Concept- Access Methods- Directory Structure- Protection – Memory-Mapped Files (Pages:529-559)

**UNIT V (15 Hours)****Linux and Windows**

**The Linux System:** Linux History- Design Principles- Kernel Modules- Process Management- Scheduling- Memory Management- File Systems- Input and Output- Interprocess Communication- Network Structure- Security(Pages:775-817)

**Windows 10:** History- Design Principles- System Components- Terminal Services and Fast User Switching- File System- Networking- Programmer Interface(Pages:821-895)

**TEXT BOOK:**

1. Silberschatz, Galvin Gagne, Operating System Concepts, 10th Edition, Wiley India Edition, 2018

**REFERENCE BOOKS:**

1. DeitelDeitelChoffnes, Operating Systems, 3rd Edition, Pearson Education, 2003.
2. Stuart E. Madnick, John J.Donovan. Operating Systems, 3rd Edition, Tata McGraw Hill,2003.
3. <http://spoken-tutorial.org/>



CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE : XVI	19CAU19	OPERATING SYSTEM - PRACTICAL	-	72	4

**Subject Description:** This course provides programming knowledge in advanced Operating System

**Goal:** To enable the students to gain skills in Android and Linux shell programming

**Objectives:** On successful completion of the course the students will understand the concepts of Operating System

### Practical List

#### Linux

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 a Shell script to demonstrate Terminal locking.

#### Android

1. Write a program to demonstrate usage of two textbox (Edit Text), Label (Text view) and Button widgets in android and perform addition of two numbers.
2. Write a program and fetch the IMEI number of your mobile phone.
3. Write a program to demonstrate usage of DateTimePicker with Toast(Message Box).
4. Write a program for sending SMS using android.
5. Write a simple program to demonstrate the contact manager using ContactAPI (Insert, Delete, Edit, and View).

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
ALLIED : IV	19CAU20	BUSINESS ACCOUNTING	60	-	4

### Preamble

To impart basic accounting knowledge

### Course Outcomes

On successful completion of the course the students should have:

CO Number	CO Statement	Knowledge Level
CO1	Understood financial accounting	K1,K2,K4
CO2	Learn accounting concepts	K2,K3,K4
CO3	Learnt transactions	K2,K3,K4
CO4	Acquire knowledge of cost accounts	K3
CO5	Learnt management accounting	K2,K3,K4.K5

## SYLLABUS

### UNIT I (14 Hours)

#### Introduction

Financial Accounting-Definition and Scope, Objectives of Financial Accounting, Accounting v/s Book Keeping Terms used in Accounting, Users of Accounting Information and Limitations of Financial Accounting.

### UNIT II (15 Hours)

#### Recording of transactions

Journals, Subsidiary Books, Ledger, Cash Book, and Trial Balance. Depreciation: Meaning, Need & Importance of Depreciation, Methods of Charging Depreciation. (WDV & SLM).

### UNIT III (14 Hours)

#### Preparation of Final Accounts

Trading, Profit and Loss Account and Balance sheet with simple adjustments-Outstanding Expenses and Income, Prepaid Expenses, Pre received Income, Depreciation –Provision for bad debts.

### UNIT IV (15 Hours)

#### Cost Account

Cost Account-Meaning Elements of Cost-Preparation of Cost Sheet with Simple Adjustments- Material Cost: Stores Ledger-FIFO-LIFO-Weighted Average, Simple Average Method.

### UNIT V (14 Hours)

#### Management Account

Management Account-Meaning –Objectives-Management Account with Financial Account, Budget and Budgetary control-Preparation of Various Budgets -Flexible Budget- Cash Budget –Sales Budget.

**TEXT BOOK:**

1. N.P.Srinivasan and M.Sakthivel Murugan, Accounting For Management, (Revised Edition), New Delhi, S.Chand & Company Ltd., 2012.

**REFERENCE BOOKS :**

1. T.S Grewal, Double Entry Book Keeping, Sultan Chand & Sons, New Delhi.
2. Sharma and Gupta, Management Accounting, Kalyani Publishers, New Delhi
3. Anil Chowdhry, Fundamentals Of Accounting & Financial Analysis, (Pearson Education)
4. Jane Reimers, Financial Accounting,(Pearson Education)
5. Rajesh Agarwal & R Srinivasan, Accounting Made Easy, (Tata McGraw –Hill)
6. Amrith Gupta, Financial Accounting For Management, (Pearson Education)
7. Dr. S. N. Maheshwari, Financial Accounting For Management, (Vikas Publishing House)

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
SKILL ENHANCEMENT COURSE : II	19SEUCA2	PROGRAMMING IN PHP - PRACTICAL	-	48	2

**Subject Description:** This course provides programming skills in PHP

**Goal:** To enable the students to develop web based application

**Objectives:** On successful completion of the course the students will understand the concepts of PHP and connectivity with My SQL

#### Practical list

1. Create a simple HTML form and accept the user name and display the name through PHP echo statement
2. Write a PHP script, which changes the color of the first character of a word
3. Write a PHP script to redirect a user to a different page
4. Write a PHP program to swap two variables
5. Write a PHP program to remove duplicates from a sorted list
6. Create a script to construct the following pattern, using nested for loop

```

*
* *
* * *
* * * *
* * * * *

```
7. Write a PHP script using nested for loop that creates a chess board
8. Create a web application takes a name as input and on submit it shows a hello<name> page where <name> is taken from the request and it shows a start time at the right top corner of the page and provides the logout button on clicking this button it should show a logout page with thank you<name> message with the duration of Usage
9. Write a PHP program to develop college application form with MySQL
10. Write a PHP program to create personal blog

**Career Enhancement (Online Examination):**

This course is 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 1½ Hours with randomly selected 50 questions for a maximum of 50 marks. The passing minimum is 40% of 50 marks ie. 20 marks

<b>Course</b>	<b>No. of Questions</b>	<b>Marks</b>	<b>Total Marks</b>
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 credit each.

CATERGORY	COURSE CODE	TITLE	C	P	CREDIT
<b>CORE : XVIII</b>	<b>19CAU22</b>	<b>RELATIONAL DATABASE MANAGEMENT SYSTEM</b>	<b>72</b>	<b>-</b>	<b>4</b>

### 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, 4<sup>th</sup> Edition, TMH, 2007.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE : XIX	19CAU23	PROGRAMMING IN PYTHON	72	-	4

### Preamble

To gain knowledge on basics of Python and to enrich the programming skills needed for Software development

### Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	To get introduced to Python Programming	K1
CO2	To acquire knowledge about Expressions, Operator Precedence and errors	K2,K3
CO3	To develop programs using conditional statements and expressions	K3,K5
CO4	To understand iteration concepts using looping statements	K2, K4
CO5	To learn how to work with Lists, Objects and Handling exceptions.	K3, K6

## SYLLABUS

### UNIT I (12 Hours) Introduction to Python programming

Learning Programming with Python- Writing a Python Program-The Python Interactive Shell-A Longer Python program- Values and Variables

### UNIT II (12 Hours) Expressions and Arithmetic

Expressions -Mixed Type Expressions-Operator Precedence and Associativity-Formatting Expressions-Comments- Errors -More Arithmetic Operators- Working with Examples.

### UNIT III (12 Hours) Conditional Execution

Boolean Expressions- The Simple If Statement- The If/Else Statement- Compound Boolean Expressions- The Pass Statement- Floating-Point Equality Nested Conditionals- Multi-Way Decision Statements- Multi-Way Versus Sequential Conditionals -Conditional Expressions.

### UNIT IV (12 Hours) Iteration

The while Statement - Definite Loops vs. Indefinite Loops- The For Statement- Nested Loops- Abnormal Loop Termination-Infinite Loops- Iteration Examples-Using Functions-Writing Functions- More on Functions.

### UNIT V (12 Hours) Working with list

List- Tuples, Dictionaries, and Sets - Lists Processing: Sorting - Flexible Sorting – Search - Objects-Custom Types-Handling Exceptions.



**TEXT BOOKS:**

1. Richard L. Halterman , Learning to Program With Python- Copyright © 2011.
2. Richard L. Halterman, Fundamentals of Programming Python, Southern Adventist University, November 30, 2017.
3. E.Balagurusamy, Introduction to Computing and Problem Solving Using Python.

**REFERENCE BOOK:**

1. Charles Dierbach, Introduction to Computer Science Using Python: A Computational Problem-Solving Focus.

CATERGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE : XX	19CAU24	PROGRAMMING IN PYTHON AND ORACLE - PRACTICAL	72	-	4

**Subject Description:** This course provide complete knowledge in Python and Oracle

**Goal:** To enable the students to develop applications using Python and develop queries and PL/SQL programming using oracle

**Objectives:** To learn how to design and program Python applications and querying and programming in oracle

### Practical List

#### PYTHON:

1. Program to check Armstrong numbers in certain interval.
2. Program make a simple calculator that can add, subtract, multiply and divide using functions.
3. Program to sort alphabetically the words form a string provided by the user.
4. Program to perform the following:
  - a) different set operations
  - b) display calendar of given month of the year
5. Program to generate:
  - a) Password
  - b) Random Number
6. Program to perform Binary search in a given list of ordered numbers.

#### 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.

CATERGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE : XXI	19CAU25	MINI PROJECT	-	-	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	<b>100</b>
Clarity and comprehensiveness of presentation in the report	30	
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	19CAU26A	DATA MINING	72	-	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 (15 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 (12 Hours)

#### Data Mining Techniques

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

#### UNIT III (15 Hours)

#### Classification

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

#### UNIT IV (15 Hours)

#### Clustering

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

#### UNIT V (15 Hours)

#### Association Rules

Introduction - Large Item Sets – Basic Algorithms – Parallel & 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, 2001 Academic Press.

CATERGORY	COURSE CODE	TITLE	C	P	CREDIT
ELECTIVE : I	19CAU26B	INTRODUCTION TO COMPILER DESIGN	72	-	4

**Preamble**

To understand the principles of Compiler design

**Course Outcomes**

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

CO Number	CO Statement	Knowledge Level
CO1	Ability to understand the basics of compilers and lexical analysis	K1,K2
CO2	Understand the concept of syntactic specification of programming languages and parsing techniques	K2,K3
CO3	Acquire knowledge on the syntax and symbol tables	K2,K3
CO4	Provide a insight on runtime storage and error recovery	K4,K5
CO5	General introduction on code optimization and generation	K2,K3,K4

**SYLLABUS****UNIT I (12 HOURS)****Introduction to Compilers**

Compilers and Translator – Need of Translator – The Structure of a Compiler – Lexical Analysis – Syntax Analysis – Intermediate Code Generation – Optimization – Code Generation – Compiler – Writing Tools. Finite Automata and Lexical Analysis: The Role of the Lexical Analysis – A Simple Approach to the Design of Lexical Analyzers- Regular Expressions to Finite Automata – Minimizing the Number of States of a DFA.

**UNIT II (15 HOURS)****The Syntactic specification of programming languages**

Context Free Grammars – Derivations and Parse Trees – Capabilities of Context Free Grammars. Basic Parsing Techniques: Parsers – Shift- Reduce Parsing – Top Down Parsing – Predictive Parsers.

**UNIT III (15 HOURS)****Syntax – directed translation**

Syntax-Directed Translation Schemes – Implementation of Syntax-Directed Translators – Intermediate Code – Postfix Notation – Parse Trees and Syntax Trees – 3 Address Code – Quadruples and Triples – Translation of Assignment Statements – Boolean Expressions – Statements that alter the Flow of Control. Symbol Tables: The Contents of a Symbol Table – Data Structures for Symbol Table – Representing Scope Information.

**UNIT IV (15 HOURS)****Run time storage administration**

Implementation of a Simple Stack Allocation Scheme – Implementation of Block-Structured Languages – Storage Allocation in Block Structured Languages. Error Deduction and Recovery: Errors – Lexical Phase Errors – Syntactic Phase Errors – Semantic Errors.

**UNIT V (15 HOURS)****Introduction of code optimization**

The Principle Sources of Optimization – Loop Optimization – The DAG Representation of Basic Blocks – Value Numbers and Algebraic Laws – Global Data Flow Analysis. Code Generation: Object Programs – Problems in Code Generation – A Machine Model – A Simple Code Generator – Register Allocation and Assignment – Code Generation from DAG's – Peepholes Optimization.

**TEXT BOOK:**

1. V.Aho, Jeffrey D.Ullman: Principles of Compiler Design by Alfred, Narosa Publishing House.

**REFERENCE BOOKS:**

1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman: Compilers, Principles, Techniques, and tools

CATERGORY	COURSE CODE	TITLE	C	P	CREDIT
ELECTIVE : I	19CAU26C	INTRODUCTION AND ROLE OF ICT IN AGRICULTURE	72	-	4

### Preamble

To acquaint the students with scope of information and communications technology in agriculture, networking and communication media.

### Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the need for ICT and role of communication in ICT.	K1,K2
CO2	Learn the various forms of communication and role of mass media in broadcasting farm technology	K2,K3
CO3	Gain the deep knowledge on the role of Telephone/Mobile Technology in assisting farmers	K2,K3,K4
CO4	Get acquainted with the various agricultural extension and advisory services	K4,K5
CO5	Get knowledge on village knowledge centre ,Web Portals and ICTs for market information and Agri-Business	K3,K5

## SYLLABUS

### UNIT I (15 HOURS) Introduction to ICT

Introduction & Scope of ICT in Agriculture- Need for ICT in Agricultural Extension - National Policies on ICT in Agricultural Extension- Role of communications in ICT: Concept, Elements & their Characteristics- Message: Meaning , Dimensions of a Message Characteristics of a Good Message, Message Treatment and Effectiveness, Distortion of Message.

### UNIT II (12 HOURS) Communication Media

Methods of Communication: Meaning and Function- Forms of Communication- Role of Mass Media in Dissemination of Farm Technology- Modern Communication Media: Electronic Video, Tele Text, Tele Conference, Computer Assisted Instruction.

### UNIT III (15 HOURS) Telephone/Mobile Technology

Telephone/Mobile Technology: Farmer Call Centre, SMS Broadcast Service, m-krishi- ICT initiatives of NGOs and Private Companies- ICT initiatives by ICAR and SAUs- Value Added Services- Fisher Friend Project- SMS Services to farmers by Department of Agriculture.

### UNIT IV (15 HOURS) ICT for Agricultural Extension

Practices of ICT for Agricultural Extension: aAQUA, Digital Green, e-Agrik (e-Agriculture), e-Sagu (e-cultivation), KISSAN (Karshaka Information Systems Service and Networking)-Solutions through Information - VASAT-Virtual Academy for the Semi-Arid Tropics-Touch Screen Kiosk- e-Extension (e-Soil Health Card Program).

**UNIT V (15 HOURS) Village Knowledge Centre and Web Portals**

Village Knowledge Centre (VRC/VRC/CIC): Introduction, Concept, Process for Setting VRC- Warana Wired Village Project - Web Portals: AGRISNET, DACNET, InDG, DEAL, i-KISAN, e- Krishi, ASHA, IFFCO- Agri-Portal, Agriwatch Portal, i-Shakti - ICTs for Market Information and Agri-Business: AGMARKNET, e-KRISHI VIPNAN, ICT-e-CHOPAL, EID Garry-Indiagriline.

**TEXT BOOKS:**

1. A.S. Sandhu, Text book on Agricultural communication process and methods, Oxford & TBH, 2004.
2. R Saravanan ,ICTs for agricultural extension, New India Publ. Agency, 2010.
3. Shaik N Meera,ICTs in agricultural extension tactical to practical, Ganga Kaveri Publ. House, Varanasi, 2008.

**REFERENCE BOOK:**

1. G.L. Ray, Extension communication and management. Kalyani Publ, 2006.
2. B Jirli, Deepak De & GCKendadamth ,Information and communication technology (ICT) and sustainable development, Ganga Kaveri Publ. House, Varanasi, 2005.
3. R Saravanan, C Kathiresan & T Indra Devi,Information & communication technology for agriculture and rural development, New India Publ. Agency, 2011.



CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
<b>SKILL ENHANCEMENT COURSE: III</b>	<b>19SEUCA3</b>	<b>TALLY- PRACTICAL</b>	-	<b>36</b>	<b>2</b>

**Subject Description:** To include the different accounting applications using Tally.

**Goals:** To impart knowledge on the different accounting applications using Tally

**Objectives:** On successful completion of the course the students will understand the accounting applications using Tally.

### Practical list

1. Creating a company with all relevant details
2. Create the ledgers under appropriate predefined groups
3. Create vouchers and view profit and loss a/c and balance sheet
4. Create stock items, Stock categories, units of measure view the Stock summary
5. Create purchase and sales vouchers for stock items
6. Create stock vouchers using debit note and credit note.
7. Memo voucher
8. Cheque printing
9. Ratio analysis
10. Prepare trading profit and loss account and b/s, with inventory details

### Open Elective

A student shall take up one **OPEN ELECTIVE** course offered by other departments under Part: IV 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 2019-20 ONWARDS

S.No.	Course Code	Department	Course
1.	19TAUC01	Tamil	jd;dk;gpf;if ,yf;fpak; (ngz;Nz eP tho;f)
2.	19ENUC01	English	English for Effective Communication
3.	19MAUC01	Mathematics	Mathematics for Business
4.	19PHUC01	Physics	Physics in day to day life
5.	19CSUC01	Computer Science	Desktop Publishing Practicals
6.	19CGUC01 19CCUC01 19CPUC01 19CFUC01	Commerce :B.Com B.Com (CA) B.Com (PA) B.Com (A&F)	Basics of Accounting Elements of Costing Investment Portfolio Accounting for Managerial Decision Making
7.	19BAUC01	Management	Start up Business

CATERGORY	COURSE CODE	TITLE	C	P	CREDIT
**	**	OPEN ELECTIVE	-	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

### 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.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
PROFICIENCY ENHANCEMENT	19PEUCA1	SOFTWARE PROJECT MANAGEMENT (SELF STUDY)	-	-	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- Metrics 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 – Metrics 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. Gopaldaswamy 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 : XXIII	19CAU28	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, Quantitative and Mixed Methods Approaches.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
CORE : XXIV	19CAU29	PROGRAMMING IN VB.NET	72	-	5

### 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" , 1<sup>st</sup> Edition, Scitech Publications(India) Pvt Ltd, 2014

**REFERENCE BOOKS:**

1. Jeffrey 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 :XXV	19CAU30	PROGRAMMING IN VB.NET - PRACTICAL	-	72	4

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

**Goal:** To enable the students to work effectively with VB.NET Programming

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

#### Practical list

#### VB.NET PROGRAMS

1. Write a simple VB.NET program to develop a calculator with basic operation.
2. Write a VB.NET Program for Font Application.
3. Write a VB.NET Program for Notepad Application.
4. Write a VB.NET Program to illustrate If condition.
5. Demonstrate the looping statements in VB.NET using a console application.
6. Develop an application for deploying various built-in functions in VB.NET.
7. Develop a windows application with Menus and Dialog Boxes.
8. Write a VB.NET Program to create and read a Text file.
9. Develop a simple project for Student Database Management System using VB.NET as front end and Oracle as back end.
10. Develop a simple project for Employee Database Management System using VB.NET as front end and Oracle as back end.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
ELECTIVE : II	19CAU31A	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, Playfair, 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	19CAU31B	BIG DATA ANALYTICS	60	-	4

#### Preamble

To provide grounding in basic and advanced methods to big data technology and tools, including MapReduce and Hadoop and its ecosystem

#### 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 big data analytics	K1,K2
CO2	Acquire the knowledge on Hadoop	K1,K2
CO3	Learn to build and maintain reliable, scalable, distributed systems with Hadoop	K2,K3
CO4	Able to apply Hadoop ecosystem components	K3,K4
CO5	Understand the basics of HIVE and its usage	K2,K3,K4

### SYLLABUS

#### UNIT I (12 Hours)

#### Introduction to Big data

Introduction – Distributed File System – Big Data and its Importance, Four V's in Big Data, Drivers For Big Data, Big Data Analytics, Big Data Applications. Algorithms Using Map Reduce, Matrix-Vector Multiplication by Map Reduce.

#### UNIT II (12 Hours)

#### Introduction to Hadoop

Big Data – Apache Hadoop & Hadoop Ecosystem – Moving Data in and out of Hadoop – Understanding Inputs and Outputs of Mapreduce - Data Serialization.

#### UNIT III (12 Hours)

#### Hadoop- Architecture and Storage

Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell Commands , Anatomy of File Write and Read, NameNode, Secondary NameNode, and DataNode, Hadoop MapReduce paradigm, Map and Reduce tasks, Job, Tasktrackers - Cluster Setup – SSH & Hadoop Configuration – HDFS Administering –Monitoring & Maintenance.

#### UNIT IV (12 Hours)

#### Hadoop ecosystem and Yarn

Hadoop ecosystem components - Schedulers - Fair and Capacity, Hadoop 2.0 New Features- NameNode High Availability, HDFS Federation, MRv2, YARN, Running MRv1 in YARN.

#### UNIT V (12 Hours)

#### HIVE and HIVEQL, HBASE

Hive Architecture and Installation, Comparison with Traditional Database, HiveQL - Querying Data - Sorting And Aggregating, Map Reduce Scripts, Joins & Subqueries, HBase concepts- Advanced Usage, Schema Design, Advance Indexing - PIG, Zookeeper - How it Helps in Monitoring a Cluster, HBase uses Zookeeper and How to Build Applications with Zookeeper.

**TEXT BOOKS:**

1. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, Professional Hadoop Solutions, Wiley, ISBN: 9788126551071, 2015.
2. Chris Eaton, Dirk deroos et al. , Understanding Big data, McGraw Hill, 2012.
3. Tom White, HADOOP: The definitive Guide, O Reilly, 2012.
4. Vignesh Prajapati, Big Data Analytics with R and Haoop, Packet Publishing, 2013.

**REFERENCE BOOKS**

1. Tom Plunkett, Brian Macdonald et al., Oracle Big Data Handbook, Oracle Press, 2014.
2. Jy Liebowitz ,Big Data and Business analytics ,CRC press, 2013.

<b>CATEGORY</b>	<b>COURSE CODE</b>	<b>TITLE</b>	<b>C</b>	<b>P</b>	<b>CREDIT</b>
<b>ELECTIVE : II</b>	<b>19CAU31C</b>	<b>E-AGRICULTURE</b>	<b>60</b>	<b>-</b>	<b>4</b>

### **Preamble**

To enhance the ethical conduct of ICT involving human subjects requires a balancing of Agriculture interests in protecting the rights of subjects in developing knowledge that can benefit the subject or society as a whole.

### **Course Outcomes**

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

<b>CO Number</b>	<b>CO Statement</b>	<b>Knowledge Level</b>
CO1	Understand the basic concepts of Expert System on selected crops and pests	K1,K2
CO2	Acquire the deep knowledge on Computer Aided Extension.	K2
CO3	Familiarize on mobile technologies for Agriculture	K3
CO4	Give detailed understanding about ICT and its issues	K4,K5
CO5	Ability to work with various extension services	K5

## **SYLLABUS**

### **UNIT I (12 Hours) Learning about Crops and Pests using ICT**

ICTs Projects - Case Studies in India And Developing World.- ICT use in Field of Extension- Expert Systems on Selected Crops and Enterprises - Self Learning Cds on Package of Practices : Diseases and Pest Management.

### **UNIT II (12 Hours) Agriculture Web Portals**

Agricultural Web Sites and Portals Related to Crop Production and Marketing - Community Radio, Web, Tele, and Video Conferencing - Computer Aided Extension - Knowledge Management - Information Kiosks - Multimedia.

### **UNIT III (12 Hours) Mobile Technologies for Farmers**

Online and Offline Extension - Tools for Mobile Technologies - ICT Extension Approaches- Pre-Requisites - Precision Farming - Human Resource Information.

### **UNIT IV (12 Hours) ICT Training Issues**

Basic E-Extension Training Issues - ICT Enabled Extension Pluralism - Emerging Issues in ICT - Case Studies.

### **UNIT V (12 Hours) Extension Services and its Types**

Cloud Based Extension Approaches - Blog Extension Practices - Voice Enabled Extension Services - SWOT Analysis of ICT Based Agriculture Projects.

**TEXT BOOKS:**

1. Batnakar S & Schware R. Information and Communication Technology in Development- Cases from India. Sage Publ.
2. Meera SN. ICTs in Agricultural Extension: Tactical to Practical, Ganga-Kaveri Publ. House. JangamWadiMath, Varanasi.

**REFERENCE BOOK:**

1. Willem Zip. Improving the Transfer and Use of Agricultural Information - A Guide to Information Technology. The World Bank, Washington.



CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
ELECTIVE : III	19CAU32A	GRAPHICS AND MULTIMEDIA	60	-	4

### 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 3D Transformations

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, Twelfth Indian Reprint, Pearson Education.

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
ELECTIVE : III	19CAU32B	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 footprint, 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	19CAU32C	WEB SERVICES	60	-	4

### Preamble

To learn about the web services technologies

### Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the basics of Web Services	K1,K2
CO2	Acquire the knowledge on application of Web Services and learn the basics of XML	K1, K2,K3,K4
CO3	Learn the structure of SOAP and WSDL	K2,K3
CO4	Study about UDDI and Message	K2,K3,K4
CO5	Case studies for Web Services	K3,K4.K5

## SYLLABUS

### UNIT I (12 Hours)

#### Introduction

Introduction: Background–Services-Web Services-Web Services Application Opportunities. Emergence of Web Services: Background-Server Side Architecture Progression-Client Side Architecture Progression-Service Oriented Architecture Future and Web Services

### UNIT II (12 Hours)

#### Web Service Application and XML

Web Service Application Scenario: Background-Web Services Hype and the Industry-Web Services and the Industry Acceptance. XML: Background-History of Markup Language-What Is XML? - Validation of XML Data-Advanced XML-Document Constraining.

### UNIT III (12 Hours)

#### SOAP and WSDL

Simple Object Access Protocol: Background-What Is SOP?-SOAP Interaction-SOAP Modeling-SOAP Encoding-SOAP Binding. Web Services Description Language: Background-What Is WSDL?-Web Services Invocation and WSDL-Web Services Description Details-Services Description through WSDL.

### UNIT IV (12 Hours)

#### Registries and RPC

Registries: Background- What Is UDDI?-UDDI Nomenclature-Core UDDI-Service Publication-Service Discovery. Remote Procedure Call and Messaging: Background-Synchronous Web Services-Asynchronous Web Services-Remote Procedure Call or Messaging?

### UNIT V (12 Hours)

#### Case Study

Web Services: Industry Adoption: Background-Adoption of Web Services By Financial Services and Banking Industry-Factors Affecting the Adoption of Web Services Technology. Context Setting: Background-Focus Areas of Case Study-The Case of Infybank.

**TEXT BOOK:**

1. B.V.Kumar, S.V.Subrahmanya, Web Services an Introduction, Tata McGraw-Hill Publishing Company Limited

**REFERENCE BOOK:**

1.Stephen Potts, Mike Kopack, Sams Teach Yourself Web Services in 24 Hours

CATEGORY	COURSE CODE	TITLE	C	P	CREDIT
<b>SKILL ENHANCEMENT COURSE : IV</b>	<b>19SEUCA4</b>	<b>PROGRAMMING IN 3D MAX - PRACTICAL</b>	-	24	2

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

**Part III - COMPREHENSION IN COMPUTER SCIENCE (Courses I, II, III, IV, V & VI)**

**(For those admitted in June 2019-20 & onwards)**

The Comprehension in Computer Science examination will be conducted at the end of each semester I, II, 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.