

# CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS)

NATIONALLY ACCREDITED (III CYCLE) WITH “A” GRADE BY NAAC

ISO 9001:2015 Certified

**TIRUCHIRAPPALLI – 18**

## DEPARTMENT OF COMPUTER APPLICATIONS



### *Bachelor of Computer Applications*

*2019-2020 onwards*

*SYLLABUS*

**BACHELOR OF COMPUTER APPLICATIONS- PROGRAMME STRUCTURE**  
**(For the Candidates admitted from the academic year 2019-2020 onwards)**

Semester	Part	Course	Title	Course Code	Inst. Hours/ Week	Credit	Exam Hours	Marks		Total
								Internal	External	
1	I	Language Course-I (LC)-Tamil / Other Languages (Hindi/Sanskrit/French)	Ikkaala ilakkiyam	19ULT1	6	3	3	25	75	100
			Story,Novel, Hindi Literature-I, & Grammar-I	19ULH1						
			History of Popular Tales Literatureand SanskritStory	19ULS1						
			Communication in French-I	19ULF1						
	II	English Language Course- I (ELC)	Functional Grammar for Effective Communication – I	19UE1	6	3	3	25	75	100
	III	Core Course - I (CC)	Programming with C	19UCA1CC1	6	6	3	25	75	100
		Core Course - I (CP)	Practical I -Programming with C	19UCA1CC1P	3	2	3	40	60	100
		First Allied - I (AC)	Essential Mathematics	19UCA1AC1	4	4	3	25	75	100
		First Allied - II (AC)	Numerical Analysis and Statistics	19UCA1AC2	3	-	-	-	-	-
	Value Education			19UGVE	2	2	3	25	75	100
Total				30	20				600	
2	I	Language Course-II (LC)-Tamil/Other Languages (Hindi/Sanskrit/French)	Idaikkaala Ilakkiyamum Puthinamum	19ULT2	6	3	3	25	75	100
			Prose, Drama, Hindi Literature-II, & Grammar-II	19ULH2						
			Poetry Textual Grammar and Alakara	19ULS2						
			Communication in French-II	19ULF2						
	II	English Language Course- II (ELC)	Functional Grammar for Effective Communication - II	19UE2	6	3	3	25	75	100
	III	Core Course - II (CC)	Data Structures	19UCA2CC2	6	6	3	25	75	100
		Core Course - II (CP)	Practical II -Data Structures UsingC	19UCA2CC2P	3	2	3	40	60	100
		First Allied - II (AC)	Numerical Analysis and Statistics	19UCA1AC2	3	3	3	25	75	100
		First Allied - III (AC)	Operations Research	19UCA2AC3	4	2	3	25	75	100
	IV	Environmental Studies		19UGES	2	2	3	25	75	100
Total				30	21				700	

3	I	Language Course - III (LC)-Tamil / Other Languages (Hindi/Sanskrit/French)	Kaappiyamum Naadakamum	19ULT3	6	3	3	25	75	100
			Medieval, Modern Poetry & History of Hindi Literature-3	19ULH3						
			Prose, Textual Grammar and Vakyarachana	19ULS3						
			Communication in French-III	19ULF3						
	II	English Language Course - III(ELC)	Reading and writing for effective communication - I	19UE3	6	3	3	25	75	100
	III	Core Course - III (CC)	Database Management Systems	19UCA3CC3	6	6	3	25	75	100
		Core Course - III (CP)	Practical III – DBMS	19UCA3CC3P	3	2	3	40	60	100
		Second Allied - I (AC)	Financial Accounting	19UCA3AC4	4	4	3	25	75	100
		Second Allied - II (AP)	Computer Applications in Business	19UCA3AC1P	3	2	3	40	60	100
	IV	NonMajor Elective– I	Principles of Internet	19UCA3NME1	2	2	3	25	75	100
			Basic Tamil	19ULC3BT1						
			SpecialTamil	19ULC3ST1						
	V	Extra Credit Course	Swayam Online Course	To be Fixed Later	As per UGC Recommendation					
Total					30	22				700
4	I	Language Course-IV (LC)-Tamil /Other Languages ((Hindi/Sanskrit/French )	Pandaiya Ilakkiyam	19ULT4	6	3	3	25	75	100
			Letter writing, General Essays, Technical Terms,Proverbs, Idioms &Pharses, Hindi Literature-4	19ULH4						
			Drama, History of Drama Literature	19ULS4						
			Communication in French-IV	19ULF4						
	II	English Language Course - IV(ELC)	Reading and writing for effective communication - II	19UE4	6	3	3	25	75	100
	III	Core Course - IV (CC)	Programming with Java	19UCA4CC4	6	6	3	25	75	100
		Core Course - IV (CP)	Practical IV - Programming with Java	19UCA4CC4P	3	2	3	40	60	100
		Second Allied - III(AC)	Organizational Behaviour	19UCA4AC5	5	3	3	25	75	100
	IV	NonMajor Elective– II	HTML Practicals	19UCA4NME2P	2	2	3	40	60	100
			Basic Tamil	19ULC4BT2				25	75	
			SpecialTamil	19ULC4ST2						
		Skill Based Elective– I	Animation Practicals -I	19UCA4SBE1AP	2	2	3	40	60	100
			HTML5Practicals	19UCA4SBE1BP						
V	Extra Credit Course	Swayam Online Course	To be Fixed Later	As per UGC Recommendation						
Total					30	21				700

5	III	CoreCourse - V (CC)	Web Programming with PHP	19UCA5CC5	5	5	3	25	75	100
		CoreCourse - V (CP)	Practical V -PHP with MySQL	19UCA5CC5P	4	3	3	40	60	100
		Core Course - VI (CC)	OperatingSystems	19UCA5CC6	5	5	3	25	75	100
		Core Course - VII (CC)	Software Engineering	19UCA5CC7	5	5	3	25	75	100
		Major Based Elective –I	Cloud Computing	19UCA5MBE1A	5	5	3	25	75	100
			Introduction to Data Mining and Data Warehousing	19UCA5MBE1B						
			Artificial Intelligence	19UCA5MBE1C						
	IV	Skill Based Elective - II	Practical - PC Packages	19UCA5SBE2AP	2	2	3	40	60	100
			Practical - Corel Draw	19UCA5SBE2BP						
		Skill Based Elective –III	Practical-Mobile Applications Development	19UCA5SBE3AP	2	2	3	40	60	100
			Practical-Multimedia Systems	19UCA5SBE3BP						
		UGC Jeevan Kaushal Life Skills	Professional Skills	19UGPS	2	2	3	25	75	100
v	Extra Credit Course	Swayam Online Course	To be Fixed Later	As per UGC Recommendation						
Total					30	29				800
6	III	CoreCourse- VIII (CC)	Computer Networks	19UCA6CC8	6	5	3	25	75	100
		Core Course - IX (CC)	Internet of Things	19UCA6CC9	6	5	3	25	75	100
		Major Based Elective –II	Python Programming	19UCA6MBE2A	6	5	3	25	75	100
			R Programming for Data Analysis	19UCA6MBE2B						
			Digital Marketing	19UCA6MBE2C						
		Major Based Elective –III	Practical-Python Programming	19UCA6MBE3AP	5	5	3	40	60	100
			Practical-R Programming	19UCA6MBE3BP						
			Practical- Dot Net Programming	19UCA6MBE3CP						
		Project Work	Project Work	19UCA6PW	6	5	-	-	-	100
	IV	Gender Studies	Gender Studies	19UGGS	1	1	3	25	75	100
v	Extension Activity		19UGEA	0	1	0	-	-	-	
	Swayam online course	As per UGC Recommendations								
Total					30	27				600
Total					180	140				4100

# **SEMESTER I**

**CORE COURSE – I (CC)**  
**PROGRAMMING WITH C**

**SEMESTER - I**

Course Code	Course Title	Category	Learning Hours	Theory Hours/ Week	Practical Hours/ Week	Credit
19UCA1CC1	Programming With C	Core	90	6	-	6

**PREAMBLE**

- To understand the concepts of C and to develop the programming skill in C programming

**COURSE OUTCOMES (CO)**

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

CO NUMBER	COSTATEMENT	KNOWLEDGE LEVEL
CO1	Explain the program structure, programming rules, C tokens, and syntax.	K2
CO2	Apply decision-making and looping statements in C Program.	K3
CO3	Utilize the concept of arrays and functions.	K3
CO4	Identify the role of structure, union and pointers.	K3
CO5	Make use of the file operations and file functions.	K3

**MAPPING WITH PROGRAMME OUTCOMES**

	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	L
CO2	S	S	M	L
CO3	S	S	S	S
CO4	S	S	S	S
CO5	S	S	S	S

S – Strong; M – Medium; L – Low

## **SYLLABUS**

### **UNIT I : BASIC CONCEPTS**

**(15 HOURS)**

Overview of C: Constants, Variables, and Data Types: Introduction - Identifiers – Constants – Variables - Data types – Declaration of variables –Assigning values to Variables-Defining Symbolic Constant- Operators and Expressions: Arithmetic, Relational, Logical, Assignment, Conditional , Bitwise, Special, Increment and Decrement operators - Arithmetic expressions - Evaluation of expressions–Precedence of Arithmetic Operators-Operator Precedence & Associativity.

### **UNIT II: INPUT AND OUTPUT OPERATIONS & ITERATIVE STRUCTURES**

**(20 HOURS)**

Managing Input and Output Operations: Reading and Writing a character -Formatted Input and Output. Decision Making and Branching: If, Switch, The ?: operator - The GoTo Instruction – Decision Making and Looping: Introduction – While, Do, For Statements –Jumps in Loops.

### **UNIT III: ARRAYS AND FUNCTIONS**

**(20 HOURS)**

Arrays: One-dimensional - Two dimensional - Multidimensional Arrays-Character Arrays and Strings: Declaring and Initializing String Variables - Reading Strings from Terminal- Writing Strings to Screen - String-Handling Functions - User-Defined Functions: Need for User -Defined Functions –A Multi-Function Program-Elements of User-Defined Functions-Definition of Functions –Return values and Their Types-Function Calls-Function Declaration-Category of Functions –Nesting of Functions - Recursion - Storage Class-The scope and lifetime of variables in functions.

### **UNIT IV: STRUCTURES AND POINTERS**

**(20 HOURS)**

Structure and Unions: Defining a Structure –Declaring Structure Variables-Accessing Structure Members- Initialization - Comparison of structure variables - Arrays of structures - Arrays within structures - Structures within Structures –Structures and Functions-Union-Size of Operator. Pointers: Understanding pointers - Accessing the address of a variable - Declaring and Initializing pointers - Accessing a variable through its pointers - Pointer Expressions - Pointers and Arrays - Pointers and Character strings –Array of Pointers- Pointers to Functions - Pointers and Structures.

### **UNIT V: FILES**

**(15 HOURS)**

File management in C: Defining and Opening a file –Closing a file - I/O operations on files –Text file- Data File-Error handling during I/O operations –Random access to files - Command line Arguments.

## **TEXTBOOK**

E. Balagurusamy, “**Programming in ANSI C**”, TMH Publishing Pvt., Ltd., 6th Edition, 2012.

## **REFERENCES**

1. Yashavant Kanetkar, “**Let Us C**”, BPB Publications, New Delhi, 6th Edition, 2005.
2. Byron S. Gottfried, “**Programming with C**”, McGraw Hill Education, 2nd Edition, 2008.
3. [www.learn-c.org](http://www.learn-c.org)
4. [www.cprogramming.com](http://www.cprogramming.com)
5. [www.zentut.com/c-tutorial](http://www.zentut.com/c-tutorial)

## **COURSE DESIGNER**

Ms.R. Brenda, Assistant Professor, Department of Computer Applications

**CORE COURSE – I (CP)****PRACTICAL I -PROGRAMMING WITH C****SEMESTER - I**

<b>Course Code</b>	<b>Course Title</b>	<b>Category</b>	<b>Learning Hours</b>	<b>Theory Hours/ Week</b>	<b>Practical Hours/ Week</b>	<b>Credit</b>
19UCA1CC1P	Practical I – Programming with C	Core	45	-	3	2

**PREAMBLE**

- To impart knowledge on basic concepts of C Programming

**COURSE OUTCOMES(CO)**

- 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	Relate looping structure with arrays.	K1
CO2	Demonstrate the concept of basic C operators and functions.	K2
CO3	Utilize the file concept.	K3

**MAPPING WITH PROGRAMME OUTCOMES**

	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>
<b>CO1</b>	M	M	M	M
<b>CO2</b>	M	M	M	M
<b>CO3</b>	S	S	S	M

**S – Strong; M – Medium; L- Low**



## **LIST OF PRACTICALS**

1.      Formulae Conversion
2.      Selection Structure
  - (a)      Simple if
  - (b)      If-else
  - (c)      Else-if ladder
  - (d)      Switch
  - (e)      Ternary Operator
3.      Iterative Structure
  - (a)      While
  - (b)      Do-while
  - (c)      For
4.      Arrays
  - (a)      One dimension
  - (b)      Two Dimension
5.      Pointers
6.      Files

## **COURSE DESIGNER**

Ms. R. Sridevi, Assistant Professor, Department of Computer Applications

**ALLIED COURSE – I (AC)****ALLIED I-ESSENTIAL MATHEMATICS****SEMESTER - I**

Course Code	Course Title	Category	Learning Hours	Theory Hours/ Week	Practical Hours/ Week	Credit
19UCA1AC1	Essential Mathematics	Allied	60	4	-	4

**PREAMBLE**

- To equip the students with mathematical methods formatted for their major concepts and train them in basic Differentiations and Integrations

**COURSE OUTCOME**

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

CO Number	CO Statement	Knowledge Level
CO1	State the basic concepts of graph theory	K1
CO2	Explain the concepts of Matrices and its types	K2
CO3	Compute characteristic equation of a matrix and its inverse by Cayley Hamilton theorem	K3
CO4	Apply Differentiation to find the solutions of Ordinary and Partial Differentiation	K3
CO5	Classify the various types of integrals	K3
CO6	Solve different types of ordinary differential equation	K3
CO7	Classify the characteristics of graph theory	K3

**COURSE OUTCOME MAPPED WITH PROGRAMME OUTCOME**

	PO1	PO2	PO3	PO4
CO1	S	S	S	S
CO2	S	S	S	M
CO3	S	S	S	S
CO4	S	M	M	M
CO5	S	S	S	M
CO6	S	S	M	M
CO7	S	S	S	S

S – Strong; M – Medium; L – Low

## SYLLABUS

### UNIT I :

(12 hours)

**Matrices :** Singular matrices – Inverse of a non-singular matrix using adjoint method - Rank of a Matrix – Consistency - Characteristic equation, Eigen values, Eigen vectors – Cayley Hamilton's Theorem (proof not needed) – Simple applications only

### UNIT II :

(12 hours)

**Differentiation:** Maxima & Minima – Concavity, Convexity – Points of inflexion - Partial differentiation – Euler's Theorem- Total differential coefficients (proof not needed) – Simple problems only.

### UNIT III:

(12 hours)

**Integration:** Evaluation of integrals of types

$$(1). \int \frac{px+q}{ax^2+bx+c} dx \quad (2). \int \frac{px+q}{\sqrt{ax^2+bx+c}} dx \quad (3). \int \frac{dx}{a+b \sin x} \quad (4). \int \frac{dx}{a+b \cos x}$$

Evaluation using Integration by parts – Properties of definite integrals.

### UNIT IV:

(12 hours)

**Differential Equations:** Variables Separables – Linear equations – Second order of types  $(aD^2 + bD + c)y = F(x)$  where a,b,c are constants and  $F(x)$  is one of the following types (i)  $e^{kx}$  (ii)  $\sin(kx)$  and  $\cos(kx)$  (iii)  $x^n$ , n being an integer (iv)  $e^{kx}f(x)$

### UNIT V:

(12 hours)

**Graph Theory:** Basic concepts- Finite and infinite graphs-Incidence and degree ideas on vertices – Isomorphism, Subgraphs, Walks – Paths and Circuits – Euler graphs.

### TEXT BOOKS:

1. T.K. Manickavasagam Pillai and others, "Algebra, Volume II", S. Viswanathan Pvt Limited, 1985.
2. S. Narayanan, T.K. Manickavasagam Pillai, "Calculus, Volume I", S. Viswanathan Pvt Limited, 2003.
3. S. Narayanan, T.K. Manickavasagam Pillai, "Calculus, Volume II", S. Viswanathan Pvt Limited, 2003.
4. S. Narayanan, T.K. Manickavasagam Pillai, "Calculus, Volume III", S. Viswanathan Pvt Limited, 2003.
5. Narsingh Deo, "Graph Theory", Hall of India Pvt Ltd, 1997.

### REFERENCE BOOKS:

1. A.Singaravelu, "Allied Mathematics", A.R.Publications, 2003.
2. P.R.Vittal, "Allied Mathematics", Margham Publications, Chennai, 2014.
3. S.Arumugam and S.Ramachandran, "Invitation to Graph Theory", SciTech Publications (India) Pvt Ltd., Chennai, 2006.

### COURSE DESIGNER:

**Dr.V.Geetha and Dr.S.Sasikala, Department of Mathematics**

## ALLIED COURSE – II (AC)

### ALLIED II- NUMERICAL ANALYSIS AND STATISTICS

Semester I & II	Internal Marks: 25			External Marks:75		
COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDITS
19UCS1AC2	Numerical Analysis and Statistics	Allied	90	3	-	3

#### Objective

- To train the students in numerical and statistical problems
- To practice the students for solving statistical problems
- Motivating the students to analysis the real life problems

#### Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Apply numerical methods to solve Algebraic, Transcendental equations and Interpolation	K3
CO2	Solve numerical integration and system of linear equation by appropriate methods.	K3
CO3	Compute the numerical solution of ordinary differential equation by various method	K3
CO4	Explain the concept of measures of central tendency and dispersion.	K2
CO5	Explain correlation and regression and solve the numerical problems.	K3

#### Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1	S	S	S	S
CO2	S	S	M	M
CO3	S	S	M	M
CO4	S	S	M	M
CO5	S	S	S	S

S – Strong; M – Medium; L - Low

#### SYLLABUS

##### UNIT I

(15 HOURS)

##### Solution of Algebraic & Transcendental Equations

Introduction- The Bisection Method - The Iteration method - The Method of False Position - Newton Raphson Method (Problems Only)

##### Interpolation

Finite differences –Forward Differences - Backward Differences - Central Differences – Newton's formulae for interpolation - Lagrange's interpolation formula.

##### UNIT II

(15 HOURS)

##### Numerical Differentiation and Integration

Numerical Integration-Trapezoidal Rule-Simpson's  $\frac{1}{3}$  rule-Simpson's  $\frac{3}{8}$  rule (proof not needed)

### Matrices and Linear System of Equations

Solutions to Linear Systems – Direct Method - Gauss Elimination - Gauss Jordan method -  
Solutions to Linear Systems -Iterative methods (Problems Only)

### UNIT III

(15 HOURS)

#### Numerical solution of Ordinary Differential Equations

Introduction - Solution by Taylor Series - Picard's Method of Successive Approximations - Euler's Method - Modified Euler's Method - Runge - Kutta Method- Predictor - Corrector Method -Adams – Moulton Method - Milne's Method.

### UNIT IV

(15 HOURS)

#### Measures of Central Tendency

Arithmetic Mean - Median - Mode - Geometric Mean – Harmonic Mean.

#### Measures of Dispersion

Range- Quartile Deviation - Mean Deviation - Standard Deviation (Problems Only)

### UNIT V

(15 HOURS)

#### Correlation

Introduction - Meaning of Correlation – Scatter Diagram – Karl Pearson's Coefficient of Correlation – Rank Correlation

#### Linear Regression

Introduction – Linear Regression –Regression Coefficients – Properties of Regression Coefficients – Angle Between Two lines of Regression – Standard Error of Estimate or Regression Variance – Correction Coefficient Between Observed and Estimate Value (Problems Only)

### Text Books:

S.No	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	S.S.Sastry	Introductory methods of Numerical Analysis, Third Edition	PrenticeHall of India Private Limited	1998
2	Gupta.S.C& Kapoor, V.K	Fundamentals of Mathematical Statistics	Sultan Chand & sons, New Delhi	2010

UNIT	CHAPTER	TEXT BOOK	SECTION
I	2 3	1	2.1 – 2.5(Omit 2.3.1) 3.3 (Omit 3.3.4), 3.6, 3.9.1
II	5 6		5.4.1 – 5.4.3 6.3.2 & 6.4
III	7		7.1 – 7.6 (Omit 7.4.1)
IV	2	2	2.5 – 2.9, 2.13
V	10 11		10.1 – 10.4, 10.7 11.1 & 11.2

### Reference Books:

S.No	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
------	---------	-------	------------	---------------------

1	M.K. Jain, S.R.K. Iyengar and R.K. Jain	Numerical Methods for Scientific and Engineering Computations	New Age International Private Limited	2003
2	RSN Pillai and Bagavathi	Statistics Theory and practice	S. Chand & Company Ltd, New Delhi	2014

### **Pedagogy**

Assignment, Seminar, Lecture, Quiz, Group discussion, Brain storming, e-content.

### **Course Designers**

1. Dr.V.Geetha
2. Dr.S.Sasikala

## **SEMESTER II**

## CORE COURSE – II (CC)

### DATA STRUCTURES

#### SEMESTER –II

CourseCode	Course Title	Category	Learning Hours	Theory Hours/ Week	Practical Hours/ Week	Credit
19UCA2CC2	Data Structures	Core	90	6	-	6

### PREAMBLE

- To understand the concepts of data structures

### COURSE OUTCOMES (CO)

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

CO NUMBER	COSTATEMENT	KNOWLEDGE LEVEL
CO1	Explain basics of data structures.	K1
CO2	State the operations of various data structures.	K1
CO3	Make use of the stack, queue and linked lists.	K2
CO4	Apply traversal concept on trees and graphs.	K3
CO5	Utilize arrays in sorting and searching.	K3

### MAPPING WITH PROGRAMME OUTCOMES

	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M
CO2	S	S	S	M
CO3	S	S	S	L
CO4	S	S	S	L
CO5	S	S	S	M

S – Strong; M – Medium; L – Low



## **SYLLABUS**

### **UNIT I : BASIC TERMINOLOGY**

**(20 HOURS)**

Introduction and Overview: Introduction- Basic Terminology- Data Structures- Data Structure Operations. Arrays: Linear Arrays – Representation of Linear Arrays in Memory – Traversing Linear Arrays- Inserting & Deleting – Multi Dimensional Arrays.

### **UNIT II: LINKED LISTS**

**(15 HOURS)**

Linked Lists: Linked Lists – Representation of Linked List in Memory – Traversing a Linked list- Searching a Linked List- Memory allocation; Garbage collection-Insertion into a Linked List – Deletion from a Linked List.

### **UNIT III: STACKS and QUEUES**

**(20 HOURS)**

Stacks and Queues: Introduction – Stacks – Array Representation of Stacks – Linked Representation of Stacks – Arithmetic Expression; Polish Notation-Application of Stacks-Recursion. Queues – Linked Representation of Queues-Queue as ADT- Deques.

### **UNIT IV: TREES**

**(15 HOURS)**

Trees: Introduction – Binary Trees – Representing Binary Trees in Memory – Traversing Binary Trees – Traversal Algorithms using Stacks-BinarySearch Trees-Balanced BinaryTrees-Applications of Trees.

### **UNIT V: GRAPHS**

**(20 HOURS)**

Graphs and their applications: Introduction – Graph Theory Terminology – Sequential Representation of Graphs – Linked representation of a Graph- Operations on Graphs – Traversing a Graph.Sorting and Searching – Bubble Sort-Insertion Sort. Searching- Linear Search – BinarySearch.

## **TEXTBOOK**

Seymour Lipschutz, “**Data Structures with C**”, McGraw Hill Education, 2011

## **REFERENCES**

1. Ellis Horowitz, Sartaj Sahni, “**Fundamentals of Data Structures**”, Galgotia Publications, 2008.
2. Anany Levitin, “**Introduction to the Design and Analysis of Algorithms**”, Pearson Education, 2nd edition, 2011.
3. Ashok N. Kamthane, “**Introduction to Data Structure in C**” Pearson Education, 2011 (Singapore)
4. [www.studytonight.com/data-structures](http://www.studytonight.com/data-structures)

## **COURSE DESIGNER**

Ms.H.Krishnaveni, Associate Professor, Department of Computer Applications

**CORE COURSE – II (CP)**  
**PRACTICAL II -DATA STRUCTURES USING C**

**SEMESTER-II**

Course Code	Course Title	Category	Learning Hours	Theory Hours/ Week	Practical Hours/ Week	Credit
19UCA2CC2P	Practical II - Data Structures Using C	Core	45	-	3	2

**PREAMBLE**

- To impart practical training on data structures using C

**COURSE OUTCOMES (CO)**

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Recall operations of various data structures using C programming.	K1
CO2	Describe sorting and searching techniques using array.	K2
CO3	Apply the concepts of traversal on trees and graphs.	K3

**MAPPING WITH PROGRAMME OUTCOMES**

	PSO1	PSO2	PSO3	PSO4
CO1	M	M	M	M
CO2	S	S	S	L
CO3	S	S	S	M

S – Strong; M – Medium; L – Low

**LIST OF PRACTICALS**

- Matrix representation and manipulation
- Sorting algorithms
- Searching algorithms
- Stack representation and manipulation
- Queue representation and manipulation
- Linked list representation and manipulation
- Binary tree traversal
- Graph traversal

**COURSE DESIGNER**

Ms.H.Krishnaveni, Associate Professor, Department of Computer Applications

## ALLIED COURSE – III (AC)

### OPERATIONS RESEARCH

SEMESTER-II	Internal Marks: 25			External Marks:75		
COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDITS
19UCS2AC3	Operations Research	Allied	60	4	-	2

#### Objective

- To inculcate the basic concepts of Operations Research
- To practice the students for solving Operation Research Problems
- Motivating the students to compare the real life problem with operations research

#### Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Explain the applications of Operations research.	K2
CO2	Illustrate the formulations of Linear Programming Problem and Solve them by graphical method	K3
CO3	Classify the different types of Simplex methods	K3
CO4	Describe the concepts of Transportation Problem and Assignment Problem and compute the solution by various methods	K3
CO5	Determine the solution of Sequencing Problem	K4
CO6	Compute PERT and CPM in Network Analysis	K3

#### Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4
CO1	S	S	M	M
CO2	S	S	S	S
CO3	M	S	M	M
CO4	S	S	S	S
CO5	S	S	S	S
CO6	S	S	S	S

S – Strong; M – Medium; L - Low

#### SYLLABUS

##### UNIT I

(10 HOURS)

##### Operations Research

Introduction-Origin and Development of O.R.- Nature and Features of O.R.- Scientific Method in O.R.- Modelling in Operations Research - Advantage and Limitation of Models- General Solution Methods for O.R. Models- Methodology of Operations Research- Operations Research and Decision Making- Application of Operations Research.

**Linear Programming Problem- Mathematical Formulation** Introduction-Linear programming Problem-Mathematical Formulation of the problem -Illustrations on Mathematical Formulation of LPPs.(simple problems only)

##### Linear programming problem-graphical Solution and Extension

Introduction- Graphical Solution Method-Some Exceptional Cases-General Linear Programming Problem-Canonical and Standard Forms of LPP.

##### UNIT II

(15 HOURS)

##### Linear Programming Problem-Simplex Method

Introduction-Fundamental Properties of Solutions- The computational Procedure- The Simplex Algorithm- Use of Artificial Variables-Two-Phase method-Big M method.(simple problems only).

**UNIT III****(15 HOURS)****Transportation problem**

Introduction-LP Formulation of the Transportation Problem- Existence of Solution in T.P-The Transportation Table-Loops in Transportation Table-Solution of a Transportation Problem-Finding an Initial Basic Feasible Solution-Test for Optimality-Economic interpretation of  $u$  s and  $v$  s- Degeneracy in  $j$  Transportation Problem-Transportation Algorithm (MODI method),(simple problems only).

**Assignment Problem**

Introduction-Mathematical Formulation of the Problem- Solution Methods of Assignment Problem-Special Cases in Assignment Problems- The Travelling Salesman problem.(simple problems only).

**UNIT IV****(10 HOURS)****Sequencing problem**

Introduction-Problem of Sequencing-Basic Terms Used in Sequencing- Processing  $n$  Jobs through Two Machines- Processing  $n$  Jobs through  $K$  Machines-Processing 2 Jobs through  $K$  Machines.(problems only).

**UNIT V****(10 HOURS)****Network Scheduling by PERT/CPM**

Introduction- Network: Basic Components- Logical Sequencing- Rules of Network Construction-Concurrent Activities-Critical Path Analysis -Probability Considerations in PERT-Distinction between PERT and CPM.

**Text Book:**

S.No	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	Kantiswarup P.K. Gupta & Man Mohan	Operations Research	Sultan Chand and Sons Publishers, New Delhi, fourteen edition	2008

UNIT	CHAPTER	SECTION
I	1	1.1 - 1.10
	2	2.1 - 2.4
	3	3.1 - 3.5
II	4	4.1 - 4.4
III	10	10.1 - 10.3, 10.5, 10.6 10.8-10.13 11.1 - 11.4, 11.7
IV	12	12.1 - 12.6
V	25	25.1 - 25.8

**Reference Books:**

S.No	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	Prem Kumar Gupta and D.S. Hira,	An Operations Research	S. Chand and Co., Ltd. New Delhi	2004
2	Hamdy A. Taha	Operations Research: An Introduction	Phi Learning, New Delhi	2007

**Pedagogy**

Assignment, Seminar, Lecture, Quiz, Group discussion, Power point presentations, Brain storming, e- content.

**Course Designers**

1. Dr.V.Geetha
2. Dr.S.Sasikala

## **SEMESTER III**

**CORE COURSE-III (CC)**  
**DATABASE MANAGEMENT SYSTEMS**

**SEMESTER - III**

Course Code	Course Title	Category	Learning Hours	Theory Hours/ Week	Practical Hours/ Week	Credit
19UCA3CC3	Database Management Systems	Core	90	6	-	6

**PREAMBLE:**

- To understand the basic concepts of the database systems
- To learn the features of relational model and ER model
- To develop SQL queries for a database
- To apply the basic normalization techniques

**COURSE OUTCOMES:**

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Explain the basic concepts of database design, architecture and its model	K2
CO2	Illustrate structure of relational database	K2
CO3	Apply the various SQL queries in the Database	K3
CO4	Implement the concepts of ER model and its diagram	K3
CO5	Relate the concept of transaction management in a database environment	K3

**MAPPING WITH PROGRAMME SPECIFIC OUTCOMES (PSO):**

	PSO1	PSO2	PSO3	PSO4
CO1	M	M	M	M
CO2	M	M	S	M
CO3	S	M	M	S
CO4	S	M	M	M
CO5	S	S	S	L

**S – Strong; M – Medium; L - Low**

# SYLLABUS

## UNIT I: INTRODUCTION

(18 HOURS)

**Introduction to DBMS:** Applications of DBMS - Purpose of DBMS - View of Data- Database Languages - Relational Databases - Database Design - Data Storage & Querying- Transaction Management - Database Architecture - Database Users and Administrators.

## UNIT II: RELATION MODEL

(18 HOURS)

**Introduction to Relation Model:** Structure of Relational Databases - Database Schema – Keys - Schema diagrams - Relational Query Languages: Relational Operators - Relational Algebra.

## UNIT III: STRUCTURED QUERY LANGUAGE

(18 HOURS)

**Introduction to SQL:** SQL Data Definition - Basic Structure of SQL Queries - Additional basic Operations - Set Operations - NULL Values - Aggregate Functions - Nested Sub Queries - Modification of Database. **Intermediate SQL:** Join Expressions – Views – Transactions - Integrity Constraints - SQL datatypes and Schemas - Authorization.

## UNIT IV: ER MODEL & FUNCTIONAL DEPENDENCY

(18 HOURS)

**Database design and ER-Model:** Overview of design process - ER Model – Constraints - ER Diagram - Reduction to Relational Schemas - ER design issues - **Relational Database Design:** Features of Good Relational Design - Atomic Domains and First Normal Form - Decomposition using Functional Dependencies - Functional Dependency Theory- Algorithms for Decomposition.

## UNIT V: TRANSACTION MANAGEMENT

(18 HOURS)

**Transaction Management:** Transaction Concepts - Storage Structure - Transaction Atomicity and Durability - Transaction Isolation - Serializability.

## TEXT:

1. Abraham Silberschatz, Henry F. Korth & S. Sudarshan, "Database System Concepts", 6<sup>th</sup> edition, McGraw Hill Education (India) Private Limited, 2013

## REFERENCES:

1. "An Introduction to Database" – C.J. Date, A. Kannan & S. Swamynathan, Pearson Education, India, 2009
2. "Essentials of Database Management Systems" - Alexis Leon, Mathews Leon, McGraw Hill Education India Pvt Ltd., Revised Edition 2009.
3. "Database System Concepts", Peter Rob, Carlos Coronel, Lengage Learning, 2008

**WEB REFERENCES:**

1. <https://beginnersbook.com/2015/04/dbms-tutorial/>
2. <https://www.studytonight.com/dbms/>
3. <https://www.tutorialspoint.com/dbms/>
4. <https://www.w3schools.in/dbms/>

**Course Designer**

Ms.Lakshna Arun - Assistant Professor, Department of Computer Applications



**CORE COURSE-III (CP)**  
**PRACTICAL III- DBMS**

**SEMESTER - III**

Course Code	Course Title	Category	Learning Hours	Theory Hours/ Week	Practical Hours/ Week	Credit
19UCA3CC3P	Practical III – DBMS	Core	45	-	3	2

**OBJECTIVE**

- To provide in depth programming knowledge in MYSQL

**COURSE OUTCOMES**

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Recall DDL and DML Commands	K1
CO2	Apply Arithmetic, Logical and Set operators	K3
CO3	Implement string operations	K3
CO4	Use Aggregate Functions in SQL Queries	K3
CO5	Create Nested Sub queries	K5

**MAPPING WITH PROGRAMME SPECIFIC OUTCOMES (PSO):**

	PSO1	PSO2	PSO3	PSO4
CO1	M	S	M	M
CO2	S	M	S	M
CO3	S	M	S	S
CO4	S	L	M	M
CO5	S	S	S	S

**S – Strong; M – Medium; L - Low**

**LIST OF PRACTICALS**

1. Create a table and perform the following DDL operations  
Set the primary key
  - a) Alter the structure of the table
  - b) Drop the table

2. Create a table and perform the following DML operations
  - a) Insert values
  - b) Update values and Delete records based on constraints
  - c) Display values using various forms of select clause
3. Perform Arithmetic, Logical and Set operations
  - a) Arithmetic Operators
  - b) AND, OR, NOT Operators
  - c) UNION, INTERSECTION, MINUS
4. Implement Nested Sub queries
  - a) Set membership (in, not in)
  - b) Set comparison (some, all)
  - c) Empty relation (exists, not exists)
  - d) Check for existence of Duplicate tuples (unique, not unique)
5. Develop MySQL Queries to implement Aggregate Functions.
6. Implement Grouping and Ordering Commands in a Table.
7. Develop MySQL Queries for View Operations.
8. Develop MYSQL queries to implement String operations using % and “\_”  
 [Note: create necessary tables for the above questions (1 to 8) with required attributes]
9. Consider the following relations for a Banking enterprise database

BRANCH(branch-name:string, branch-city:string, assets:real)  
 ACCOUNT(accno:int, branch-name:string, balance:real)  
 DEPOSITOR(customer-name:string, accno:int)  
 CUSTOMER (customer-name: string, customer-street: string, customer-city:string)

Perform the following operations:

- a) Create the above relations by properly specifying the primary keys and the Foreign keys
- b) Enter at least five tuples for each relation
- c) Find all the customers who have at least two accounts at the main branch
- d) Find all the customers who have an account at *all* the branches located in a specific city.
- e) Generate suitable reports

## **COURSE DESIGNER**

Ms. Lakshna Arun- Assistant Professor, Department of Computer Applications

**ALLIED COURSE – II**  
**FINANCIAL ACCOUNTING**

**SEMESTER - III**

Course Code	Course Title	Category	Learning Hours	Theory Hours/Week	Practical Hours/Week	Credit
19UCA3AC4	Financial Accounting	Allied	45	4	.	4

**Course Objective**

- To equip the students with fundamental knowledge and acquire analytical skills on the accounting concepts.

**Course Outcome**

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

CO No.	CO Statement	Knowledge Level
CO 1	Define the basic concepts of Accounting	K1
CO2	Explain the accounting rules required for business enterprise	K2
CO3	Develop the skills in preparation of financial reports	K3
CO4	Analyze various methods of depreciation	K4

**Mapping with Programme Outcomes**

Cos	PO1	PO2	PO3	PO4	PO5
CO1	M	S	S	S	M
CO2	S	S	S	S	M
CO3	S	S	S	S	S
CO4	S	S	S	S	S

S – Strong; M – Medium; L - Low

# **SYLLABUS**

## **Unit – I: Introduction**

**(12 Hours)**

Accounting Meaning – Need for Accounting – Users of Accounting Information – Meaning of Book Keeping – Accounting Principles – Accounting Cycle – Phases of Accounting – Accounting Equation. Double Entry: Meaning – Nature and Principle of Double Entry. Journal: Meaning and Need – Steps in Journalizing – Exercises of Journal Entry. Subsidiary Books: Meaning – Classification and Advantages.

## **Unit – II: Ledger & Trial Balance**

**(12 Hours)**

Ledger: Meaning and Difference between Journal and Ledger – Steps in Posting – Problems on Journal, Ledger and Trial Balance. Trial Balance: Meaning and Objective of Preparing Trial Balance – Comprehensive Problems on Journal, Ledger and Trial Balance.

## **Unit – III: Cash Book & Bank Reconciliation Statement (BRS)**

**(12 Hours)**

Cash Book: Meaning – Objectives and Classification – Difference between Cash and Trade Discount – Problems on Triple Column Cash Book. Bank Reconciliation Statement (BRS): Meaning – Causes for Difference between Cash and Pass Book Problems.

## **Unit – IV: Final Accounts**

**(12 Hours)**

Meaning – Need for Preparation – Components of Final Accounts – Problems with Adjustments.

## **Unit – V: Depreciation**

**(12 Hours)**

Meaning – Need for Providing Depreciation – Problems on Straight Line Method, Diminishing Balance Method and Annuity Method.

### **Text:**

1. Fundamentals of Accounting, S.P.Jain and K.L.Narang, Kalyani Publishers, 2017

### **References:**

1. Financial Accounting, T.S. Reddy & Murthy, Margham Publications, 2017

### **Course Designer**

Ms. Shilpa A. Talreja – Assistant Professor, Department of Commerce.

**ALLIED COURSE – II**  
**COMPUTER APPLICATIONS IN BUSINESS**

**SEMESTER - III**

<b>Course Code</b>	<b>Course Title</b>	<b>Category</b>	<b>Learning Hours</b>	<b>Theory Hours/Week</b>	<b>Practical Hours/Week</b>	<b>Credit</b>
<b>19UCA3AC1P / 19UIT3AC1P</b>	<b>Computer Applications in Business</b>	<b>Allied</b>	<b>45</b>	<b>-</b>	<b>3</b>	<b>2</b>

**Course Objective**

- The primary objective of this course is to expose the students with the Accounting Software Tally ERP9 with GST.

**Course Outcome**

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

<b>CO No.</b>	<b>CO Statement</b>	<b>Knowledge Level</b>
CO 1	Recall the basic concepts of components of computer	K1
CO2	Understand the basic features of Tally ERP9	K2
CO3	Prepare different types of financial reports	K3
CO4	Analyse stock group, stock category, stock item and compare stock category summary with godown summary.	K4
CO5	Explain the procedure for GST Registration.	K5

**Syllabus**

**Unit – I Introduction to Computerized Accounting**

Introduction to computerized Accounting – Features – Advantages – Manual Accounting Vs. Computerized Accounting – Accounting transaction – Journal Entry – Ledgers – Trial Balance – Balance Sheet.

**Unit – II Introduction to Tally**

Opening Tally screen – Gate way of Tally – Features of Tally – Creation of Company – Selecting a Company – Altering / Modifying existing company – Configuration of Tally – Tally screen and Menu.

### **Unit – III Creation of Ledgers, Groups & Voucher Entries**

Creation of Ledger – Group – Voucher – Displaying – Altering – Deleting – Introduction to Voucher entries – Contra Voucher – Payment Voucher – Receipt Voucher – Journal Voucher – Sales Voucher – Recording transaction of sample data.

### **Unit – IV Cost Categories & Cost Centre**

Introduction to Cost – Creation of cost Categories – Creation of Cost Centre – Editing – Deleting – Usage of Cost Category and Cost Centres in voucher entry.

### **Unit – V GST & Generating Reports**

Introduction to GST – Registration - Creating Company with GST – Creating Tax Ledgers- Recording GST Sales – Financial Reports: Trial Balance – Profit & Loss – Balance Sheet - Bank Reconciliation Statement - Stock Summary.

#### **List of Practicals:**

1. Creation, alteration and deletion of companies and user defined accounting groups.
2. Creation, alteration and deletion of ledger Accounts.
3. Preparation of Final Accounts with adjustments.
4. Voucher entries in double entry mode.
5. Creation, alteration and deletion of inventory masters.
6. Generating Accounting and Inventory Reports.
7. GST Registration and E-filing of returns.

#### **Text Book**

<b>S.No.</b>	<b>Authors</b>	<b>Title</b>	<b>Publishers</b>	<b>Year of Publication</b>
1.	Computer Applications in Business	V. Srinivasa Vallabhan	Sultan Chand & Sons	2014
2.	Computer Application by Implementing Tally ERP	A.K. Nadhani	BPB Publications, Chennai.	2015
3.	Windows and MS Office with Database Concepts	N. Krishnana	Scitech Publications	2001

### Reference Book

S.No.	Authors	Title	Publishers	Year of Publication
1.	Computer Applications in Business	K. Mohankumar & S. Rajkumar	Vijay Nicole Imprints (P) Ltd	2018
2.	TallyERP 9	Dr. PIRizwan Ahmed	Margham Publications	2016
3.	Computer Application in Business	Dr. Joseph Anbarasu	Learn Tech Press	2007

### Course Designer

Ms. J. Lalithambigai– Assistant Professor, Department of Commerce.

**NON MAJOR ELECTIVE –I  
PRINCIPLES OF INTERNET**

**Semester: III**

<b>Course Code</b>	<b>Course Title</b>	<b>Category</b>	<b>Learning Hours</b>	<b>Theory Hours/ Week</b>	<b>Practical Hours/ Week</b>	<b>Credit</b>
19UCA3NME1	Principles of Internet	NME-I	30	2	-	2

**OBJECTIVES**

- To understand the architecture of Internet
- To brief the concepts of network and WWW
- To expose students about entertainment on Internet with security

**COURSE OUTCOMES**

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

<b>CO NUMBER</b>	<b>CO STATEMENT</b>	<b>KNOWLEDGE LEVEL</b>
CO1	State the dangers in Internet	K1
CO2	Understand the architecture of Internet	K2
CO3	Utilize the Internet	K3
CO4	Discuss on Internet tools	K2
CO5	Apply Internet for entertainment & multimedia	K3

**MAPPING WITH PROGRAMME SPECIFIC OUTCOMES (PSO):**

	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>
<b>CO1</b>	M	S	M	M
<b>CO2</b>	M	M	M	M
<b>CO3</b>	M	S	S	M
<b>CO4</b>	S	M	S	M
<b>CO5</b>	S	S	S	S

**S – Strong; M – Medium; L - Low**



**UNIT I: ARCHITECTURE OF INTERNET****(6 HOURS)**

Understanding the Internet's Underlying Architecture: What is Internet? - How computer networks send data across the internet? - How TCP/IP works?

**UNIT II: CONNECTING TO THE INTERNET****(6 HOURS)**

How computers connect to the Internet? - How wireless connections and WIFI works? - How Home networks work?

**UNIT III: USING THE WORLD WIDE WEB****(6 HOURS)**

How Google works? - How map sites work? - How Wikis and Wikipedia work? - Using common internet tools: How telnet works? - How FTP works? - How agents work? - How CGI scripting works?

**UNIT IV: ENTERTAINMENT AND MULTIMEDIA ON THE INTERNET****(6 HOURS)**

How music and audio works on the Internet? - How music sharing and file sharing? - How animation on the web works? - Shopping and doing business on the Internet.

**UNIT V: PROTECTING YOURSELF ON THE INTERNET****(6 HOURS)**

How firewalls work? - How hackers can cripple the Internet and attack your PC? - The dangers of wireless networking -How viruses work? – Parental controls on the Internet.

**TEXT:**

1. How the Internet Works? - Preston Gralla, Pearson Education, 8<sup>th</sup> Edition

**REFERENCES:**

1. "Internet for Everyone"- Alexis Leon, S.Chand (G/L)& Company; 2<sup>nd</sup> Edition, 2012

**WEB REFERENCES:**

1. <http://web.stanford.edu/>
2. <https://in.zapmetasearch.com/>
3. <https://ads.google.com/>
4. <https://in.zapmetasearch.com/>
5. <https://www.izito.co.in/>

**COURSE DESIGNER**

Ms. T. Julie Mary- Assistant Professor, Department of Computer Applications

## **SEMESTER IV**

## CORE COURSE – III (CC) PROGRAMMING WITH JAVA

Course Code	Course Title	Category	Learning Hours	Theory Hours/ Week	Practical Hours/ Week	Credit
19UCA4CC4	Programming with JAVA	Core	90	6	-	6

### PREAMBLE

- Understand fundamentals of programming concepts, OOPs concepts and ability to write a Java program to solve specified problems.

### COURSE OUTCOME:

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Explain the fundamental concepts in Object Oriented Programming	K2
CO2	List basic programming skills in Java	K1
CO3	Illustrate package and exceptions with example	K2
CO4	Demonstrate the usage of threading and files	K2
CO5	Applet package and Database connectivity	K3

### MAPPING WITH PROGRAM SPECIFIC OUTCOMES:

	PSO1	PSO2	PSO3	PSO4
CO1	M	M	M	M
CO2	M	M	M	M
CO3	S	M	M	M
CO4	S	M	M	M
CO5	S	S	S	M

### SYLLABUS

#### UNIT I: OOPs Fundamentals

(18 HOURS)

**Fundamentals of Object-Oriented Programming:** Basic Concepts of Object- Oriented Programming- Benefits and Applications of OOP. **Java Evolution:** Java Features – How Differs from C And C++ - Java and Internet – Java and World Wide Web – Web Browsers - Java Environment- **Overview of Java Language:** Simple Java Program- More of Java- An Application With Two Classes- Java Program Structures, Tokens, Statements–

Installing And Configuring Java- Implementing A Java Program – Java Virtual Machine – Comment Line Arguments – Programming Style.

## **UNIT II: Constants, Variables, Data Types, Operators and Control Statements**

**(18 HOURS)**

**Constants, Variables and Data Types:** Constants- Variables – Data Types – Declaration of Variables – Giving Values to Variables – Scope of Variables – Symbolic Constants- Type Casting- Getting Values of Variables. **Operators and Expressions- Decision Making and Branching -Decision Making and Looping** – While, Do, For Statements, Jump in Loops, Return Statements.

## **UNIT III: Classes, Objects, Methods, Arrays, Strings, Vectors, Interfaces and Packages**

**(18 HOURS)**

**Classes, Objects and Methods:** Defining A Class – Fields and Methods Declaration - Creating Objects – Accessing Class Members – Constructors – Method Overloading – Static Members – Nesting of Methods – Inheritance: Extending A Class – Overriding Methods – Final Variables, Methods and Classes – Finalizer Methods – Abstract Methods and Classes – Visibility Control. **Arrays, Strings and Vectors:** Creating Arrays – One And Two Dimensional Arrays- Strings – Vectors – Wrapper Classes – Enumerated Types. **Interfaces: Multiple Inheritance – Packages.**

## **UNIT IV: Multithreaded Programming, Files and I/O Streams**

**(18 HOURS)**

**Multithreaded Programming:** Creating Threads – Extending the Thread Class – Stopping and Blocking Thread- Life Cycle of Thread-Using Thread Method-Thread Exception- Thread Priority-Synchronization – Implementing The Runnable Interface-**Managing Errors and Exceptions. Managing Input / Output Files in Java.**

## **UNIT V: Applet and Database Connectivity**

**(18 HOURS)**

**Applet Programming:** How Applets Differ From Applications - Preparing To Write Applets- Building Applet Code- Applet Life Cycle- Creating and Executable Applet – Designing A Web Page- Applet Tag-Adding Applet to HTML File-Running the Applet. **Java Database Connectivity:** Introduction – JDBC Architecture – Discussion with Example – Overview of JDBC Components.

### **TEXT:**

1. E. Balagurusamy,” Programming with JAVA”, Tata McGraw-Hill Publishing Company Limited, New Delhi, 6<sup>th</sup> Edition, 2019.

**REFERENCES:**

1. Ken Arnold gosling and Davis Holmen.”The JAVA Programming Language”,3<sup>rd</sup> Edition. Addition Wesley Publication.
2. S.Sagayaraj, R.Denis, P.Karthik and D.Gajalakshmi, “Java programming”, Universities Press,2017.
3. C.Muthu,”Programming with JAVA”, Second Edition, McGraw Hill Education(2008).
4. Schildt Herbert, “Java :The Complete Reference”, Tata McGraw-Hill,8<sup>th</sup> Edition ,2011.

**WEB REFERENCES:**

1. <https://beginnersbook.com/>
2. [https://www.tutorialspoint.com/java/java\\_tutorial.pdf](https://www.tutorialspoint.com/java/java_tutorial.pdf)
3. [http://www.ntu.edu.sg/home/ehchua/programming/java/jdbc\\_basic.html](http://www.ntu.edu.sg/home/ehchua/programming/java/jdbc_basic.html) - For JDBC connection.

**COURSE DESIGNER**

Ms.V.Yasodha, Assistant Professor, Department of Computer Applications.

**CORE COURSE – IV (CP)**  
**PRACTICAL-IV –PROGRAMMING WITH JAVA**

**Semester: IV**

Course Code	Course Title	Category	Learning Hours	Theory Hours/Week	Practical Hours/Week	Credit
19UCA4CC4P	Practical IV- Programming with Java	Core	45	–	3	2

**PREAMBLE:**

- To impart practical training on Programming with Java.

**COURSE OUTCOMES (CO):**

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Recall basic arithmetic operations, command line arguments and arrays.	K1
CO2	Apply polymorphism, inheritance, interface and packages concepts.	K3
CO3	Implement all string operations.	K3
CO4	Use thread and exception handling concepts.	K3
CO5	Create applet programs	K5

**MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:**

	PSO1	PSO2	PSO3	PSO4
CO1	S	M	M	M
CO2	M	S	M	S
CO3	M	M	S	L
CO4	M	S	M	S
CO5	L	S	S	S

S-Strong; M-Medium; L-Low

**LIST OF PRACTICALS**

**1. COMMAND LINE ARGUMENTS**

Write a program to find the factorial of a given number using command line arguments.

**2. ARRAYS**

Write a program to sort list of elements in ascending and descending order.

### 3. STRING OPERATIONS

Write a program to implement all string operations.

### 4. POLYMORPHISM

Write program to implement constructor overloading.

### 5. INHERITANCE

Write a program to calculate employee payslip using single inheritance.

### 6. INTERFACE

Write a program to implement the concept of interface.

### 7. PACKAGES

Write a program to find the student's percentage and grade using packages.

### 8. THREAD

Write a program to implement multithread concept and also assign priorities to them.

### 9. EXCEPTION HANDLING

Write a program to handle the exception using try and multiple catch statements  
(NumberFormatException, ArithmeticException, ArrayIndexOutOfBoundsException).

### 10. APPLETS

Write a program to create a window with three check boxes called red, green, blue. The applet should change the colors according to the selection of the check box.

### **COURSE DESIGNER:**

Ms. P. Ranjani, Assistant Professor, Department of Computer Applications.

**ALLIED COURSE – III**  
**ORGANIZATIONAL BEHAVIOUR**  
**2019 – 2020 Onwards**

<b>Semester – IV</b>	<b>Organizational Behaviour</b>	<b>Hours/Week – 5</b>	
<b>Allied Course – III</b>		<b>Credits – 3</b>	
<b>Course Code - 19UCA4AC5 / 19UIT4AC5</b>		<b>Internal 25</b>	<b>External 75</b>

**Course Objective**

- To help the students to develop cognizance of the importance of human behaviour.
- To enable students to describe how people behave under different conditions and understand why people behave as they do.
- To provide the students to analyse specific strategic human resources demands for future action.

**Course Outcome**

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

<b>CO No.</b>	<b>CO Statement</b>	<b>Knowledge Level</b>
CO 1	Define the conceptual framework of organization behaviour	K1
CO2	Explain what leadership is and what makes an effective leader	K2
CO3	Identify the individual characteristics that influence work behaviour and organizational effectiveness.	K3
CO4	Analyse specific strategic human resources demands for future action	K4

**Syllabus**

**Unit – I Fundamentals of Organisational Behaviour (15 Hours)**

Definition – Nature – Scope and Goals of Organisation Behaviour – Fundamentals Concepts – Models – Foundation of Individual Behaviour – Human Behaviour - TQM – Managing Cultural Diversity – Total Employee Involvement.

**Unit – II Personality, Perception & Motivation (15 Hours)**

Definition – Determinants – Theories of Personality – Trait Theory: Big Five Model Type of Theory – Types of Personality. Perception: Meaning – Factors Affecting Perception – Motivation – Needs and Importance of Motivation – Process and Models of Motivation – Theories of Motivation: Maslow’s Need Hierarchy Theory, Mc Gregor’s Theory “X” and Theory “Y” and Herzberg’s Two factor theory of Motivation – Techniques of Motivation.

**Unit – III Job Satisfaction & Job Stress (15 Hours)**

Meaning – Factors – Importance of Satisfaction – Morale – Importance – Employee Attitude and Behaviour and Their Significance to Employee Productivity – Job Enrichment – Job Enlargement - Job Stress – Nature - Kinds of Stressors – Managing Stress – Job Frustration.

**Unit – IV Groups and Conflict in Organisation (15 Hours)**

Group: Meaning - Nature - Types – Group Dynamics – Cohesiveness – Group Norms. Conflict: Concept – Process – Types – Resolution of Conflict – Sociometry – Power and Politics – Meaning – Distinction between Power and Politics – Organisational Politics – Types of Power.

**Unit – V Learning & Leadership (15 Hours)**

Learning - Components of Learning, Theories of Learning - Leadership – Types – Theories – Trait – Managerial Grid - Fielders Contingency Theory – Organisational Climate – Organisational Effectiveness – Counselling and Guidance – Importance – Types of Counselling.



---

**Text Book**

---

<b>. No.</b>	<b>Authors</b>	<b>Title</b>	<b>Publishers</b>	<b>of Publication</b>
1.	L.M. Prasad	Organisational Behaviour	Sultan Chand & Sons	2008
2.	K. Aswathappa	Organisational Behaviour Text, Cases & Games	Himalaya Publications	2013

---

**Reference**

---

<b>. No.</b>	<b>Authors</b>	<b>Title</b>	<b>Publishers</b>	<b>of Publication</b>
1.	P. Subba Rao	Management & Organisational Behaviour	Himalaya Publications	2009
2.	S.S. Khanka	Organisational Behaviour Text & Cases	Sultan Chand & Co. Ltd	2008
3.	Fred Luthans	Organisational Behaviour Text & Cases	Mc Graw Hill	2014

---

**Pedagogy**

---

Lecture, Power Point Presentation, Assignment, Quiz, Google Classroom, Moodle, Seminar & Group Discussions.

---

**Course Designer**

---

Ms. D. Indumathi– Assistant Professor, Department of Commerce.

**SKILL BASED ELECTIVE-I**  
**PRACTICAL – I - ANIMATION PRACTICAL**

**SEMESTER-IV**

Course Code	Course Title	Category	Learning Hours	Theory Hours/Week	Practical Hours/Week	Credit
19UCA4SBE1AP	Animation Practical-I	SBE	30	–	2	2

**PREAMBLE:**

- To impart training on Animation practical

**COURSE OUTCOMES (CO):**

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

CONUMBER	COSTATEMENT	KNOWLEDGE LEVEL
CO1	Recall pen, brush tools in Photoshop	K1
CO2	Apply resolution, grayscale, black and white to an image	K3
CO3	Using layers, masking, rotation, overlapping of an image	K3
CO4	Creating custom colors, gradients, grouping, tweening	K5

**MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:**

	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M
CO2	M	S	S	S
CO3	M	S	S	S
CO4	S	S	S	S

**S-Strong; M-Medium; L-Low**

## **LIST OF PRACTICALS**

### **PHOTOSHOP**

#### **1. BRUSH TOOL**

Create a multicolor real life image using brush tool.

#### **2. IMAGE SIZE, RESOLUTION AND COLOR CHANGE**

- a. Changing size, resolution and grayscale of an image.
- b. Convert black and white image into color image.

#### **3. IMAGE MODIFICATION**

Cropping, rotating, overlapping, super imposing an image.

#### **4. COMMERCIAL BROCHURE**

Develop a commercial brochure with background tints.

#### **5. LAYERS**

Working with layers (creation, deletion, merge).

#### **6. FILTERS AND MASKS**

Applying masks and filtering on images.

### **FLASH**

#### **1. STROKES AND FILLS**

Working with strokes and fills.

#### **2. WORKING WITH COLOURS**

Creating custom colors, gradients, grouping of objects.

#### **3. CONVERSION**

Converting text to shapes.

#### **4. TWEENING**

Applying tweening (motion, shape)

### **COURSE DESIGNER:**

**Ms. P. Ranjani, Assistant Professor, Department of Computer Applications.**

## PRACTICAL – B - HTML 5 PRACTICALS

### SEMESTER-IV

Course Code	Course Title	Category	Learning Hours	Theory Hours / Week	Practical Hours / Week	Credit
19UCA4SBE1BP	HTML 5 Practicals	SBE	30	-	2	2

#### PREAMBLE:

To know the basic concepts of HTML 5.

#### COURSE OUTCOMES (CO):

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Understand basic HTML tags	K1
CO2	Create a HTML page using keygen, meter and menu elements	K5
CO3	Apply audio components and data list in HTML 5	K3

#### MAPPING WITH PROGRAMME SPECIFIC OUTCOMES (PSO):

	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M
CO2	M	M	M	M
CO3	M	S	S	M

**S- Strong; M-Medium; L-Low**

#### LIST OF PRACTICALS

##### 1. BASIC ELEMENTS OF HTML

- Design a webpage using SCRIPT & NOSCRIPT tags using HEADER & FOOTER
- Design a webpage using Citations, Quotations & Definitions

##### 2. PHRASE TAGS

- Create a web page using Canvas element in HTML.
- Design a webpage by applying Keygen element of HTML.

##### 3. PRESENTATION TAGS

Create a web page using Background image & color properties

4. LIST PROPERTY

Design a webpage using list-style-type property.

5. LINKS AND IMAGES

- a. Create a web page using HYPERLINK
- b. Create a web page using IMAGES.

6. TABLES

Design a webpage using Table elements

7. FORMS

Design a webpage by applying Form elements of HTML.

8. FRAMES

Create a web page using frames

9. JAVASCRIPT

Write JAVASCRIPT to display the result of any calculation, using HTML output element.

**COURSE DESIGNER:**

Ms.Lakshna Arun, Assistant Professor, Department of Computer Applications

## **SEMESTER V**

**CORE COURSE – V (CC)**  
**WEB PROGRAMMING WITH PHP**

**SEMESTER: V**

Course Code	Course Title	Category	Learning Hours	Theory Hours/ Week	Practical Hours/ Week	Credit
19UCA5CC5	Web Programming with PHP	Core	75	5	-	5

**PREAMBLE**

- To understand the fundamentals of programming such as variables, operators, flow control and to learn website creation using PHP.
- To understand the concepts of designing simple web application using PHP with MySQL.

**COURSE OUTCOME:**

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Describe the basic concepts of PHP	K2
CO2	Implement functions and arrays in PHP	K3
CO3	Apply OOPS concepts in PHP	K3
CO4	Demonstrate the concepts of session, cookies and FTP	K2
CO5	Execute MySQL queries using PHP	K3

**MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:**

	PSO1	PSO2	PSO3	PSO4
CO1	M	M	M	M
CO2	M	M	M	M
CO3	S	S	M	M
CO4	S	S	M	M
CO5	S	S	S	M

**S-Strong; M-Medium; L-Low**

## **SYLLABUS:**

### **UNIT I: Essential PHP**

**(15 HOURS)**

Essential PHP: Creating your Development Environment- Creating a First PHP Page-Mixing HTML and PHP - Printing Some Text- Printing Some HTML- More Echo Power- Using PHP “Here” Documents-Adding Comments to PHP - Variables - Constants - Data Types, Operators and Flow Control.

### **UNIT II: PHP Basics**

**(15 HOURS)**

Strings and Arrays - Creating Functions- Reading Data in Web Pages: Setting Up Web Pages to Communicate with PHP - Handling Text Fields and Text Areas - Handling Check Boxes and Radio Buttons - Handling List Boxes, Password Controls, Hidden Controls, Image Maps, File Uploads and Buttons.

### **UNIT III: OOPS Concepts**

**(15 HOURS)**

Object-Oriented Programming: Creating Classes, Objects - Setting Access to Properties and Methods - Using Constructors and Destructors - Inheritance - Overriding, Overloading Methods, Autoloading Classes. Advanced Object-Oriented Programming: Creating Static Methods, Abstract Classes, Interfaces and Class Constants, Supporting Object Iteration - Using Final Keyword - Cloning Objects- Reflection.

### **UNIT IV: File Handling**

**(15 HOURS)**

PHP Browser-Handling Power -File Handling-Cookies and FTP: Setting, Reading, Deleting Cookies - Working with FTP - Downloading, Uploading, Deleting a File with FTP - Creating and Removing Directories with FTP - Working with E-mail. Session Handlers: Session Handling - Configuration Directives - Working with Sessions - Practical Session-Handling Examples - Creating Custom Session Handlers.

### **UNIT V: MySQL using PHP**

**(15 HOURS)**

Introducing MySQL: Key Features of MySQL - Prominent MySQL Users. Working with Databases: Creating a MySQL Database - Creating a New Table - Putting Data into the New Database - Accessing the Database in PHP -Update Data into the Database- Insert Data into the Database - Delete Data from Database. Drawing Images on the Server.

## **TEXT:**

1. Steven Holzner, “The Complete Reference PHP”, Tata McGraw Hill Pvt. Ltd., 2012.
2. Frank M. Kromann, “Beginning PHP and MySQL”, Novice to Professional, Fifth Edition, 2018. (Chapters 3, 17, 22)



**REFERENCES:**

1. Rasmus Lerdorf, KevinTatroe, PeterMacIntyre, “Programming PHP”, Third Edition, O’Reilly, 2013.
2. Luke Welling, Laura Thomson, “PHP and MySQL Web Development”, Fifth Edition, Pearson India Education Services Pvt. Ltd., 2017.

**WEB REFERENCES:**

1. <https://www.php.net/manual/en/index.php>
2. [www.tutorialspoint.com/php/php\\_tutorial.pdf](http://www.tutorialspoint.com/php/php_tutorial.pdf)

**COURSE DESIGNER**

Ms.R.Brendha, AssociateProfessor, Department ofComputer Applications.

**CORE COURSE – V (CP)**  
**PRACTICAL V –PHP WITH MySQL**

**SEMESTER: V**

Course Code	Course Title	Category	Learning Hours	Theory Hours/ Week	Practical Hours/ Week	Credit
19UCA5CC5P	Practical V- PHP With MySQL	Core	60	-	4	3

**PREAMBLE:**

- To impart practical training on Programming with PHP.

**COURSE OUTCOME:**

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Apply HTML tags and PHP coding to design an application form	K3
CO2	Implement form validation using PHP	K3
CO3	Create session for college office bearers election	K3
CO4	Create and manipulate database using MySQL	K5
CO5	Develop an application by their own	K5

**MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:**

	PSO1	PSO2	PSO3	PSO4
CO1	S	M	M	M
CO2	S	M	M	M
CO3	S	S	L	L
CO4	S	S	M	M
CO5	S	S	S	S

S-Strong; M-Medium; L-Low

**LIST OF PRACTICALS**

- Using HTML tags, create a college application form. (Note: Application form should contain the following fields Name, Father's Name, Date of Birth, Gender, Email-Address, Mobile Number, Address and Course to be Applied)
- Apply PHP coding to print the data of the college application form.
- Validate the application form using validator functions and display the error messages.

4. Design a HTML form to get a student's semester mark details and calculate the total, average, grade, result according to the marks.
5. Create a PHP page for the college union bearers' election using sessions.
6. Database in PHP
  - a. Get the student details, using application form insert into the database.
  - b. Design a HTML page for selecting subjects for examination and insert into database.
  - c. Based on student's selection of subjects generate hall ticket with examination date.
7. Create your own PHP applications (like Employee Management System, Library Management System, Student Management System)

**COURSE DESIGNERS:**

Ms. V. Infine Sinduja, Assistant Professor, Department of Computer Applications.

Ms. A. Jabeen, Assistant Professor, Department of Computer Applications.

## CORE COURSE – VI (CC)

### OPERATING SYSTEMS

SEMESTER: V

Course Code	Course Title	Category	Learning Hours	Theory Hours/ Week	Practical Hours/ Week	Credit
19UCA5CC6	Operating Systems	Core	75	5	-	5

#### PREAMBLE:

- To understand the concept of Process Management, Synchronization, Scheduling, Deadlock, Memory Management and File Systems in Operating Systems

#### COURSE OUTCOME:

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	State the types of Operating System and its Structure	K1
CO2	Describe Process Management & Synchronization	K1
CO3	Explain various Scheduling and deadlock	K2
CO4	Discuss Memory Management & Mass Storage	K2
CO5	Illustrate File Systems	K3

#### MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:

	PSO1	PSO2	PSO3	PSO4
CO1	S	M	M	M
CO2	S	S	M	M
CO3	S	S	L	L
CO4	S	S	S	L
CO5	S	S	S	S

S – Strong; M – Medium; L - Low

## **SYLLABUS:**

### **UNIT I: Introduction to Operating System**

**(15 HOURS)**

**Introduction:** Objectives and Functions – Different Views of an OS – Evolution of Operating Systems - Types of Operating System – Comparison between different Operating Systems – Computer System Organization – Computer System Architecture – Operating System Operations - Operating System Structures.

### **UNIT II: Process Management & Synchronization**

**(15 HOURS)**

**Process Management:** Introduction – Process Concept – Process Scheduling - Operations on Process – Cooperating Processes – Interprocess Communication. **Process Synchronization:** Principles of Concurrency – Precedence Graph – Critical regions – Synchronization: Software Approaches - Semaphores.

### **UNIT III: Scheduling & Deadlock**

**(15 HOURS)**

**CPU Scheduling:** Introduction – Scheduling Concepts – Scheduling Criteria - Scheduling Algorithm – Multiprocessor Scheduling – Real-time Scheduling – Algorithm Evaluation – Thread Scheduling. **Deadlock:** System Model – Deadlock Characterization – Method for Handling Deadlock – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Deadlock Recovery.

### **UNIT IV: Memory Management, I/O Systems & Mass Storage**

**(15 HOURS)**

**Memory Management Strategies:** Background – Contiguous Memory Allocation – Non-Contiguous Memory Allocation – Swapping – Overlays. **Virtual Memory:** Demand Paging – Page Replacement– Thrashing. **I/O Systems:** Introduction – I/O techniques – Application I/O Interface – Kernel I/O Sub systems. **Mass Storage:** Introduction – Disk Structure- Disk Scheduling.

### **UNIT V: File Systems**

**(15 HOURS)**

**File Systems:** Introduction – Basic concept – Directories – File System Mounting – Record Blocking- File Sharing – Protection.- **Implementation of File System:** File System Structure – File System Implementation – Allocation Methods – Implementing Directories – Shared Files – Free Space Management – Recovery– Log Structured File System.

## **TEXT:**

1. Rohit Khurana, “Operating Systems”, Vikas Publishing House Pvt. Ltd, New Delhi, 2<sup>nd</sup> Edition, 2018.

**REFERENCES:**

1. “Abraham Sliberschatz, Peter Baer Galvin, Greg Gagne”, “Operating System concepts”, JohnWiley & Sons, Inc, New Delhi, 6<sup>th</sup> Edition, 2002.
2. “Ann McIverMcHoes, Ida M.Flynn”, “Understanding Operating Systems”,Cengage Learning, New Delhi, 6<sup>th</sup> Edition, 2018.

**WEB REFERENCES:**

1. [https://www.tutorialspoint.com/operating\\_system/](https://www.tutorialspoint.com/operating_system/)
2. <https://www.geeksforgeeks.org/operating-systems/>
3. [http://www.sncwgs.ac.in/wp-content/uploads/2015/11/operating\\_system\\_tutorial.pdf](http://www.sncwgs.ac.in/wp-content/uploads/2015/11/operating_system_tutorial.pdf)

**COURSE DESIGNER**

Ms.P.Ranjani, Assistant Professor, Department ofComputer Applications.

**CORE COURSE – VII (CC)**  
**SOFTWARE ENGINEERING**

**SEMESTER: V**

Course Code	Course Title	Category	Learning Hours	Theory Hours/ Week	Practical Hours/ Week	Credit
19UCA5CC7	Software Engineering	Core	75	5	-	5

**PREAMBLE:**

- To provide knowledge of the various phases of Software Engineering Process

**COURSE OUTCOME:**

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Describe the basics of Software Engineering	K1
CO2	State the concepts of design and ArchitectureEngineering	K1
CO3	Explain object oriented analysis and design concepts	K2
CO4	Demonstrate the design and coding of a software	K2
CO5	Make use of various types of software testing	K3

**MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:**

	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	S
CO2	S	L	S	S
CO3	M	S	S	S
CO4	S	S	S	L
CO5	S	S	S	M

**S – Strong; M – Medium; L – Low**

## **SYLLABUS:**

### **Unit I: Introduction to Software Engineering**

**(15 HOURS)**

**Software Engineering-Introduction:** Introduction to Software Engineering -Software Process - Software Process Models -Software product -**Requirements Engineering Principles:** Introduction - Requirements Engineering - Importance ofRequirements -Types ofRequirements.

### **Unit II: Analysis & Design**

**(15 HOURS)**

**Requirement Analysis Modeling:** Analysis Modeling Approaches -Structured Analysis - Object Oriented Analysis - **Design and Architectural Engineering:** Design Process and Concepts - Basic Issues in Software Design - Characteristics of Good Design - Software Design and Software Engineering - Function Oriented System vs Object Oriented System - Modularity, Cohesion, Coupling, Layering - Real Time Software Design -Design Models -Design Documentation.

### **Unit III: Object Oriented Concepts**

**(15 HOURS)**

**Object Oriented Concepts:** Introduction - Fundamental Parts of Object-Oriented Approach -Data Hiding and Class Hierarchy Creation -Relationships -Role of UML in OO Design -Design Patterns - Frameworks – **Object Oriented Analysis and Design:** Object Oriented Analysis -Object Oriented Design.

### **Unit IV: Software Design & Coding**

**(15 HOURS)**

**User Interface Design:** Concepts of User Interface - Elements of User Interface -Designing the User Interface -User Interface Evaluation -Golden Rules ofUser Interface Design -User Interface Models –Usability- **Software Coding:** Introduction – Programming Principles –Programming Guidelines – Coding Conventions – Key Concepts inSoftware Coding.

### **Unit V: Software Testing & Maintenance**

**(15 HOURS)**

**Introduction to Software Testing:** Introduction – Psychology of Testing – Software Testing Scope - Software Testing Objectives - Strategic Approach to Software Testing- Types ofSoftware Testing - **Software Maintenance:** Introduction - Maintenance Activities - Maintenance Process - Maintenance Cost - Software Evolution - Reverse Engineering - Re-engineering - Re-structuring - Maintenance Strategies - Issues inSoftware Maintenance.



**TEXT:**

1. Chandramouli Subramanian, Saikat Dutt, Chandramouli Seetharaman, B.G.Geetha “Software Engineering”, Pearson Publications, 2015.

**REFERENCES:**

1. Jibitesh Mishra,”Software Engineering”, Pearson Education, 2011
2. Richard E. Fairley, “Software Engineering Concepts”, Tata McGraw-Hill Publishing Company Ltd. 2001
3. Roger S.Pressman, Bruce R.Maxim, “Software Engineering: A Practitioner's Approach, Tata McGraw-Hill Publishing Company Ltd., 2014.

**WEB REFERENCES:**

1. [https://www.tutorialspoint.com/software\\_engineering/](https://www.tutorialspoint.com/software_engineering/)
2. <https://www.geeksforgeeks.org/software-engineering/>
3. <https://www.slideshare.net/pashadon143/se-46394097/>

**COURSE DESIGNER**

Ms.A.Jabeen, Assistant Professor, Department of Computer Applications.

**MAJOR BASED ELECTIVE – I (MBE)****CLOUD COMPUTING****SEMESTER: V**

Course Code	Course Title	Category	Learning Hours	Theory Hours/ Week	Practical Hours/ Week	Credit
19UCA5MBE1A	Cloud Computing	MBE-I	90	6	-	5

**PREAMBLE**

- To understand the concepts in Cloud Computing and its Applications

**COURSE OUTCOME:**

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	State the Architecture of Cloud Computing	K1
CO2	Explain the Virtualization of Cloud Computing	K2
CO3	Explain the Data storage in Cloud	K2
CO4	Discuss the Applications of Cloud Computing	K2
CO5	Illustrate the Risks & Data Security	K3

**MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:**

	PSO1	PSO2	PSO3	PSO4
CO1	M	S	M	S
CO2	S	S	S	S
CO3	M	S	M	S
CO4	S	S	S	M
CO5	M	S	M	M

**S-Strong; M-Medium; L-Low**

## **SYLLABUS:**

### **UNIT I: Cloud Computing & Architecture**

**(18 HOURS)**

**Cloud Computing Foundation:** Cloud Computing Basics-History of Cloud Computing. **Move to Cloud Computing:** Pros and Cons of Cloud Computing-Technologies in Cloud Computing. **Types of Cloud:** Public and Private Cloud-Cloud Infrastructure. Cloud Application Architecture. **Working of Cloud Computing:** Cloud Service Models-Cloud Deployment Models-**Cloud Computing and Services:** Pros and Cons.**Cloud Computing Architecture:** Cloud Computing Technology-Cloud Lifecycle Model- Role of Cloud Modeling and Architecture-Cloud Architecture.

### **UNIT II: Virtualization**

**(18 HOURS)**

**Foundations:** Definition of Virtualization-Adopting Virtualization-Types of Virtualization-Virtualization Architecture and Software-Virtualization Application-Pitfalls of Virtualization. **Grid, Cloud and virtualization:** Virtualization in Grid-Virtualization in Cloud-Virtualization and Cloud Security. **Virtualization and Cloud Computing:** Anatomy of Cloud Infrastructure-Virtual Infrastructures-CPU Virtualization-Network and Storage Virtualization.

### **UNIT III: Data Storage and Cloud Computing**

**(18 HOURS)**

**Data Storage:** Introduction to Enterprise Data Storage–Data Storage Management-File Systems-Cloud Data Stores –Using Grids for Data Storage. **Cloud Storage:** Cloud Storage Introduction-Overview of Cloud Storage-Data management for Cloud Storage-Provisioning Cloud Storage-Data-intensive Technologies for Cloud Computing, **Cloud Computing Elements:** The Cloud-Value of Cloud Computing-Cloud Do's and Don'ts-Cloud Computing-Legal Implication-Overview of Amazon Web Services. **Understanding Services and Applications by Type:** Web based Application-Web Services- Infrastructure Services-Ondemand Computing-Web Application Framework.

### **UNIT IV: Cloud Services & Applications**

**(18 HOURS)**

**Cloud Services:** Cloud Types and Services-Software as a Service- Platform as a Service-Infrastructure as a Service-Other Cloud Services. **Cloud Applications:** Microsoft Cloud Services. **Google Cloud Applications:** Google Applications Utilizing Cloud-Google App Engine-**Amazon Cloud Services:** Understanding Amazon Web Components and Services-Elastic Compute Cloud (EC2)-Amazon Storage System-Amazon Database Services.

### **UNIT V: Cloud Computing and Security**

**(18 HOURS)**

**Risk in Cloud Computing:** Introduction- Risk Management-Cloud Impact-Enterprise Wide Risk Management- Types of Risks in Cloud Computing. **Data Security in Cloud:** Introduction-Current State-Homo Sapiens and Digital Information-Content Level Security (CLS). **Cloud Security Services:** Objectives-Confidentiality, Integrity and Availability-Security Authorization Challenges in the Cloud-Secure Cloud Software Requirements-Secure Cloud Software Testing-Future Cloud.

**TEXT:**

1. A.Srinivasan, J.Suresh, “Cloud Computing: A practical approach for learning and implementation”, Pearson India Publications, 2014

**REFERENCES:**

1. Kai Hwang Geoffrey Fox Jack J.Dongarra, “Distributed Cloud Computing: From Parallel Processing To Internet of Things”, Elsevier, 2012
2. Judith S. Hurwitz, Daniel Kirsch, “Cloud Computing for Dummies”, WILEY, 2020
3. Barrie Sosinsky, “Cloud Computing Bible”, WILEY, 2011

**WEB REFERENCES:**

1. [https://en.wikipedia.org/wiki/Cloud\\_computing](https://en.wikipedia.org/wiki/Cloud_computing)
2. [https://link.springer.com/chapter/10.1007/978-3-030-34957-8\\_7](https://link.springer.com/chapter/10.1007/978-3-030-34957-8_7)

**COURSE DESIGNER**

MsLakshna Arun, Assistant Professor, Department of Computer Applications.

**Major Based Elective - I (MBE)**  
**INTRODUCTION TO DATA MINING AND WAREHOUSING**

**SEMESTER: V**

Course Code	Course Title	Category	Learning Hours	Theory Hours/ Week	Practical Hours/ Week	Credit
19UCA5MBE1B	Introduction to Data Mining And Warehousing	MBE I	75	5	-	5

**PREAMBLE**

- To understand concepts of data mining and ware housing.

**COURSE OUTCOME:**

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Understand the concept of data mining and dataware housing	K1
CO2	Know the various data mining techniques such as association rule mining	K2
CO3	Describe the Characteristics of web and web Mining	K3
CO4	Discuss the Knowledge on multi-dimensional data and OLAP operations	K3

**MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:**

	PSO1	PSO2	PSO3	PSO4
CO1	M	S	M	M
CO2	M	M	M	M
CO3	M	S	S	M

**S– Strong; M–Medium; L -Low**

**UNIT I: Introduction**

**(18 HOURS)**

Data Mining Definition - Application - Data Mining Techniques - Data Mining Case Studies: Aviation, Astrology, Mall Order - Future of Data Mining - Data Mining Software. Association Rule Mining: Introduction - Basics – Apriori Algorithm.

**UNIT II: Classification**

**(18 HOURS)**

Introduction- Decision tree -Building a Decision Tree - The Tree Induction Algorithm - Split Algorithm based on Information Theory- Over fitting and Pruning - Decision Tree Rules - Naive Bayes Method - Estimation of Predictive Accuracy of Classification Methods.

**UNIT III: Cluster Analysis****(18 HOURS)**

Cluster Analysis - Desired Features of Cluster Analysis - Types of Data - Computing Distance - Types of Cluster Analysis Methods – Partition Methods: K-Means Method - Hierarchical Methods : Distance between clusters - Agglomerative Method - Divisive Hierarchical Method - Density based Methods - Dealing With Large Databases .

**UNIT IV: Web Data Mining****(18 HOURS)**

Introduction - Web Terminology and Characteristics - WebContent Mining - Web Usage Mining - Web Structure Mining - Search Engines: Search Engines Functionality Search Engines Architecture - Ranking Of Web Pages.

**UNIT V: Data Warehousing****(18 HOURS)**

Introduction - Data Warehouses - Data Warehousing Design - Guidelines for Data Warehousing Implementation - Data Warehouse Metadata. Online Analytical Processing (OLAP): Introduction - Characteristics of OLAP System: Multidimensional View and Data Cube , OLAP Cube Operations.

**TEXT:**

1. G.K. Gupta “Introduction To Data Mining With Case Studies” , PHI, 2014

**REFERENCES:**

1. Jiawei Han, Micheline Kamber, Jian Pei “Data Mining: Concepts and Techniques” Morgan Kaufman Publishers, Third Edition, 2012
2. C.S.R. Prabhu “Data Warehousing: Concepts, Techniques, Products and Application” PHI Learning Private Ltd. Second Edition, 2008

**WEB REFERENCES:**

1. <https://www.tutorialride.com/data-mining/data-mining-tutorial.htm>
2. [https://hanj.cs.illinois.edu/bk3/bk3\\_slidesindex.htm](https://hanj.cs.illinois.edu/bk3/bk3_slidesindex.htm)

**COURSE DESIGNER**

Ms.T.Julimary, Assistant Professor, Department of Computer Applications.

**MAJOR BASED ELECTIVE – I (MBE)  
ARTIFICIAL INTELLIGENCE**

**SEMESTER: V**

Course Code	Course Title	Category	Learning Hours	Theory Hours/ Week	Practical Hours/ Week	Credit
19UCA5MBE1C	Artificial Intelligence	MBE I	75	5	-	5

**PREAMBLE**

To foster the development and understanding of Artificial Intelligence and its applications worldwide.

**COURSE OUTCOMES:**

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Explain the AI problem Solving Techniques	K-2
CO2	Describe Several General Purpose Search Techniques	K-3
CO3	Explain Various Heuristic Search Algorithms	K-2
CO4	Discuss the Predicate Logic and Relationships for Knowledge Representation	K-3
CO5	Apply the Use of Rules to Encode Knowledge	K-2

**MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:**

COs	PSO1	PSO2	PSO3	PSO4
CO1	M	M	M	S
CO2	S	S	M	S
CO3	M	S	S	S
CO4	S	S	M	S

**S – Strong; M – Medium; L – Low**

**UNIT I: Problems and Search**

**(18 Hours)**

**What is Artificial Intelligence?:-** The AI Problems-What is an AI Technique?-**Problems, Problem Spaces and Search:** Defining the Problem as State Space Search- Production Systems - Control Strategies – Algorithm: Breadth-First Search – Algorithm: Depth-First Search – Advantages of Depth-First Search and Breadth-First Search.

**UNIT II: Heuristic Search Techniques****(18 Hours)**

Generate-and-Test –Algorithm: Generate-and-Test - Hill Climbing –Simple Hill Climbing – Algorithm: Simple Hill climbing - Steepest-Ascent Hill Climbing – Algorithm: Steepest-Ascent Hill Climbing - Best-first Search– OR-Graphs – Algorithm: Best-First Search-The A\* Algorithm.

**UNIT III: Heuristic Search Techniques****(18 Hours)**

Problem Reduction – AND-OR Graphs – Algorithm- Problem Reduction - The AO\*Algorithm – Algorithm: AO\* - Constraint Satisfaction– Algorithm: Constraint Satisfaction -Means-Ends- Analysis.

**UNIT IV: Knowledge Representation****(18 Hours)**

**Knowledge Representation Issues:** Representations and mappings -Approaches to Knowledge Representation. **Using Predicate Logic:** Representing Simple Facts in Logic- Representing Instance and ISA Relationships - Computable Functions and Predicates.

**UNIT V: Representing knowledge using Rules****(18 Hours)**

Procedural Versus Declarative Knowledge – Logic Programming – Forward Versus Backward Reasoning. **Symbolic Reasoning Under Uncertainty:** Introduction to Non-monotonic Reasoning - Logics for Non-monotonic Reasoning.

**TEXT:**

1. Elaine Rich, Kevin Knight and Shivashankar B Nair, “Artificial Intelligence”, Tata McGraw-Hill companies, Third Edition, Reprint 2017.

**REFERENCES:**

1. Stuart Russeland Peter Norvig , “Artificial Intelligence- A Modern Approach”, Pearson Education ,2<sup>nd</sup> Edition, 2020.
2. Saroj Kaushik, “Artificial Intelligence” , Cengage Learning India, 2011.

**WEB REFERENCES:**

1. [www.eeCIS.udel.edu](http://www.eeCIS.udel.edu)
2. <https://courses.cs.washington.edu>
3. [www.cs.ukzn.ac.za](http://www.cs.ukzn.ac.za)
4. [www.tutorialspoint.com/pdf/artificial\\_intelligence\\_expert\\_systems.pdf](http://www.tutorialspoint.com/pdf/artificial_intelligence_expert_systems.pdf)

**COURSE DESIGNER**

A. Anandhavalli, Assistant Professor, Department of Computer Applications.



**SKILL BASED ELECTIVE – II (SBE)****PRACTICAL - PC Packages****Semester: V**

Course Code	Course Title	Category	Learning Hours	Theory Hours/ Week	Practical Hours/ Week	Credit
19UCA5SBE2AP	PC Packages	SBE	30	-	2	2

**PREAMBLE:**

- To understand concepts of PC Package Programming.

**COURSE OUTCOME:**

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Creating documents using template in MS – word	K1
CO2	Design a worksheet in MS- Excel	K2
CO3	Demonstrate usage of slides in MS - PowerPoint	K3

**MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:**

	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	S
CO2	S	S	M	M
CO3	M	M	S	S
CO4	M	M	M	L

S-Strong; M-Medium; L-Low

**LIST OF PRACTICALS****MS – WORD**

- Text Manipulation– Change the font type and style, alignment of text and underline the text
- Prepare a document with Bullets, Footers and Headers
- Prepare a document in newspaper format
- Table – Creation, insertion, deletion (Columns and rows)
  - Create a MarkSheet using table and find out total of all marks for each student
- Picture insertion and alignment: - Prepare a Greeting Card

6. Creation of documents using templates
  - a. Prepare a letter using any template
  - b. Prepare a Biodata using any kind of templates
7. Mail Merge: - Prepare Convocation invitation to be sent to specific addresses in the data source.

## **MS EXCEL**

8. MS-Excel-Introduction: - Worksheet & Work book preparation
  - a. Entering, Editing and Deleting Text, Numbers, Dates
  - b. Moving and Copying data
  - c. Inserting, Deleting and Hiding Rows & Columns
  - d. Inserting, Deleting, Moving and Copying Sheets
  - e. Merging of cells
9. Implement built-in functions such as date, date & time, Text functions
10. Data sorting – Ascending and Descending (both numbers and alphabets)
11. Prepare worksheet
  - a. For Mark list of a class with a chart (any type)
  - b. For electricity bill
12. Implement Data filtering in the mark list
13. Implement the concept of conditional formatting and freeze panes.

## **MS POWER POINT**

14. MS-PowerPoint: - Inserting clip and pictures

Create a slide show presentation for a seminar chooses your own topics.

  - a. Enter the text in outline view
  - b. Create non-bulleted and bulleted body text
  - c. Apply the appropriate text attributes
15. Presentation using wizards -Usage of design templates: - Creation of a slide show presentation using different presentation template and different transition effect for each slide. Use different text attributes in each slide.

## **COURSE DESIGNER**

Ms,T. Julie Mary, Assistant Professor, Department of Computer Applications.

## SKILL BASED ELECTIVE - II

### PRACTICAL –COREL DRAW

Semester: V

Course Code	Course Title	Category	Learning Hours	Theory Hours/ Week	Practical Hours/ Week	Credit
19UCA5SBE2BP	COREL DRAW	SBE	30	-	2	2

#### PREAMBLE

- To make students familiar about CorelDraw Tools for designing a webpage.

#### COURSE OUTCOME:

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Define usage of CorelDraw X7	K1
CO2	Describe formatting tools in CorelDraw	K2
CO3	Creating effective document	K3
CO4	Demonstrating all options in shapes tool	K3
CO5	Developing a sample webpage	K3

#### MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:

	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	S
CO2	S	S	M	M
CO3	M	M	S	S
CO4	M	M	M	L

S-Strong; M-Medium; L-Low

#### LIST OF PRACTICALS

##### Download & Install Corel Draw X7

- Creating new document, adding new pages and resizing the documents using simple tools in CorelDraw X7.

2. Design a page with shapes and colours using tools in toolbox
3. Formatting & decorating text shapes using Smear tool.
4. Import an image and alter it by applying crop tool
5. Create a document with all the options in Draw tool.
6. Design a Brochure design using Artistic tool & text tool
7. Demonstrate Shadow/Contour/Blend in shapes & text.
8. Create a Poster using Transparency tool & text tool.

## **COURSE DESIGNER**

Ms. M.Ellakkiya, Assistant Professor, Department of Computer Applications.

**SKILL BASED ELECTIVE – III (SBE)**  
**PRACTICAL - MOBILE APPLICATIONS DEVELOPMENT**

**SEMESTER: V**

Course Code	Course Title	Category	Learning Hours	Theory Hours/ Week	Practical Hours/ Week	Credit
19UCA5SBE3AP	Practical -Mobile Applications Development	SBE	30	-	2	2

**PREAMBLE**

- To understand the android studio tools and SDK for developing android applications.

**COURSE OUTCOMES:**

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Illustrate the android application development tools with installation.	K2
CO2	Develop user interfaces for the android platform.	K3
CO3	Apply Java programming concepts to android application development.	K3

**MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:**

	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M
CO2	S	M	M	M
CO3	M	M	L	L

**S – Strong; M – Medium; L - Low**

**LIST OF PRACTICALS**

1. Develop a “Hello World” application.
2. Develop an application that uses GUI components (Font and Colors).
3. Develop a login module (Check username and password) using activity and Intent.
4. Develop a native calculator application using activities and Fragments.
5. Develop an application that draws basic graphical primitives on the screen.
6. Develop an application that makes use of databases.
7. Develop an application that creates an alarm clock.

**COURSE DESIGNER**

Ms.V.Yasodha, Assistant Professor, Department of Computer Applications.

**SKILL BASED ELECTIVE– III (SBE)****PRACTICAL - MULTIMEDIA SYSTEMS****SEMESTER: V**

<b>Course Code</b>	<b>Course Title</b>	<b>Category</b>	<b>Learning Hours</b>	<b>Theory Hours/ Week</b>	<b>Practical Hours/ Week</b>	<b>Credit</b>
19UCA5SBE3BP	Practical - Multimedia Systems	SBE	30	2	-	2

**PREAMBLE**

- Understand the use of various components of multimedia systems.

**COURSE OUTCOME:**

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

<b>CO NUMBER</b>	<b>CO STATEMENT</b>	<b>KNOWLEDGE LEVEL</b>
CO1	Understand and apply the basic concepts of Multimedia	K1
CO2	Demonstrate the Animation with Music	K2
CO3	Develop logo using images and graphics	K3

**MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:**

	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>
<b>CO1</b>	S	S	M	S
<b>CO2</b>	S	S	S	S
<b>CO3</b>	S	S	M	S

**S-Strong; M-Medium; L-Low**

## **LIST OF PRACTICALS**

1. Registration of a user in [www.Renderforest.com](http://www.Renderforest.com)
2. Design a Multicolor Blast logo and Igniting logo Reveal
3. Create your own animation with music
4. Create mockup for any business with tag line
5. Develop a college website using the tools of renderforest
6. Create a video for teacher's day celebration
7. Design flyers and posters for graduation day

## **COURSE DESIGNERS:**

Ms.M.Ellakkiya, Assistant Professor, Department of Computer Applications

Ms.K.Akila, Assistant Professor, Department of Computer Applications

# **SEMESTER VI**



## CORE COURSE VIII– (CC)

### COMPUTER NETWORKS

Semester: VI

Course Code	Course Title	Category	Learning Hours	Theory Hours/ Week	Practical Hours/ Week	Credit
19UCA6CC8	Computer Networks	Core	90	6	-	5

#### PREAMBLE:

- To understand the design and organization of computer networks

#### COURSE OUTCOME:

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Describe the design and issues of the layers	K1
CO2	State the concepts of physical layer and data link layer	K1
CO3	Explain the various routing algorithms	K2
CO4	Demonstrate the protocols of transport layers	K2
CO5	Explain the function of application layer	K2

#### MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:

	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	S
CO2	S	L	S	S
CO3	M	S	S	S
CO4	S	S	S	L
CO5	S	S	S	M

S – Strong; M – Medium; L – Low

#### SYLLABUS

##### UNIT I: Introduction to Network Layers and Reference Models

(18 HOURS)

**Introduction** – Uses of Computer Networks – Network Hardware – Network Software: Protocol Hierarchies – Design Issues for the Layers – Connection Oriented and Connectionless Services – Service Primitives **Reference models:** The OSI Reference Model – TCP/IP Reference Model.

**UNIT II: Physical layer and Data link layer****(18 HOURS)**

**The Physical Layer:** Guided Transmission Media – Public Switched Telephone Network – Structure of Telephone System – Trunks and Multiplexing – Switching - **The Data link Layer:** Data link layer Design Issues – Error Detection and Correction – Stop and Wait Protocol - Sliding Window Protocol.

**UNIT III: Network Layer and Routing Algorithms****(18 HOURS)**

**The Network Layer:** The Network Layer Design Issues – **Routing Algorithms:** The Optimality Principle – Shortest Path Routing – Flooding – Distance Vector Routing – Link State Routing – Hierarchical Routing – Broadcast Routing – Congestion Control Algorithms: General Principles of Congestion Control – Congestion Prevention Policies.

**UNIT IV: Transport layer and Protocols****(18 HOURS)**

**The Transport Layer:** The Transport Service – Elements of Transport Protocols – **Internet Transport Protocols:** Introduction to UDP – RPC – TCP: TCP Service Model – TCP Protocol – TCP Segment Header.

**UNIT V: Application Layer****(18 HOURS)**

**The Application Layer:** The DNS Name Space – E-mail: Architecture and Services – Message Formats.

**TEXT:**

1. Andrew S. Tanenbaum, David J. Wetherall “Computer Networks”, Pearson Prentice Hall, Fifth Edition, 2019.

**REFERENCES:**

1. Behrouz A. Forouzan, “Data Communications and Networking”, Tata McGraw-Hill, Fifth Edition, 2017.
2. William Stallings, “Data and Computer Communication”, PHI, Fifth Edition, 2008.

**WEB REFERENCES:**

1. <https://www.geeksforgeeks.org/layers-of-osi-model/>
2. <https://www.geeksforgeeks.org/classification-of-routing-algorithms/>
3. [https://www.tutorialspoint.com/communication\\_technologies/](https://www.tutorialspoint.com/communication_technologies/)

**COURSE DESIGNER**

Ms.A. Jabeen, Assistant Professor, Department of Computer Applications.

## CORE COURSE IX– (CC)

### INTERNET OF THINGS

Semester: VI

Course Code	Course Title	Category	Learning Hours	Theory Hours/ Week	Practical Hours/ Week	Credit
19UCA6CC9	Internet of Things	Core	90	6	-	5

#### PREAMBLE

- To understand the concepts of Internet of Things and technologies involved in the connected devices

#### COURSE OUTCOME:

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Explain IoT enabling Technologies.	K2
CO2	Analyze applications of IoT in realtime scenario	K4
CO3	Design a portable IoT using Raspberrypi	K5
CO4	Explain Data Analytics for IoT.	K2
CO5	Illustrate Tools in IoT	K3

#### MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:

	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M
CO2	M	S	M	M
CO3	S	M	S	S
CO4	S	S	S	S
CO5	S	S	S	S

S – Strong; M – Medium; L – Low

#### SYLLABUS

##### UNIT I: Internet of Things & Design Principles

(18 HOURS)

**Internet of Things an Overview:** Internet of Things-IoT conceptual framework-IoT architectural view-Technology behind IoT-Sources of IoT –M2M communication-Examples of IoT. **Design Principles for connected devices:** Introduction –IoT/M2M Systems layers & designs standardisation-communication technologies-data enrichment, data consolidation & device management at gateway-ease of designing and affordability.

## **UNIT II : Design & Web Connectivity Principles**

**(18 HOURS)**

**Design Principles For Web Connectivity:** Introduction – Web Communication Protocol for Connected Devices-Message Communication Protocol for Connected Devices-Web Connectivity for Connected Devices Network Using Gateway, SOAP, REST, HTTP Restful & Websockets. **Internet Connectivity Principles:** Introduction-Internet Connectivity-Internet Based Communication-IP Addressing in the IoT-Media Access Control-Application Layer Protocols: HTTP, HTTPS-FTP-Telnet and Others.

## **UNIT III: Data Acquiring and Data Collection**

**(18 HOURS)**

**Data Acquiring, Organizing, Processing and Analytics:** Introduction-Data Acquiring and Storage-Organizing the Data-Transactions, Business Process, Integrations & Enterprise Distance-Analytics-Knowledge Acquiring, Managing and Storing Processors. Data Collection, Storage & Computing Using Cloud Platform: Introduction-Cloud Computing Paradigm for Data Collection, Storage and Computing-Everything as a Service and Cloud Service Models-IoT Cloud based Services Using the Xively, Nimbits and Other Platforms.

## **UNIT IV: Sensors and Embedded Devices**

**(18 HOURS)**

**Sensors, Participatory Sensing, RFIDs and Wireless Sensor Networks:** Introduction-Sensor Technology-Participating Sensing, Industrial IoT and Automotive IoT-Actuators-Sensor Data Communication Protocols - Radio Frequency Identification Technology-Wireless Sensor Network Technology. **Prototyping the Embedded Devices for IoT and M2M:** Introduction-Embedded Computing Basics –Embedded Platforms for Prototyping-Things always connected to the Internet/Cloud.

## **UNIT V: IoT Security**

**(18 HOURS)**

**IoT Privacy, Security and Vulnerabilities Solutions:** Introduction- Vulnerabilities, Security Requirements and Threat Analysis-Use Cases and Misuse Cases-IoT Security Tomography and Layered Attacker Models – Identity Management and Establishment, Access Control and Secured Message Communication –Security Models, Profiles and Protocols for IoT.

### **TEXT:**

1. Raj Kamal, “Internet of Things Architecture and Design Principles”, McGraw Hill Education (India) Private Limited, 2017.

### **REFERENCES:**

1. David Hanes, Gonzalo Salgueiro, Patrick Grossette, Robert Barton, Jerome Henry, “IoT Fundamentals, Networking Technologies, Protocols and Use cases for Internet of Things”, Cisco Press, 2017.
2. Olivier Hersent, David Boswarthick, Omar Elloumi, “The Internet of Things – Key applications and Protocols”, Wiley, 2012.

### **WEB REFERENCES:**

1. <https://www.tutorialspoint.com/>
2. <https://www.guru99.com/>
3. <https://www.pythonforbeginners.com/>

### **COURSE DESIGNER**

Ms.Lakshna Arun, Assistant Professor, Department of Computer Applications.

**MAJOR BASED ELECTIVE- II**  
**PYTHON PROGRAMMING**

**Semester: VI**

Course Code	Course Title	Category	Learning Hours	Theory Hours/Week	Practical Hours/Week	Credit
19UCA6MBE2A	Python Programming	MBE II	90	6	-	5

**PREAMBLE**

- To understand concepts of Python programming language.

**COURSE OUTCOME :**

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Understand Python's core data types while writing new programs	K1
CO2	Demonstrate different decision-making statements	K2
CO3	Describe the knowledge of file concepts	K3

**MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:**

	PSO1	PSO2	PSO3	PSO4
CO1	M	S	M	M
CO2	M	M	M	M
CO3	M	S	S	M

S- Strong; M-Medium; L-Low

**SYLLABUS**

**UNIT I: Basics of Python Programming**

**(18 HOURS)**

Introduction: Python Character Set-Token-Python Core Data Type- The print() Function- Assigning value to a variable-Multiple Assignments- Writing Simple Programs in Python- The input() Function- The eval() Function- Formatting Number and Strings- Python Inbuilt Functions

**UNIT II: Operators , Expressions, Decision and Loop Control Statements**

**(18 HOURS)**

Introduction: Operators and Expressions- Arithmetic Operators- Operator Precedence and Associativity- Bitwise Operator- Introduction: Boolean Operators- Using Numbers with Boolean Operators- Using String with Boolean Operators- Boolean Expressions and Relational Operators-Decision Making Statements- Conditional Expressions-Introduction: While Loop-The range() Function-The For Loop-Nested Loops-The break Statement-The continue Statement

### **UNIT III: Functions, Strings and Lists**

**(18 HOURS)**

Introduction: Syntax and Basics of a Function-Use of a Function-Parameters and Arguments in a Function-The Local and Global Scope of a Variable-The return Statement-Recursive Functions-The Lambda Function-Introduction-The str class-Basic Inbuilt Python Functions for String-The index[] Operator-Traversing String with for and while Loop-Immutable Strings-String Operations-Introduction: Creating Lists-Accessing the Elements of a List-Negative List Indices-List Slicing-List Slicing with Step Size-Python Inbuilt Functions for Lists- The List Operator-List Methods- List and Strings- Splitting a String in List-Passing List to a Function-Returning List from a Function

### **UNIT IV: List Processing, Object-Oriented Programming**

**(18 HOURS)**

Introduction: Searching Techniques-Introduction to Sorting-Introduction: Defining Classes-The Self-parameter and Adding Methods to a Class-Display Class Attributes and Methods-Special Class Attributes-Accessibility-The init-Method-Passing an Object as Parameter to a Method- -del()-Class Membership Tests-Method Overloading in Python-Operator Overloading-Inheritance-Types of Inheritance-Inheritance in Detail-Subclass Accessing Attributes of Parent Class-Multilevel Inheritance and Multiple Inheritance in Detail- Using super()-Method Overriding

### **UNIT V: Tuples, Sets, Dictionaries, Graphics Programming, File handling**

**(18 HOURS)**

Introduction to Tuples- Sets- Dictionaries-Introduction-Getting Started with the Turtle Module- Moving Turtle to Any Location-The color , bgcolor ,circle and Speed Method of Turtle-Drawing with Colors-Drawing Basic Shapes using Iterations-Changing Color Dynamically Using List-Turtles to Create Bar Charts-Introduction- Need of File Handling-Text Input and Output-The seek() Function- Binary Files

#### **TEXT:**

1. Ashok Namdev Kamthane, Amit Ashok Kamthane, “Programming and Problem Solving with Python”, Mc Graw Hill Education, 2018.

#### **REFERENCES:**

1. Jeeva Jose and P. Sojan Lal, “Introduction to Computing and Problem Solving with Python”, Khanna Book Publishing Co. (P) Ltd., 2016.
2. Ch. Satyanarayana, M Radhika Mani & B N Jagadesh, “Python Programming”, Universities Press, 2018.

#### **WEB REFERENCES:**

1. [www.learnpython.org/](http://www.learnpython.org/)
2. <https://www.codecademy.com/learn/python>
3. <https://www.Codementor.io>
4. <https://www.Python.org>

#### **COURSE DESIGNER**

Ms.K.Akila, Assistant Professor, Department of Computer Applications.

## MAJORBASED ELECTIVE – II

### R PROGRAMMING FOR DATA ANALYSIS

Semester: VI

Course Code	Course Title	Category	Learning Hours	Theory Hours/ Week	Practical Hours/ Week	Credit
19UCA6MBE2B	R Programming for Data Analysis	MBE - II	90	6	-	5

#### PREAMBLE:

- To impart knowledge in fundamentals of R using Data Analysis.

#### COURSE OUTCOME:

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Recognize Data Analytics Lifecycle	K1
CO2	State Datatypes and its Values	K1
CO3	Classify Operations and Testing Conditions	K2
CO4	Discuss Functions and Matrices	K2
CO5	Operate Data Frames and Plots	K3

#### MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:

	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M
CO2	S	S	M	M
CO3	M	M	S	S
CO4	M	M	M	L
CO5	M	M	L	L

S-Strong; M-Medium; L-Low

## **SYLLABUS**

### **UNIT I: Introduction to Data Analytics and R**

**(18 HOURS)**

Data Analytics Lifecycle Overview – Discovery– Data Preparation – Model Planning –Model Building – Communication Results – Operationalize. Understanding R – Installing R – Installing Rstudio – Exploring Rstudio – Setting preferences – Creating an R script - Storing a single value – Adding comments – Recognizing datatypes – Storing multiple values – Storing mixed datatypes – Plotting stored values – Controlling objects.

### **UNIT II: Performing Operation and Testing Conditions**

**(18 HOURS)**

Doing arithmetic – Making comparisons – Assessing logic – Operating on elements – Comparing elements – Recognizing precedence – Manipulating elements – Seeking truth – Branching alternatives –Chaining branches – Switching branches – Looping while true – Performing for loops – Breaking from loops.

### **UNIT III: Employing Functions and Building Matrices**

**(18 HOURS)**

Doing mathematics – Manipulating strings – Producing sequences – Generating random numbers – Distributing patterns – Extracting statistics – Creating functions – Providing defaults – Building matrix – Transposing data – Binding vectors – Naming rows and columns – Plotting matrices – Adding labels – Extracting matrix subsets – Maintaining dimensions.

### **UNIT IV: Constructing data frames and Producing quick plots**

**(18 HOURS)**

Constructing a data frame – Importing data sets – Examining data frames – Addressing frame data – Extracting frame subsets Changing frame columns – Filtering data frames – Merging data frames – Adjusting factors – Installing packages – Scattering points – Smoothing lines – Portraying stature – Depicting groups – Adding labels – Drawing columns – Understanding histograms – Producing histograms – Understanding box plots – Producing box plots.

### **UNIT V: Storytelling with data and Plotting perfection**

**(18 HOURS)**

Presenting data – Considering aesthetics – Using geometries – Showing statistics – Illustrating facets – Controlling coordinates – Designing themes – Loading the data – Retaining objects – Overriding labels – Adding a theme – Restoring the workspace – Comparing boxes – Identifying extremes – Limiting focus – Displaying facets – Exporting graphics – Presenting analyses.

### **TEXT:**

1. EMC Education Services, “Data Science and Big Data Analytics”, John Wiley & Sons, Inc, 2015.
2. Mike McGrath, “R for Data Analysis in easy steps”, In EasySteps, 2018.

### **REFERENCES:**

1. Dr. Mark Gardener, “Beginning R the Statistical Programming Language”, John Wiley & Sons, Inc, 2012.
2. Jafed P.Lander, “R for EveryOne”, Pearson Education, 2015.



**WEB REFERENCES:**

1. <https://www.r-project.org/about.html>
2. <https://www.datacamp.com/community/tutorials/r-or-python-for-data-analysis>
3. [https://lgatto.github.io/2017\\_11\\_09\\_Rcourse\\_Jena/index.html](https://lgatto.github.io/2017_11_09_Rcourse_Jena/index.html)

**COURSE DESIGNER**

Ms. V. Infine Sinduja, Assistant Professor, Department of Computer Applications.

## MAJOR BASED ELECTIVE – II (MBE)

### DIGITAL MARKETING

Semester: VI

Course Code	Course Title	Category	Learning Hours	Theory Hours/ Week	Practical Hours/ Week	Credit
19UCA6MBE2C	Digital Marketing	MBE-II	90	6	-	5

#### PREAMBLE:

- To facilitate the students to develop an overall understanding of digital marketing and online platforms and increase their job opportunities

#### COURSE OUTCOME:

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Explain the basic concept of Digital Marketing	K1
CO2	Discuss the concepts of Display Advertising	K2
CO3	Discuss the Search Engine Advertising	K2
CO4	Utilize the Social Media Platforms	K3
CO5	Illustrate the Search Engine Optimization	k3

#### MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:

	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M
CO2	S	S	M	M
CO3	M	M	M	M
CO4	M	M	M	M
CO5	M	M	M	M

S- Strong; M- Medium; L- Low

#### SYLLABUS

##### UNIT I: Introduction to Digital Marketing

(18 HOURS)

Introduction- Digital Marketing- Internet Users - Digital Marketing Strategy - Digital Advertising Market in India - Skills Required in Digital Marketing - Digital Marketing Plan.

**UNIT II: Display Advertising****(18 HOURS)**

Introduction - Concept of Display Advertising - Types of Display Ads - Buying Models - Display Plan - Targeting - Programmatic Digital Advertising - Analytics Tools - YouTube Advertising.

**UNIT III: Search Engine Advertising****(18 HOURS)**

Introduction - Search Advertising - Ad placement - AdRanks - Creating the First Ad Campaign - Enhance Your Ad Campaign - Performance Reports.

**UNIT IV: Social Media Marketing****(18 HOURS)**

Introduction - Social Media Marketing Strategies - Facebook Marketing: Facebook for Business - Anatomy of an Ad Campaign - Adverts - Facebook Insights.

**UNIT V: Search Engine Optimization****(18 HOURS)**

Search Engine- Concept of Search Engine Optimization (SEO) - SEO Phases - On Page Optimization - OffPage Optimisation - Social Media Reach.

**TEXT:**

1. Seema Gupta," Digital Marketing", McGraw Hill Education (India) Private Limited, 2018.

**REFERENCES:**

1. Puneet Bhatia," Fundamentals of Digital Marketing", Pearson Publication, 2018.
2. Nitin C Kamat & ChinmayNitin Kamat," Digital Social Media", Himalaya Publishing House, 2018.

**WEB REFERENCES:**

1. [www.digitalmarketer.com](http://www.digitalmarketer.com)
2. [www.learndigital.withgoogle.com](http://www.learndigital.withgoogle.com)

**COURSE DESIGNER**

Ms. R. Sridevi, Assistant Professor, Department of Computer Applications.

**MAJOR BASED ELECTIVE- III**  
**PRACTICAL - PYTHON PROGRAMMING**

**Semester: VI**

Course Code	Course Title	Category	Learning Hours	Theory Hours/ Week	Practical Hours/ Week	Credit
19UCA6MBE 3AP	Practical - Python Programming	MBE III	75	-	5	5

**PREAMBLE:**

- To impart the practical training on Python programming

**COURSE OUTCOME:**

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Understand and apply the basic concepts of Python	K1
CO2	Demonstrate the basic concepts of OOPS	K2
CO3	Use the knowledge of file concepts	K3

**MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:**

	PSO1	PSO2	PSO3	PSO4
CO1	M	S	M	M
CO2	M	M	M	M
CO3	S	S	S	M

S- Strong; M-Medium; L-Low

## **LIST OF PRACTICALS**

1. Types of Operators
2. Numbers
3. Strings
4. List & Dictionaries
5. Tuples & Set
6. Flow Control
7. Functions
8. Modules and Packages
9. File Handling
10. Exception Handling

## **COURSE DESIGNER**

Ms. K. Akila, Assistant Professor, Department of Computer Applications.

**MAJOR BASED ELECTIVE - III****PRACTICAL - R PROGRAMMING****Semester: VI**

<b>Course Code</b>	<b>Course Title</b>	<b>Category</b>	<b>Learning Hours</b>	<b>Theory Hours/ Week</b>	<b>Practical Hours/ Week</b>	<b>Credit</b>
19UCA6MBE 3BP	Practical-R Programming	MBE-III	75	-	5	5

**PREAMBLE**

- To impart practical training on R Programming

**COURSE OUTCOME:**

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

<b>CO NUMBER</b>	<b>CO STATEMENT</b>	<b>KNOWLEDGE LEVEL</b>
CO1	Define usage of R & R studio	K1
CO2	Describe objects & vectors	K2
CO3	Create data frames and matrix	K3
CO4	Manipulate data frames and matrices using functions	K3
CO5	Demonstrate data visualization	K3

**MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:**

	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>
<b>CO1</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO2</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>M</b>
<b>CO3</b>	<b>M</b>	<b>M</b>	<b>S</b>	<b>S</b>
<b>CO4</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>L</b>
<b>CO5</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>L</b>

S-Strong; M-Medium; L-Low

## **LIST OF PRACTICALS**

1. Create R program to take input from the user (name and age) and display the values. Also print the version of R installation.
2. Get the details of the objects in memory using R.
3. Create three vectors such as numeric data, character data and logical data. Display the content of the vectors and their type.
4. Create a simple bar plot of five subjects marks of a student.
5. Create data frames which contain details of 5 employees and display summary of the data.
6. Create an array of two 3x3 matrices for two given vectors.
7. Extract 3<sup>rd</sup> and 5<sup>th</sup> rows with 1<sup>st</sup> and 3<sup>rd</sup> columns from a given data frame.
8. Generate inner, outer, left, right join (merge) from given two data frames.
9. Demonstrate use of histogram.
10. Demonstrate box plot function.

## **COURSE DESIGNER**

Ms. V. Infine Sinduja, Assistant Professor, Department of Computer Applications.

### MAJOR BASED ELECTIVE – III (MBE)

#### PRACTICAL - DOT NET PROGRAMMING

Semester: VI

Course Code	Course Title	Category	Learning Hours	Theory Hours/ Week	Practical Hours/ Week	Credit
19UCA6MBE3CP	Practical- Dot Net Programming	MBE-III	75	-	5	5

#### PREAMBLE:

- To impart practical training on Dot Net Programming.

#### COURSE OUTCOME:

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Design a web form using server and standard controls	K3
CO2	Implement form validation in Dot Net	K3
CO3	Connect and manipulate the database with the Dot Net	K3
CO4	Develop a web application by their own	K5

#### MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:

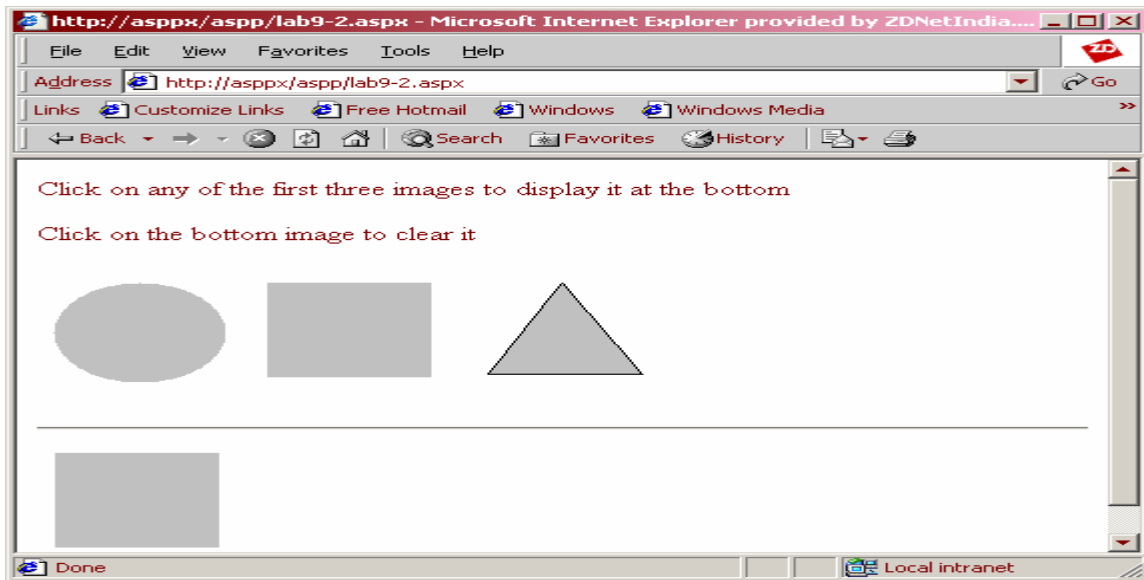
	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	M
CO2	S	S	M	M
CO3	S	S	M	L
CO4	S	S	M	L

S-Strong; M-Medium; L-Low



## LIST OF PRACTICALS

1. Write a program using Dot Net framework with C# to display three images in a line. When any one of the images is clicked, it must be displayed below. On clicking the displayed image it must be cleared. The screen must look as in the figure given below:



2. Use Dot Net framework with VB.Net to do the following exercises:
  - a) Design ASP.Net web form using HTML Server Controls to enter job seeker's details
  - b) Create an ASP.Net web form using Web controls to fill E-Mail registration form
  - c) Validate the E-Mail registration form using the validation controls such as Required Field validator, Regular expression validator, Compare validator and Range validator
  - d) Write an ASP.Net application to retrieve form data and display it the client browser in a table format.
  - e) Create a web application using ADO.Net that uses details view which performs basic data manipulations (Insertion, Updation and Deletion) in MS- Access database.
  - f) Create an application using Details view control to perform the basic data manipulations in SQL server database.
  - g) Create an application using Grid view control to access information from a table in SQL server.
  - h) Create an application using Data list control to access information from table in SQL server and display the result in neat format.
  - i) Create a College portal which must include basic database operations such as Insertion, Deletion, Modification, Selection and Searching.

### COURSE DESIGNER:

Dr. H. Krishnaveni, Associate Professor, Department of Computer Applications.