

Bachelor of



Computer Applications

**SRI VIDYA MANDIR ARTS & SCIENCE COLLEGE**

**(Autonomous)**

[An Autonomous College Affiliated to Periyar University, Salem, Tamil Nadu]

[Accredited by NAAC with 'A' Grade with CGPA of 3.27]

[Recognized 2(f) & 12(B) Status under UGC Act of 1956]

**Katteri – 636 902, Uthangarai (Tk), Krishnagiri (Dt)**

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**DEGREE OF BACHELOR OF COMPUTER APPLICATIONS**  
**CHOICE BASED CREDIT SYSTEM (CBCS)**

**REGULATIONS AND SYLLABUS FOR**

**BCA PROGRAMME**

**(SEMESTER PATTERN)**

**(For Students Admitted in the College from the  
Academic Year 2020-2021)**



### Programme Outcomes (POs)

|            |  |
|------------|--|
| <b>PO1</b> | To provide thorough understanding of nature, scope and application of computer and computer languages.   |
| <b>PO2</b> | Effectively communicate business issues, management concepts, plans and decisions both in oral and written form using appropriate supportive technologies. |
| <b>PO3</b> | Develop various real time applications using latest technologies and programming languages.  |
| <b>PO4</b> | Blend analytical, logical and managerial skills with the technical aspects to resolve real world issues.   |
| <b>PO5</b> | Become employable in various IT companies and government jobs.   |

### Programme Specific Outcomes (PSOs)

|             |  |
|-------------|--|
| <b>PSO1</b> | Apply fundamental concepts and methods of Computer Science to a wide range of applications.  |
| <b>PSO2</b> | Understand the basic concepts of digital fundamentals, OOP concepts, Databases, web applications and hardware related applications.  |
| <b>PSO3</b> | Ability to understand the principles and working of computer systems.  |
| <b>PSO4</b> | Able to understand, analyze and develop computer programs in the areas related to algorithm, system analysis, web design and networking for efficient design of computer based system. |
| <b>PSO5</b> | Ability to apply mathematical methodologies to solve computation task, model real world problem using appropriate data structure and suitable algorithm.                               |
| <b>PSO6</b> | Student will able to know various issues, latest trends in technology development and thereby innovate new ideas and solutions to existing problems.                                   |
| <b>PSO7</b> | Gain knowledge and skill set in applying core concepts.  |
| <b>PSO8</b> | Able to communicate effectively and to improve their competency skills to solve real time problems.  |
| <b>PSO9</b> | Analyze and apply latest technologies to solve problems in the areas of computer applications.   |



## SRI VIDYA MANDIR ARTS & SCIENCE COLLEGE

(Autonomous)

**Bachelor of Computer Applications (BCA)**

**Programme Pattern and Syllabus (CBCS)**

(For Students Admitted in the College from the Academic Year 2020-2021 Onwards)

| Sl. No               | Part | Nature of Course    | Course Code | Name of the Course            | Hours/Week | Credits   | Marks      |            |            |
|----------------------|------|---------------------|-------------|-------------------------------|------------|-----------|------------|------------|------------|
|                      |      |                     |             |                               |            |           | CIA        | ESE        | Total      |
| <b>SEMESTER – I</b>  |      |                     |             |                               |            |           |            |            |            |
| 1                    | I    | Language            | 20UTA1F01   | Tamil – I / Other Language    | 5          | 3         | 25         | 75         | 100        |
| 2                    | II   | Language            | 20UEN1F01   | English – I                   | 5          | 3         | 25         | 75         | 100        |
| 3                    | III  | Core – I            | 20UCA1C01   | Programming in Python         | 4          | 4         | 25         | 75         | 100        |
| 4                    |      | Core Practical – I  | 20UCA1P01   | Programming in Python Lab     | 3          | 2         | 40         | 60         | 100        |
| 5                    |      | Core – II           | 20UCA1C02   | Digital Computer Fundamentals | 5          | 4         | 25         | 75         | 100        |
| 6                    |      | Allied – I          | 20UMA1A01   | Allied Maths – I              | 6          | 3         | 25         | 75         | 100        |
| 7                    | IV   | Value Education     | 20UVE101    | Yoga                          | 2          | 2         | 25         | 75         | 100        |
| <b>Total</b>         |      |                     |             |                               | <b>30</b>  | <b>21</b> | <b>190</b> | <b>510</b> | <b>700</b> |
| <b>SEMESTER – II</b> |      |                     |             |                               |            |           |            |            |            |
| 8                    | I    | Language            | 20UTA2F02   | Tamil – II / Other Language   | 5          | 3         | 25         | 75         | 100        |
| 9                    | II   | Language            | 20UEN2F02   | English – II                  | 5          | 3         | 25         | 75         | 100        |
| 10                   | III  | Core – III          | 20UCA2C03   | Programming in C              | 4          | 4         | 25         | 75         | 100        |
| 11                   |      | Core – IV           | 20UCA2C04   | Data Structures & Algorithms  | 4          | 4         | 25         | 75         | 100        |
| 12                   |      | Core Practical – II | 20UCA2P02   | Data Structures Using C Lab   | 3          | 2         | 40         | 60         | 100        |
| 13                   |      | Allied – II         | 20UMA2A02   | Allied Maths – II             | 6          | 3         | 25         | 75         | 100        |
| 14                   | IV   | SBEC – I            | 20UCA2SP01  | Office Automation Lab         | 2          | 2         | 40         | 60         | 100        |
| 15                   |      | Common Paper        | 20UES201    | Environmental Studies         | 1          | 2         | 25         | 75         | 100        |
| <b>Total</b>         |      |                     |             |                               | <b>30</b>  | <b>23</b> | <b>230</b> | <b>570</b> | <b>800</b> |



| SEMESTER – III |                      |                         |                   |   |           |           |            |            |            |
|----------------|----------------------|-------------------------|-------------------|---|-----------|-----------|------------|------------|------------|
| 16             | III                  | Core – V                | 20UCA3C05         | Programming in C++                        | 5         | 4         | 25         | 75         | 100        |
| 17             |                      | Core Practical – III    | 20UCA3P03         | Programming in C++ Lab                    | 3         | 2         | 40         | 60         | 100        |
| 18             |                      | Core – VI               | 20UCA3C06         | Web Technology                            | 5         | 4         | 25         | 75         | 100        |
| 19             |                      | Core Practical –IV      | 20UCA3P04         | Web Technology Lab                        | 3         | 2         | 40         | 60         | 100        |
| 20             |                      | Core – VII              | 20UCA3C07         | Operating Systems                         | 6         | 4         | 25         | 75         | 100        |
| 21             |                      | Allied – III            | 20UCM3A01         | Principles of Accountancy                 | 6         | 3         | 25         | 75         | 100        |
| 22             | IV                   | Non-Major Elective – I  | ---               | Non Major Elective Course – I             | 2         | 2         | 25         | 75         | 100        |
| <b>Total</b>   |                      |                         |                   |   | <b>30</b> | <b>21</b> | <b>205</b> | <b>495</b> | <b>700</b> |
| SEMESTER – IV  |                      |                         |                   |   |           |           |            |            |            |
| 23             | III                  | Core – VIII             | 20UCA4C08         | Relational Database Management System     | 4         | 4         | 25         | 75         | 100        |
| 24             |                      | Core Practical – V      | 20UCA4P05         | Relational Database Management System Lab | 3         | 2         | 40         | 60         | 100        |
| 25             |                      | Core – IX               | 20UCA4C09         | .Net Programming                          | 4         | 4         | 25         | 75         | 100        |
| 26             |                      | Core Practical – VI     | 20UCA4P06         | .Net Programming Lab                      | 3         | 2         | 40         | 60         | 100        |
| 27             |                      | Core – X                | 20UCA4C10         | Software Engineering                      | 5         | 4         | 25         | 75         | 100        |
| 28             |                      | Allied – IV             | 20UCM4A02         | Cost & Management Accounting              | 5         | 3         | 25         | 75         | 100        |
| 29             | Allied Practical – I | 20UCM4AP01              | Practical Lab – I | 2   | 2         | 40        | 60         | 100        |            |
| 30             | IV                   | SBEC – II               | 20UCA4S02         | Quantitative Aptitude – I                 | 2         | 2         | 25         | 75         | 100        |
| 31             |                      | Non-Major Elective – II | ---               | Non Major Elective Course – II            | 2         | 2         | 25         | 75         | 100        |
| <b>Total</b>   |                      |                         |                   |   | <b>30</b> | <b>25</b> | <b>270</b> | <b>630</b> | <b>900</b> |
| SEMESTER – V   |                      |                         |                   |   |           |           |            |            |            |
| 32             | III                  | Core – XI               | 20UCA5C11         | Java Programming                          | 5         | 4         | 25         | 75         | 100        |
| 33             |                      | Core Practical – VII    | 20UCA5P07         | Java Programming Lab                      | 3         | 2         | 40         | 60         | 100        |
| 34             |                      | Core – XII              | 20UCA5C12         | LINUX & Shell Programming                 | 5         | 4         | 25         | 75         | 100        |



|                      |     |                       |            |                               |            |            |             |             |             |
|----------------------|-----|-----------------------|------------|-------------------------------|------------|------------|-------------|-------------|-------------|
| 35                   |     | Core Practical – VIII | 20UCA5P08  | LINUX & Shell Programming Lab | 3          | 2          | 40          | 60          | 100         |
| 36                   |     | Core – XIII           | 20UCA5C13  | Computer Networks             | 6          | 4          | 25          | 75          | 100         |
| 37                   |     | Elective – I          | ---        | Elective – I                  | 6          | 5          | 25          | 75          | 100         |
| 38                   | IV  | SBEC – III            | 20UCA5S03  | Quantitative Aptitude – II    | 2          | 2          | 25          | 75          | 100         |
| <b>Total</b>         |     |                       |            |                               | <b>30</b>  | <b>23</b>  | <b>205</b>  | <b>495</b>  | <b>700</b>  |
| <b>SEMESTER – VI</b> |     |                       |            |                               |            |            |             |             |             |
| 39                   | III | Core – XIV            | 20UCA6C14  | PHP with MySQL                | 5          | 4          | 25          | 75          | 100         |
| 40                   |     | Core Practical – IX   | 20UCA6P09  | PHP with MySQL Lab            | 3          | 2          | 40          | 60          | 100         |
| 41                   |     | Core – XV             | 20UCA6C15  | Mobile Computing              | 5          | 4          | 25          | 75          | 100         |
| 42                   |     | Core – XVI            | 20UCA6C16  | Computer Graphics             | 5          | 4          | 25          | 75          | 100         |
| 43                   |     | Elective – II         |            | Elective – II                 | 5          | 5          | 25          | 75          | 100         |
| 44                   |     | Project               | 20UCA6PR1  | .Net / PHP / Android          | 4          | 5          | 40          | 60          | 100         |
| 45                   | IV  | SBEC – IV             | 20UCA6SP04 | Android Programming Lab       | 3          | 2          | 40          | 60          | 100         |
| 46                   | V   | ---                   | 20UCA6EX01 | Extension Activities          | -          | 1          | -           | -           | -           |
| <b>Total</b>         |     |                       |            |                               | <b>30</b>  | <b>27</b>  | <b>220</b>  | <b>480</b>  | <b>700</b>  |
| <b>Grand Total</b>   |     |                       |            |                               | <b>180</b> | <b>140</b> | <b>1320</b> | <b>3180</b> | <b>4500</b> |

**Note**

CBCS – Choice Based Credit system

CIA – Continuous Internal Assessment

ESE – End of Semester Examinations

**Major Elective Courses**

| Semester | Part | Nature of Course | Course Code | Name of the Course                  |
|----------|------|------------------|-------------|-------------------------------------|
| V        | III  | Elective – I     | 20UCA5E01   | Cyber Security                      |
|          |      |                  | 20UCA5E02   | Artificial Intelligence             |
|          |      |                  | 20UCA5E03   | E-Commerce Technologies             |
| VI       | III  | Elective – II    | 20UCA6E04   | Data Mining                         |
|          |      |                  | 20UCA6E05   | System Administration & Maintenance |
|          |      |                  | 20UCA6E06   | Software Testing                    |

**Skill Based Elective Courses**

| Sl. No               | Part | Nature of Course | Course Code | Name of the Course         | Hours/Week | Credits | Marks |     |       |
|----------------------|------|------------------|-------------|----------------------------|------------|---------|-------|-----|-------|
|                      |      |                  |             |                            |            |         | CIA   | ESE | Total |
| <b>SEMESTER – II</b> |      |                  |             |                            |            |         |       |     |       |
| 1                    | IV   | SBEC – I         | 20UCA2SP01  | Office Automation Lab      | 2          | 2       | 40    | 60  | 100   |
| <b>SEMESTER – IV</b> |      |                  |             |                            |            |         |       |     |       |
| 2                    | IV   | SBEC – II        | 20UCA4S02   | Quantitative Aptitude – I  | 2          | 2       | 25    | 75  | 100   |
| <b>SEMESTER – V</b>  |      |                  |             |                            |            |         |       |     |       |
| 3                    | IV   | SBEC – III       | 20UCA5S03   | Quantitative Aptitude – II | 2          | 2       | 25    | 75  | 100   |
| <b>SEMESTER – VI</b> |      |                  |             |                            |            |         |       |     |       |
| 4                    | IV   | SBEC – IV        | 20UCA6SP04  | Android Programming Lab    | 2          | 2       | 40    | 60  | 100   |

**Non-Major Elective Courses**

| Sl. No                | Part | Nature of Course        | Course Code | Name of the Course                  | Hours/Week | Credits | Marks |     |       |
|-----------------------|------|-------------------------|-------------|-------------------------------------|------------|---------|-------|-----|-------|
|                       |      |                         |             |                                     |            |         | CIA   | ESE | Total |
| <b>SEMESTER – III</b> |      |                         |             |                                     |            |         |       |     |       |
| 1                     | IV   | Non-Major Elective – I  | 20UCA3N01   | Basics of Computer                  | 2          | 2       | 25    | 75  | 100   |
| 2                     | IV   | Non-Major Elective – I  | 20UCA3N02   | System Administration & Maintenance | 2          | 2       | 25    | 75  | 100   |
| <b>SEMESTER – IV</b>  |      |                         |             |                                     |            |         |       |     |       |
| 3                     | IV   | Non-Major Elective – II | 20UCA4N03   | Exploring on Word                   | 2          | 2       | 25    | 75  | 100   |
| 4                     | IV   | Non-Major Elective – II | 20UCA4N04   | Basics of Internet                  | 2          | 2       | 40    | 60  | 100   |



### List of Extension Activities

1. National Service Scheme (NSS)
2. Youth Red Cross (YRC)
3. Physical Education (PYE)
4. Eco Club (ECC)
5. Red Ribbon Club (RRC)
6. Women Empowerment Cell (WEC)



# PROGRAMME SYLLABUS





| Program: Bachelor of Computer Applications (BCA) |            |                        |         |  |
|--|------------|------------------------|---------|--|
| Core – I   |            | Course Code: 20UCA1C01 |         | Course Title:<br>Programming in Python |
| Semester   | Hours/Week | Total Hours            | Credits | Total Marks                            |
| I  | 4          | 60                     | 4       | 100                                    |

### Course Objectives

1. To understand the nature of Python programming.
2. To describe the core syntax and semantics of Python programming language.
3. To infer the object-oriented programming concepts in Python.
4. To understand why Python is a useful scripting language for developers.
5. To get practical knowledge of a popular programming language Python.

### **UNIT – I**

Introduction – History of Python – Installation – Commenting – Execution Modes – Internal Working of Python – Implementation. Python Character Set – Token – Core Data Type – The print() Function – Assigning Value to a Variable – Multiple Assignments – input(), eval() Function – Formatting Number and Strings – Inbuilt Functions. Operator and Expression: Types of Arithmetic Operators: Unary, Binary – Bitwise Operators – Operator Precedence and Associativity.

### **UNIT – II**

Decision Making Statements – if, if – else, nested if , Multi-way if-elif – else Statements. Loop Control Statements: While Loop – range() Function – for loop. Functions: Syntax and Basics of a Function –Parameters and Arguments in a Function – Local and Global Scope of a Variable – Return Statement – Recursive Functions – Lambda Function.

### **UNIT – III**

Lists: Introduction - Creating Lists – Accessing the Elements of a List – Negative List Indices – List Slicing – Python Inbuilt Functions for List – List Comprehensions – List Methods – List and Strings – Splitting a String in List – Passing List to a Functions – Returning List from a Function.



## UNIT – IV

Object Oriented Programming: Introduction – Defining Classes – The Self-Parameter and Adding Methods to a Class- Display Class Attributes and Methods – Special Class Attributes – Accessibility – The `_init_Method` (Constructor) – Passing on Object as Parameter to a Method – `_del_()` (Destructor Method) – Class Membership Tests – Method Overloading – Operator Overloading – Inheritance: Types of Inheritance – The Object Class – Subclass Accessing Attributes of Parent Class – Multiple Inheritance – Multilevel Inheritance – Method Overriding .

## UNIT – V

Tuples: Creating Tuples – `tuple()` Function – Inbuilt Functions for Tuples – Indexing and Slicing – Passing Variable Length Arguments to Tuples – Sets: Creating Sets – The Python Set Class – Set Operations – Dictionaries: Basics of Dictionaries – Creating a Dictionary – Adding, Replacing and Retrieving Values – Methods of Dictionary Class.

### Text Book

1. Ashok Namdev Kamthane, Amit Ashok Kamthane, “Programming and Problem Solving with PYTHON”, McGraw Hill Education (India) Private Limited, Chennai, 2018.

### Reference Books

1. S. A. Kulkarni, “Problem Solving and Python Programming”, Yes Dee Publishing Pvt. Ltd., Chennai, 2017 (Anna University Regulation 2017).
2. Martin C Brown, “The Complete Reference Python”, McGraw Hill Education, Osborne, 2018.

### Web Referenced

1. <http://www.python.org>
2. [http://www/python.org/doc/](http://www.python.org/doc/)
3. <http://wiki.python.org/>
4. <http://pypi.python.org/pypi>
5. <http://www/mhhe.com/kamthane/python>



### Assignments

1. Write a Python program to search a name in given tuple of names.
2. Write a Python program using Dictionary to find maximum and minimum from a set of values.

### Course Outcomes (COs)

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

| CO Number | CO Statement  | Knowledge Level |
|-----------|---|-----------------|
| CO1       | Understand and explain Python Programming.  | K1 & K2         |
| CO2       | Interpret the fundamental Python syntax and semantics.  | K2 & K3         |
| CO3       | Understand the concept of scripting and the contributions of scripting languages.                       | K3 & K4         |
| CO4       | Articulate the Object-Oriented Programming concepts used in python.                                     | K5              |
| CO5       | Write codes using Multiple level of organizational structures, functions, classes, modules and package. | K6              |

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

### Mapping of COs with POs

| PO \ CO | PO1 | PO2 | PO3 | PO4 | PO5 |
|---------|-----|-----|-----|-----|-----|
| CO1     | S   | M   | S   | S   | S   |
| CO2     | M   | M   | S   | S   | S   |
| CO3     | S   | S   | S   | S   | S   |
| CO4     | S   | S   | S   | S   | S   |
| CO5     | S   | S   | S   | S   | S   |

S – Strong

M – Medium

L – Low



| <b>Program: Bachelor of Computer Applications (BCA)</b> |                   |                               |                |  |
|---|-------------------|-------------------------------|----------------|--|
| <b>Core Practical – I</b>                               |                   | <b>Course Code: 20UCA1P01</b> |                | <b>Course Title: Programming in Python Lab</b> |
| <b>Semester</b>   | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                             |
| I   | 3                 | 45                            | 2              | 100  |

### Course Objectives

1. To train the students for the basics of coding and executing Python scripts.
2. To understand the various data structures available in Python programming language and apply them in solving computational problems.
3. To develop problem solving skills and their implementation through python.
4. To apply various constructs of the language for data analytics.

### **List of Programs**

1. Programs using conditional branches and loops.
2. Programs using functions.
3. Programs using Lists and List processing.
4. Programs using exception handling.
5. Programs using classes and objects.
6. Programs using Overloading.
7. Programs using inheritance.
8. Programs using polymorphism.



### Course Outcomes (COs)

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

| CO Number | CO Statement   | Knowledge Level |
|-----------|--|-----------------|
| CO1       | Learn to design and implement conditional branches and loops efficient programming using python. | K1 & K3         |
| CO2       | Learn working with functions, lists and list processing.   | K2 & K3         |
| CO3       | Learn to work with exception handling, classes and objects.                                      | K3 & K4         |
| CO4       | Learn to apply overloading concepts.   | K3 & K5         |
| CO5       | Learn to use inheritance and polymorphism.   | K6              |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**

### Mapping of COs with POs

| PO \ CO | PO1 | PO2 | PO3 | PO4 | PO5 |
|---------|-----|-----|-----|-----|-----|
| CO1     | S   | M   | M   | S   | S   |
| CO2     | M   | M   | S   | S   | S   |
| CO3     | S   | S   | S   | S   | S   |
| CO4     | S   | S   | S   | S   | S   |
| CO5     | S   | S   | S   | S   | S   |

**S – Strong**

**M – Medium**

**L – Low**



| Program: Bachelor of Computer Applications (BCA) |            |                        |         |   |
|--|------------|------------------------|---------|---|
| Core – II  |            | Course Code: 20UCA1C02 |         | Course Title: Digital Computer Fundamentals |
| Semester   | Hours/Week | Total Hours            | Credits | Total Marks                                 |
| I  | 5          | 75                     | 4       | 100   |

### Course Objectives

1. Understand the Digital number system and their conversions.
2. Identify the operations of logic Gates and simplify the Boolean expressions using K-Map.
3. Comprehend the fundamental principles of simple Arithmetic Circuits.
4. Know the design and operations of Data Processing Circuits.
5. Realize the design of sequential logic circuits such as Flip Flops, Registers and Counters and its applications.
6. Gain the knowledge about the memory elements like RAM, ROM, and Magnetic Disk memories.

### **UNIT – I**

Number Systems and Codes: Binary Number System – Binary-to-Decimal Conversion – Decimal-to-Binary Conversion – Octal Numbers – Hexadecimal Numbers – The ASCII Code – The Excess-3 Code – The Gray Code. Digital Computers.

### **UNIT – II**

Digital Logic: The Basic Gates – NOT, OR, AND – Universal Logic Gates – NOR, NAND – AND-OR-Invert Gates. Combinational Logic Circuits: Boolean Laws and Theorems – Sum-of-Products Method – Truth Table to Karnaugh Map – Pairs, Quads, and Octets – Karnaugh Simplification – Don't-Care Conditions – Product-of-Sums Simplification.

### **UNIT – III**

Data-Processing Circuits: 16-to-1 Multiplexer – 1-to-16 De-Multiplexer – BCD-to-Decimal Decoder – Decimal-to-BCD Encoder – Exclusive-or Gates. Arithmetic Circuits: Binary Addition – Binary Subtraction – Unsigned Binary Numbers – Sign-Magnitude Numbers – 2'S Complement Representation – 2'S Compliment Arithmetic.

**UNIT – IV**

Arithmetic Circuits: Arithmetic Building Blocks – The Adder – Subtractor. Flip-Flops: RS Flip-Flops – Edge-Triggered D Flip-Flops – Edge triggered JK Flip-Flops – JK Master-Slave Flip-Flops.

**UNIT – V**

Registers: Serial-In Serial-Out – Serial-In Parallel-Out – Parallel-In Serial-Out – Parallel-In Parallel-Out (54/74174). Memory: Introduction – Magnetic Memory – Optical Memory.

**Text Book**

1. Donald P Leach, Albert Paul Malvino and Goutam Saha, “Digital Principles and Applications,” 8<sup>th</sup> Edition, TMH, 2006.

**Reference Books**

1. Morris Mano, "Digital Logic and Computer Design," 4<sup>th</sup> Edition, Pearson, 2008.
2. Thomas C Bartee, "Digital Computer Fundamentals," 6<sup>th</sup> edition, McGraw-Hill, 1985.

**Course Outcomes (COs)**

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

| CO Number | CO Statement   | Knowledge Level |
|-----------|--|-----------------|
| CO1       | Understand the Number system and conversion from one system to another system.   | K1 & K2         |
| CO2       | Understand the functional concepts of Logic gates.                               | K1, K2 & K3     |
| CO3       | Analyze the concept of Boolean Algebra and Simplifying the Boolean expression.   | K3 & K4         |
| CO4       | Applying the knowledge to perform arithmetical operations using Logical circuit. | K4 & K5         |
| CO5       | Gain the Knowledge about memory Elements.  | K5              |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**



**Mapping of COs with POs**

| <b>PO<br/>CO</b> | <b>PO1</b> | <b>PO2</b> | <b>PO3</b> | <b>PO4</b> | <b>PO5</b> |
|------------------|------------|------------|------------|------------|------------|
| <b>CO1</b>       | M          | M          | S          | S          | M          |
| <b>CO2</b>       | S          | M          | S          | S          | M          |
| <b>CO3</b>       | S          | S          | S          | S          | M          |
| <b>CO4</b>       | S          | M          | S          | S          | S          |
| <b>CO5</b>       | M          | S          | S          | S          | S          |

**S – Strong**

**M – Medium**

**L – Low**





| Program: Bachelor of Computer Applications (BCA) |            |                        |         |                                   |
|--|------------|------------------------|---------|-----------------------------------|
| Core – III                                       |            | Course Code: 20UCA2C03 |         | Course Title:<br>Programming in C |
| Semester   | Hours/Week | Total Hours            | Credits | Total Marks                       |
| II   | 4          | 60                     | 4       | 100                               |

### Course Objectives

1. To understand the nature of C programming.
2. To describe the core syntax and semantics of C programming language.
3. To develop logics which will help to create programs, applications in C.
4. To implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.
5. To help students to get the practical knowledge of a programming language C.

### **UNIT – I**

Overview of C: History of C – Importance of C – Basic Structure of C Programs. Constants, Variables and Data Types: Character Set – C Tokens – Keywords and Identifiers – Constants – Variables – Declaration of Storage Classes – Assigning Values to Variables- Defining Symbolic Constants. Operators and Expression – Evaluation of Expressions – Precedence of Arithmetic Operators – Type Conversions in Expressions – Operator Precedence and Associativity – Mathematical Functions. Managing Input and Output Operations: Reading and Writing a Character – Formatted Input and Output.

### **UNIT – II**

Decision Making and Branching: Simple IF, IF-ELSE, Nesting of IF-ELSE, ELSE-IF Ladder, Switch Statements – GOTO Statements. Decision Making and Looping: WHILE Statement – DO Statement – FOR Statement – Jumps in Loops. Arrays: Definition & Declaration – One Dimensional – Two Dimensional – Multi Dimensional Arrays – Dynamic Arrays.



### UNIT – III

Character Arrays and Strings: Introduction – Declaring and Initializing String Variables – Reading Strings from Terminal – Writing Strings to Screen – String Handling Functions – Table of Strings. User – Defined Functions: Introduction – Need for User – Defined Function – A Multi- Function Program – Elements of User – Defined Function – Definition of Functions – Return Values and Their Types – Function Calls – Function Declaration – All Category of Functions – Nesting of Functions – Recursion – Passing Arrays to Functions – Passing Strings to Function.

### UNIT – IV

Structures and Unions: Introduction – Defining a Structure – Declaring Structure Variables – Accessing Structure Members – Structure Initialization – Copying and Comparing Structure Variables – Arrays of Structures – Arrays within Structures – Structures within Structures – Structures and Functions – Unions – Size of Structures – Bit Fields.

Pointers: Introduction – Understanding Pointers – Accessing the Address of a Variable – Initializing of Pointer Variables. Chain of Pointers – Pointer Expressions – Pointers and Arrays – Pointers and Character Strings – Arrays of Pointers – Pointers as Function Arguments – Functions Returning Pointers – Pointers to Functions – Pointer and Structures.

### UNIT – V

File Management: Introduction – Defining and Opening a File – Closing a File – Input/ Output Operation on Files – Error Handling During I/O Operations – Random Access Files – Command Line Arguments.

### Text Book

1. E. Balgurusamy, “Programming in ANSI C”, 5th Edition, Tata McGraw Hill, New Delhi, 2010.

### Reference Books

1. Herbert Schildt, “C: The Complete Reference”, 4th Edition, McGraw Hill, 2003.
2. B.L.Juneja, “Programming in C”, 1st Edition, Cengage Learning, 2012.



### Course Outcomes (COs)

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

| CO Number | CO Statement  | Knowledge Level |
|-----------|---|-----------------|
| CO1       | Understand and explain C Programming.   | K1 & K2         |
| CO2       | Able to define data types and use them in simple data processing applications.  | K2 & K3         |
| CO3       | Analyze programming problems to choose when regular loops should be used and when recursion will produce a better program.    | K3 & K4         |
| CO4       | Design, implement, test and debug programs that use arrays for character strings and that use pointers for character strings. | K3, K4 & K5     |
| CO5       | Develop solutions to problems using C programming.  | K6              |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**

### Mapping of COs with POs

| PO \ CO | PO1 | PO2 | PO3 | PO4 | PO5 |
|---------|-----|-----|-----|-----|-----|
| CO1     | S   | M   | S   | S   | S   |
| CO2     | S   | M   | S   | S   | S   |
| CO3     | S   | S   | S   | S   | S   |
| CO4     | M   | S   | S   | S   | S   |
| CO5     | S   | S   | M   | S   | S   |

**S – Strong**

**M – Medium**

**L – Low**



| <b>Program: Bachelor of Computer Applications (BCA)</b> |                   |                               |                |   |
|---|-------------------|-------------------------------|----------------|---|
| <b>Core – IV</b>  |                   | <b>Course Code: 20UCA2C04</b> |                | <b>Course Title: Data Structures &amp; Algorithms</b> |
| <b>Semester</b>   | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                                    |
| II  | 4                 | 60                            | 4              | 100   |

### Course Objectives

1. To have fundamental knowledge about data and the way it is stored.
2. To educate the concepts of fundamentals of writing algorithms and approach in problem solving.
3. To understand the concepts like stacks, queues, lists and its structures.
4. To know the concepts of Trees, Tree Traversals and Graphs.
5. To develop some applications using data structures.

### **UNIT – I**

Algorithms (Analysis and Design): Problem Solving – Top-Down and Bottom-Up Approaches to Algorithm Design – Use of Algorithms in Problem Solving – Design, Implementation, Verification of Algorithm – Efficiency Analysis of Algorithms: Space, Time Complexity, and Frequency Count – Sample Algorithms: Exchange the Value of Two Variables – Summation of Set of Numbers – Decimal to Binary Conversion – Sorting – Factorial – Fibonacci – Finding a Largest Number in an Array – Reverse the Order of Elements in Array.

### **UNIT – II**

Introduction: Definitions – Concepts – Overview – Implementation of Data Structures. Arrays: Definition – Terminology – One Dimensional Array – Multi Dimensional Array. Stacks: Introduction – Definition – Representation of Stacks – Operations on Stacks – Applications of Stack: Evaluation of Arithmetic Expression – Implementation of Recursion- Factorial Calculation

**UNIT – III**

Queues: Introduction – Definition – Representation of Queues – Various Queue Structures: Circular Queue – De-Queue – Priority Queue – Applications of Queues: CPU Scheduling. Linked List: Definition – Single Linked List – Double Linked List – Circular Double Linked List – Applications: Sparse Matrix – Polynomial Representation – Dynamic Storage Management – Boundary Tag System – Buddy System .

**UNIT – IV**

Trees: Terminologies – Definitions & Concepts – Representation of Binary Tree – Operations on Binary Tree – Types of Binary Trees: Expression Tree – Binary Search Tree – Heap Tree – Red Black Tree.

Graphs: Introduction – Graph Terminologies – Representation of Graphs – Operations on Graphs.

Applications of Graph: Shortest Path Problem – Topological Sorting – Minimum Spanning Tree: Kruskal and Prims Algorithm.

**UNIT – V**

Searching: Terminologies – Linear Search Techniques with – Array, Linked List, and Ordered List – Binary Search – Non Linear Search – Binary Tree Searching – Binary Search Tree Searching. Sorting: Terminologies – Sorting Techniques – Insertion Sort – Selection Sort – Bubble Sort – Quick Sort – Merge Sort.

**Text Books**

1. Sathish Jain, Shashi Singh, "Data Structure Made Simple", BPB Publications, 1st Edition, New Delhi, 2006.
2. Debasis Samanta, "Classic Data Structures", PHI Learning, New Delhi, 2nd Edition, 2009.

**Reference Books**

1. Aprita Gopal, "Magnifying Data Structures", PHI Learning, New Delhi, 1st Edition, 2010.
2. Chitra A & Rajan PT, "Data Structures", Vijay Nicole Publications, 2nd Edition, 2016.
3. Ellis Horowitz and Sartaj Sahni, "Fundamentals of Data Structure", Galgotia Publications, New Delhi, 1985.



4. Ellis Horowitz and Sartaj Sahni, “Fundamentals of computer algorithms”, Galgotia Publications, New Delhi, 1985.

### Course Outcomes (COs)

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

| CO Number | CO Statement   | Knowledge Level |
|-----------|--|-----------------|
| CO1       | Understand the representations of data and various algorithms.                     | K1 & K2         |
| CO2       | Analyze the complexity of different algorithms.                                    | K2 & K3         |
| CO3       | Remember the concept of algorithms for searching, sorting and dynamic programming. | K1, K2 & K3     |
| CO4       | Adapting the algorithmic concepts and implement new ones.                          | K4 & K5         |
| CO5       | Apply appropriate algorithms and data structure for real time.                     | K6              |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**

### Mapping of COs with POs

| PO \ CO | PO1 | PO2 | PO3 | PO4 | PO5 |
|---------|-----|-----|-----|-----|-----|
| CO1     | S   | M   | M   | S   | S   |
| CO2     | S   | M   | S   | S   | S   |
| CO3     | S   | S   | S   | S   | S   |
| CO4     | S   | S   | S   | S   | S   |
| CO5     | S   | S   | S   | S   | M   |

S – Strong

M – Medium

L – Low



| Program: Bachelor of Computer Applications (BCA) |            |                        |         |   |
|--|------------|------------------------|---------|---|
| Core Practical – II                              |            | Course Code: 20UCA2P02 |         | Course Title: Data Structures Using C Lab |
| Semester   | Hours/Week | Total Hours            | Credits | Total Marks                               |
| II   | 3          | 45                     | 2       | 100                                       |

### Course Objectives

1. To train the students for the basics of coding and executing C Programming using data structures.
2. To understand how to implement various data structures in C Programming language and apply them in solving computational problems.
3. To implement the applications of stacks and queues using arrays and pointer in C program.
4. To perform some real time applications like searching, sorting in C program using the application of data structures.

### List of Programs

1. Implement Push and Pop Operations of a Stack using Array.
2. Write a program to perform factorial calculation using recursion.
3. Implement Add and Delete Operations on Queue using Pointer.
4. Implement Add and Delete Operations on Circular Queue.
5. Write a Program to convert an Infix Expression to Postfix Expression using Arrays.
6. Write a Program to add Two Polynomials using Pointers.
7. Perform Tree Traversals for a Binary Tree using Recursion.
8. Write a program to perform Binary Search.
9. Sort the given list of numbers using Heap Sort.
10. Sort the given list of numbers using Quick Sort.

### Course Outcomes (COs)



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

| CO Number | CO Statement  | Knowledge Level |
|-----------|---|-----------------|
| CO1       | Understand and basics of coding and executing the C program using data structures.          | K1 & K2         |
| CO2       | Understand the various data structures and implement them using C program.                  | K2 & K3         |
| CO3       | Implement the applications of stacks and queues and solving the problems in C.              | K3 & K4         |
| CO4       | Choose the appropriate concept of data structure to solve the complex problems in C program | K5              |
| CO5       | Try to develop a solution to solve the real time problems using any type of data structure. | K6              |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**

### Mapping of COs with POs

| PO \ CO | PO1 | PO2 | PO3 | PO4 | PO5 |
|---------|-----|-----|-----|-----|-----|
| CO1     | S   | S   | S   | S   | S   |
| CO2     | S   | S   | S   | S   | S   |
| CO3     | S   | S   | S   | S   | S   |
| CO4     | S   | S   | S   | S   | S   |
| CO5     | M   | S   | S   | S   | M   |

S – Strong

M – Medium

L – Low





| <b>Program: Bachelor of Computer Applications (BCA)</b> |                   |                               |                |   |
|---|-------------------|-------------------------------|----------------|---|
| <b>Core – V</b>   |                   | <b>Course Code: 20UCA3C05</b> |                | <b>Course Title: Programming in C++</b> |
| <b>Semester</b>   | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                      |
| III   | 5                 | 75                            | 4              | 100                                     |

### Course Objectives

1. To understand how C++ improves C with object-oriented features.
2. To describe the core syntax and semantics of C++ programming language.
3. To develop logics which will help to create programs, applications in C++.
4. To implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.
5. To help students to get the practical knowledge of a programming language C++.

### **UNIT – I**

Object-Oriented Programming: Principles – Benefits of OOP – Application of OOP – Tokens, Expression and Control Structures: Tokens – Keywords – Identifiers and Constants – Data Types – Constants – Variables – Operators – Manipulators – Expressions – Control Structure.

### **UNIT – II**

Functions – Prototyping – Call by Reference – Return by Reference – Inline Functions – Default Arguments – const Arguments – Function Overloading – Friend and Virtual Functions, Classes and Objects – Class – Member Functions – Arrays with in a Class – Memory Allocation for Objects – Static data members – Static member functions – Arrays of Objects – Objects as Function Arguments – Friendly Functions – Returning Objects – const Member Functions – Pointers to Members, Constructors and Destructors.

### **UNIT – III**

Operator Overloading and Type Conversions, Inheritance: Extending Classes – Derived Classes – Single Inheritance – Multilevel Inheritance – Multiple Inheritance – Hierarchical Inheritance – Hybrid Inheritance – Virtual Base Classes – Abstract Classes, Pointers, Virtual



Functions and Polymorphism: Pointers – Pointers to Objects – this Pointer – Pointers to Derived Classes – Virtual Functions – Pure Virtual Functions.

#### **UNIT – IV**

Managing I/O Operations: C++ Streams – C++ Stream Classes – Unformatted I/O and Formatted I/O Operations – Managing Output with Manipulators, Working with Files: Classes for File Stream Operations – Opening and Closing a File – Detecting end-of-file – File Pointers and Their Manipulators – Sequential I/O Operations – Updating a File – Error Handling during File Operations – Command Line Arguments

#### **UNIT – V**

Templates: Class Templates – Class Templates with Multiple Parameters – Function Templates – Function Templates with Multiple Parameters – Overloading of Template Functions – Member Function Templates – Non-Type Template Arguments, Exception Handling: Basics – Exception Handling Mechanism – Throwing Mechanism – Catching Mechanism – Re-throwing an Exception – Specifying Exceptions.

#### **Text Book**

1. E.Balagurusamy, “Object Oriented Programming with C++”, Tata McGraw Hill Publications, 5th Edition, 2011.

#### **Reference Books**

1. M.T. Somashekara, “Object Oriented programming with C++”, Prentice Hall of India Learning Limited, 2nd Edition, 2012.
2. Behrouz A.Forouzan, “A Structured Approach Using C++”, Cengage Learning, 2nd Edition, 2003.



### Course Outcomes (COs)

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

| CO Number | CO Statement  | Knowledge Level |
|-----------|---|-----------------|
| CO1       | Understand basic object oriented programming concepts.                                    | K1 & K2         |
| CO2       | Able to define data types and use them in simple data processing applications.            | K2 & K3         |
| CO3       | To design, implement, debug and test programs using the fundamental elements of C++.      | K3 & K4         |
| CO4       | Implement programming techniques to solve problems in the C++ programming language.       | K3 & K5         |
| CO5       | Apply the concepts and principles of the programming language to the real-world problems. | K6              |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**

### Mapping of COs with POs

| PO \ CO | PO1 | PO2 | PO3 | PO4 | PO5 |
|---------|-----|-----|-----|-----|-----|
| CO1     | S   | S   | S   | S   | S   |
| CO2     | S   | M   | S   | S   | S   |
| CO3     | S   | S   | S   | S   | S   |
| CO4     | M   | S   | S   | S   | S   |
| CO5     | S   | S   | M   | S   | S   |

**S – Strong**

**M – Medium**

**L – Low**



**Program: Bachelor of Computer Applications (BCA)**

|                             |                   |                               |                |   |  |
|-----------------------------|-------------------|-------------------------------|----------------|---|--|
| <b>Core Practical – III</b> |                   | <b>Course Code: 20UCA3P03</b> |                | <b>Course Title: Programming in C++ Lab</b> |  |
| <b>Semester</b>             | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                          |  |
| III                         | 3                 | 45                            | 2              | 100   |  |

**Course Objectives**

1. To learn the fundamental C++ programming concepts
2. To train the students for the basics of coding and executing C++
3. To code, document, test, and implement a well-structured, robust computer program using the C++ programming language.
4. To write reusable modules (collections of functions).

**List of Programs**

1. Write a C++ Program to create a class ARITHMETIC which consists of a FLOAT and an INTEGER variable. Write member functions ADD( ), SUB( ), MUL( ), DIV( ) to perform addition, subtraction, multiplication, division respectively. Write a member function to get and display values.
2. Write a C++ Program to create a class that contains one float data member. Overload all the four Arithmetic operators so that they operate on the object FLOAT.
3. Write a C++ Program to create a class for STRING. Write a Member Function to initialize, get and display strings. Overload the operators ++ and == to concatenate two Strings and to compare two strings respectively.
4. Write a C++ Program to create class, which consists of EMPLOYEE Detail like E\_Number, E\_Name, Department, Basic, Salary, Grade. Write a member function to get and display them. Derive a class PAY from the above class and write a member function to calculate DA, HRA and PF depending on the grade.
5. Write a C++ Program to create a class SHAPE which consists of two VIRTUAL FUNCTIONS Calculate\_Area() and Calculate\_Perimeter() to calculate area and perimeter of various figures. Derive three classes SQUARE, RECTANGLE, TRIANGLE



from class Shape and Calculate Area and Perimeter of each class separately and display the result.

6. Write a C++ Program using Function Overloading to read two Matrices of different Data Types such as integers and floating point numbers. Find out the sum of the above two matrices separately and display the sum of these arrays individually.
7. Write a C++ Program to Convert an Infix Expression to Postfix Expression using Arrays.
8. Write a C++ Program to create a class to implement the data structure STACK. Write a constructor to initialize the TOP of the STACK. Write a member function PUSH() to insert an element and member function POP() to delete an element. Check for overflow and underflow conditions.
9. Write a C++ Program to check whether the given string is a palindrome or not using Pointers.
10. Write a C++ Program to merge two files into a single file.

### Course Outcomes (COs)

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

| CO Number | CO Statement  | Knowledge Level |
|-----------|---|-----------------|
| CO1       | To design, implement, debug and test programs using the fundamental elements of C++.                          | K1 & K3         |
| CO2       | Analyze the given problem statements to create basic program designs.   | K2 & K3         |
| CO3       | Implement different functions for input and output, various data types, basic operators, files and functions. | K3 & K4         |
| CO4       | Implement programming techniques to solve problems in the C++ programming language.                           | K3, K4 & K5     |
| CO5       | To learn how to design C++ classes for code reuse.  | K6              |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**



**Mapping of COs with POs**

| PO<br>CO   | PO1 | PO2 | PO3 | PO4 | PO5 |
|------------|-----|-----|-----|-----|-----|
| <b>CO1</b> | S   | M   | M   | S   | S   |
| <b>CO2</b> | M   | M   | S   | S   | S   |
| <b>CO3</b> | S   | S   | S   | S   | S   |
| <b>CO4</b> | S   | S   | S   | S   | S   |
| <b>CO5</b> | S   | S   | S   | S   | S   |

**S – Strong**

**M – Medium**

**L – Low**



| <b>Program: Bachelor of Computer Applications (BCA)</b> |                   |                               |                |                                     |
|---|-------------------|-------------------------------|----------------|-------------------------------------|
| <b>Core – VI</b>  |                   | <b>Course Code: 20UCA3C06</b> |                | <b>Course Title: Web Technology</b> |
| <b>Semester</b>   | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                  |
| III   | 5                 | 75                            | 4              | 100                                 |

### Course Objectives

1. To understand the structuring documents for the web.
2. To understand website development in a user friendly manner.
3. To improve the visual design and content structuring.
4. To gain the skills and project-based experience needed for entry into web application and development careers.

### **UNIT – I**

Structuring Documents for the Web: Introducing HTML and XHTML, Basic Text Formatting, Presentational Elements, Phrase Elements, Lists, Editing Text, Core Elements and Attributes, Attribute Groups. Links and Navigation: Basic Links, Creating Links with the <a> Element, Advanced E- mail Links. Images, Audio, and Video: Adding Images Using the <img> Element, Using Images as Links Image Maps, Choosing the Right Image Format, Adding Flash, Video and Audio to your Webpages.

### **UNIT – II**

Tables: Introducing Tables, Grouping Section of a Table, Nested Tables, Accessing Tables. Forms: Introducing Forms, Form Controls, Sending Form Data to the Server. Frames: Introducing Frameset, <frame> Element, Creating Links Between Frames, Setting a Default Target Frame Using <base> Element, Nested Framesets, Inline or Floating Frames with <iframe>.

### **UNIT – III**

Cascading Style Sheets: Introducing CSS, Where you can Add CSS Rules. CSS Properties: Controlling Text, Text Formatting, Text Pseudo Classes, Selectors, Lengths, Introducing the



Box Model. More Cascading Style Sheets: Links, Lists, Tables, Outlines, The :focus and :activate Pseudo classes Generated Content, Miscellaneous Properties, Additional Rules, Positioning and Layout wit, Page Layout CSS , Design Issues.

#### UNIT – IV

Java Script: How to Add Script to Your Pages, Variables and Data Types – Statements and Operators, Control Structures, Conditional Statements, Loop Statements – Functions – Message box, Dialog Boxes, Alert Boxes, Confirm Boxes, Prompt Boxes.

#### UNIT – V

Working with JavaScript: Practical Tips for Writing Scripts, JavaScript Objects: Window Object – Document Object – Browser Object – Form Object – Navigator Object Screen object – Events, Event Handlers, Forms – Validations, Form Enhancements, JavaScript Libraries.

#### Text Book

1. Jon Duckett, Beginning HTML, XHTML, CSS and JavaScript, Wiley Publishing, 2009.

#### References Books

1. Chris Bates, “Web Programming”, Wiley Publishing, 3<sup>rd</sup> Edition, 2007.
2. M. Srinivasan, “Web Technology: Theory and Practice”, Pearson Publication, 2012.

#### Course Outcomes (COs)

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

| CO Number | CO Statement                                       | Knowledge Level |
|-----------|--|-----------------|
| CO1       | Understand the uses of HTML Tags.                  | K1 & K2         |
| CO2       | Learning and implementing CSS.                     | K2 & K3         |
| CO3       | Understanding the concepts of scripting languages. | K1, K2 & K3     |
| CO4       | Make the web pages more dynamic and interactive.   | K2, K3, K4 & K5 |
| CO5       | Designing and developing web pages.                | K5 & K6         |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**





**Mapping of COs with POs**

| PO<br>CO | PO1 | PO2 | PO3 | PO4 | PO5 |
|----------|-----|-----|-----|-----|-----|
| CO1      | M   | M   | S   | S   | S   |
| CO2      | M   | S   | S   | S   | S   |
| CO3      | S   | S   | S   | S   | S   |
| CO4      | S   | M   | S   | S   | S   |
| CO5      | S   | M   | S   | S   | S   |

**S – Strong**

**M – Medium**

**L – Low**



**Program: Bachelor of Computer Applications (BCA)**

|                            |                   |                               |                |   |  |
|----------------------------|-------------------|-------------------------------|----------------|---|--|
| <b>Core Practical – IV</b> |                   | <b>Course Code: 20UCA3P04</b> |                | <b>Course Title: Web Technology Lab</b> |  |
| <b>Semester</b>            | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                      |  |
| III                        | 3                 | 45                            | 2              | 100                                     |  |

**Course Objectives**

1. To understand the structuring documents for the web.
2. To understand website development in a user friendly manner.
3. To improve the visual design and content structuring.
4. To gain the skills and project-based experience needed for entry into web application and development careers.

**List of Programs**

1. Create a form having number of elements (Textboxes, Radio buttons, Checkboxes, and so on). Write JavaScript code to count the number of elements in a form.
2. Create a HTML form that has number of Textboxes. When the form runs in the Browser fill the textboxes with data. Write JavaScript code that verifies that all textboxes has been filled. If a textboxes has been left empty, popup an alert indicating which textbox has been left empty.
3. Develop a HTML Form, which accepts any Mathematical expression. Write JavaScript code to Evaluates the expression and Displays the result.
4. Create a page with dynamic effects. Write the code to include layers and basic animation.
5. Write a JavaScript code to find the sum of N natural Numbers. (Use user defined function)
6. Write a JavaScript code block using arrays and generate the current date in words, this should include the day, month and year.
7. Create a form for Student information. Write JavaScript code to find Total, Average, Result and Grade.
8. Create a form for Employee information. Write JavaScript code to find DA, HRA, PF, TAX, Gross pay, Deduction and Net pay.



9. Create a form consists of a two Multiple choice lists and one single choice list
  - a. (a)The first multiple choice list, displays the Major dishes available
  - b. (b)The second multiple choice list, displays the Starters available.
  - c. (c)The single choice list, displays the Soft drinks available.
10. Create a web page using two image files, which switch between one another as the mouse pointer moves over the image. Use the on Mouse Over and on Mouse Out event handlers.

### Course Outcomes (COs)

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

| CO Number | CO Statement                                       | Knowledge Level |
|-----------|--|-----------------|
| CO1       | Understand the uses of HTML Tags.                  | K1 & K2         |
| CO2       | Learning and implementing CSS.                     | K2 & K3         |
| CO3       | Understanding the concepts of scripting languages. | K1, K2 & K3     |
| CO4       | Make the web pages more dynamic and interactive.   | K2, K3, K4 & K5 |
| CO5       | Designing and developing web pages.                | K5 & K6         |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**

### Mapping of COs with POs

| PO \ CO | PO1 | PO2 | PO3 | PO4 | PO5 |
|---------|-----|-----|-----|-----|-----|
| CO1     | M   | M   | S   | S   | S   |
| CO2     | M   | S   | S   | S   | S   |
| CO3     | S   | S   | S   | S   | S   |
| CO4     | S   | M   | S   | S   | S   |
| CO5     | S   | M   | S   | S   | S   |

S – Strong

M – Medium

L – Low



| <b>Program: Bachelor of Computer Applications (BCA)</b> |                   |                               |                |                                       |
|---|-------------------|-------------------------------|----------------|---------------------------------------|
| <b>Core – VII</b>                                       |                   | <b>Course Code: 20UCA3C07</b> |                | <b>Course Title: Operating System</b> |
| <b>Semester</b>   | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                    |
| III   | 6                 | 90                            | 4              | 100                                   |

### Course Objectives

1. To obtain knowledge about Operating System overview.
2. To impart the basic commands in shell programming.
3. To know about process and threads.
4. To understand the concepts of Deadlock, Concurrency and Semaphores.
5. To understand the basic concepts in file management.

#### **UNIT – I**

Introduction – History of Operating System – Different Kinds of Operating System – Operation System Concepts – System Calls – Operating System Structure.

#### **UNIT – II**

Processes and Threads: Processes – Threads – Thread Model and Usage – Inter Process Communication.

#### **UNIT – III**

Scheduling – Memory Management: Memory Abstraction – Virtual Memory – Page Replacement Algorithms.

#### **UNIT – IV**

Deadlocks: Resources – Introduction to Deadlocks – Deadlock Detection and Recovery – Deadlocks Avoidance – Deadlock Prevention. Multiple Processor System: Multiprocessors – Multi-Computers.

**UNIT – V**

Input/Output: Principles of I/O Hardware – Principles of I/O Software. Files Systems: Files – Directories – Files Systems Implementation – File System Management and Optimization.

**Text Book**

1. Andrew S. Tanenbaum, “Modern Operating Systems”, PHI Private Limited, New Delhi, 2<sup>nd</sup> Edition, 2008.

**Reference Books**

1. William Stallings, “Operating Systems – Internals & Design Principles”, Prentice – Hall of India Private Ltd., New Delhi, 5<sup>th</sup> Edition, 2004.
2. Sridhar Vaidyanathan, “Operating System”, Vijay Nicole Publications, 1<sup>st</sup> Edition, 2014.

**Course Outcomes (COs)**

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

| CO Number | CO Statement   | Knowledge Level |
|-----------|--|-----------------|
| CO1       | Understand the structure of OS and basic architectural components involved in OS design. | K1 & K2         |
| CO2       | Understand what a process is and how process are synchronized and schedule.              | K2 & K3         |
| CO3       | Understand the concepts like deadlock, memory management and file management.            | K2, K3 & K4     |
| CO4       | Analyze the need for scheduling algorithms.  | K4 & K5         |
| CO5       | Demonstrate an understanding of different I/O technique in OS.                           | K5              |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**



### Mapping of COs with POs

| PO<br>CO   | PO1 | PO2 | PO3 | PO4 | PO5 |
|------------|-----|-----|-----|-----|-----|
| <b>CO1</b> | M   | M   | S   | M   | S   |
| <b>CO2</b> | M   | M   | S   | S   | S   |
| <b>CO3</b> | M   | S   | S   | S   | S   |
| <b>CO4</b> | M   | S   | S   | S   | S   |
| <b>CO5</b> | S   | S   | S   | S   | S   |

**S – Strong**

**M – Medium**

**L – Low**



| <b>Program: Bachelor of Computer Applications (BCA)</b> |                               |                          |   |                           |
|---|-------------------------------|--------------------------|---|---------------------------|
| <b>Core – VIII</b>                                      | <b>Course Code: 20UCA4C08</b> |                          | <b>Course Title:</b><br>Relational Database Management System |                           |
| <b>Semester</b><br>IV                                   | <b>Hours/Week</b><br>4        | <b>Total Hours</b><br>60 | <b>Credits</b><br>4   | <b>Total Marks</b><br>100 |

### Course Objectives

1. To understand the concepts of Database concepts.
2. To understand the concepts of Relational Calculus.
3. To develop the logical design of the database using data modeling concepts such as entity-relationship diagrams.
4. To develop programming skills in PL/SQL.
5. To create a relational database using a relational database package, function and trigger.

### **UNIT – I**

Introduction: Database System Applications – DBMS Vs. File System – View of Data – Data Model – Database Languages – Database users and Administrators – Transaction Management – Database System Structure – Application Architecture. Data Models: Basic Concepts – Constraint – Keys – ER Diagram – Weak Entity – Extended ER Features - Design of an ER Schema.

### **UNIT – II**

Relational Model: Structure of Relational Databases – Relational Algebra. SQL: Background–Basic Structure – Set Operation – Aggregate Function – Null Values – Nested Sub Queries – Views – Modification of the Database – Data Definition Language – Embedded SQL – Dynamic SQL.

### **UNIT – III**

Data Normalization: Pitfalls in Relational Database Design – Decomposition – Functional Dependencies – Normalization – First Normal Form – Second Normal Form – Third Normal



Form – Boyce-Codd Normal Form – Fourth Normal Form – Fifth Normal Form – Denormalization – Database Security: Data Security Requirements – Protecting the Data within the Database – Granting and Revoking Privileges – Data Encryption.

#### **UNIT – IV**

PL/SQL: A Programming Language: History – Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Declaration – Assignment Operation – Bind Variables – Substitution Variables – Printing – Arithmetic Operators. Control Structures and Embedded SQL: Control Structures – Nested Blocks – SQL in PL/SQL – Data Manipulation – Transaction Control Statements. PL/SQL Cursors and Exceptions: Cursors – Implicit & Explicit Cursors and Attributes – Cursor FOR loops – SELECT...FOR UPDATE – WHERE CURRENT OF Clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions.

#### **UNIT – V**

PL/SQL Composite Data Types: Records – Tables – Varrays. Named Blocks: Procedures – Functions – Packages – Triggers – Data Dictionary Views. .

#### **Text Books**

1. A Silberschatz, H Korth, S Sudarshan, “Database System and Concepts”, McGraw-Hill, 5<sup>th</sup> Edition, 2005.
2. Alexis Leon & Mathews Leon, “Fundamentals of DBMS”, Vijay Nicole Publications, 2<sup>nd</sup> Edition, 2014.
3. Nilesh Shah, “Database Systems Using Oracle”, PHI, 2nd edition, 2004

#### **Reference Book**

1. Alexis Leon & Mathews Leon, “Essential of DBMS”, Vijay Nicole Publications, 2<sup>nd</sup> Reprint, 2009.





### Course Outcomes (COs)

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

| CO Number | CO Statement  | Knowledge Level |
|-----------|---|-----------------|
| CO1       | Understand database concepts, structures and E-R Model.   | K1 & K2         |
| CO2       | Understand the relational model and relational algebra operations.                                  | K2              |
| CO3       | Normalize the relational tables applying normalization rules.                                       | K2 & K3         |
| CO4       | Perform PL/SQL programming using concept of Cursor Management, Error Handling, Package and Trigger. | K2, K3 & K4     |
| CO5       | Apply PL/SQL procedural interfaces statement on relational tables as per requirements.              | K4, K5 & K6     |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**

### Mapping of COs with POs

| PO \ CO | PO1 | PO2 | PO3 | PO4 | PO5 |
|---------|-----|-----|-----|-----|-----|
| CO1     | M   | M   | S   | S   | S   |
| CO2     | M   | M   | S   | S   | S   |
| CO3     | M   | M   | S   | S   | S   |
| CO4     | M   | S   | S   | S   | S   |
| CO5     | M   | S   | S   | S   | S   |

**S – Strong**

**M – Medium**

**L – Low**



**Program: Bachelor of Computer Applications (BCA)**

|                           |                   |                               |                |  |  |
|---------------------------|-------------------|-------------------------------|----------------|--|--|
| <b>Core Practical – V</b> |                   | <b>Course Code: 20UCA4P05</b> |                | <b>Course Title: Relational Database Management System Lab</b> |  |
| <b>Semester</b>           | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>   |  |
| IV                        | 3                 | 45                            | 2              | 100  |  |

**Course Objectives**

1. To understand the concepts of Database concepts.
2. To understand the concepts of Relational Calculus.
3. To develop the logical design of the database using data modeling concepts such as entity-relationship diagrams.
4. To develop programming skills in PL/SQL.
5. To create a relational database using a relational database package, function and trigger.

**List of Programs**

1. Data Definition of Base Tables.
2. DDL with Primary key constraints.
3. DDL with constraints and verification by insert command.
4. Data Manipulation of Base Tables and Views.
5. Demonstrate the Query commands.
6. Write a PL/SQL code block that will accept an account number from the user and debit an amount of Rs. 2000 from the account if the account has a minimum balance of 500 after the amount is debited. The Process is to fired on the Accounts table.
7. Write a PL/SQL code block to calculate the area of the circle for a value of radius varying from 3 to 7. Store the radius and the corresponding values of calculated area in a table Areas. Areas – radius, area.
8. Write a PL/SQL block of code for reversing a number. (Example: 1234 as 4321).
9. Create a transparent audit system for a table Client\_master (client\_no, name, address, Bal\_due). The system must keep track of the records that are being deleted or updated. The functionality being when a record is deleted or modified the original record details



and the date of operation are stored in the auditclient(client\_no, name, bal\_due, operation, userid, update) table, then the delete or update is allowed to go through.

### Course Outcomes (COs)

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

| CO Number | CO Statement  | Knowledge Level |
|-----------|---|-----------------|
| CO1       | Understand database concepts, structures and E-R Model.   | K1 & K2         |
| CO2       | Understand the relational model and relational algebra operations.                                  | K2              |
| CO3       | Normalize the relational tables applying normalization rules.                                       | K2 & K3         |
| CO4       | Perform PL/SQL programming using concept of Cursor Management, Error Handling, Package and Trigger. | K2, K3 & K4     |
| CO5       | Apply PL/SQL procedural interfaces statement on relational tables as per requirements.              | K4, K5 & K6     |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**

### Mapping of COs with POs

| PO \ CO | PO1 | PO2 | PO3 | PO4 | PO5 |
|---------|-----|-----|-----|-----|-----|
| CO1     | M   | M   | S   | S   | S   |
| CO2     | M   | M   | S   | S   | S   |
| CO3     | M   | M   | S   | S   | S   |
| CO4     | M   | S   | S   | S   | S   |
| CO5     | M   | S   | S   | S   | S   |

**S – Strong**

**M – Medium**

**L – Low**



**Program: Bachelor of Computer Applications (BCA)**

|                  |                   |                               |                |                                       |  |
|------------------|-------------------|-------------------------------|----------------|---------------------------------------|--|
| <b>Core – IX</b> |                   | <b>Course Code: 20UCA4C09</b> |                | <b>Course Title: .Net Programming</b> |  |
| <b>Semester</b>  | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                    |  |
| IV               | 4                 | 60                            | 4              | 100                                   |  |

**Course Objectives**

1. Creates web based applications using . net frameworks.
2. Use different server controls to create rich user interactive websites.
3. Access data from the database in data bound controls on the web page.
4. Apply master page to different pages in the website.

**UNIT – I**

The .NET Framework – Learning the .NET languages – Introduction – .Net Revolution – .Net Framework and its Architecture – CLR – What is Assembly – Components of Assembly – DLL Hell and Assembly Versioning – Objects and Namespaces – Setting Up ASP.NET and IIS.

**UNIT – II**

Developing VB.NET Applications – Introduction to VB.Net, The .Net Frame Work and Common Language Runtime, Building VB. Net Application, VB IDE, Forms, Properties, Events, VB Language - Console Application and 46 Windows Application, Data Type, Declaring Variable, Scope of Variable, Operators and Statements - Windows Applications - Forms, Adding Controls to Forms, Handling Events, MsgBox, Input Box, Multiple Forms, Handling Mouse and Keyboard Events, Object Oriented Programming Creating and Using Classes and Objects, Handling Exceptions – On Error Goto.

**UNIT – III**

Developing ASP.NET Applications – ASP.NET Applications – Understanding ASP.NET Controls – Overview of ASP.NET Framework, Web Form Fundamentals – Web Control



Classes – Using Visual Studio.NET – Validation and Rich Controls – State Management – Tracing, Logging, and Error Handling.

#### **UNIT – IV**

Developing C#.NET Applications – Introducing C# – Overview of C# – Literals, Variables – Data Types, – Operators – Checked and Unchecked Operators – Expressions – Branching – Looping – Object Oriented Aspects Of C#: Class – Objects – Constructors and its Types – Inheritance, Properties, Indexers, Index Overloading – Polymorphism – Sealed Class and Methods – Interface – Abstract Class, Operator Overloading, – Delegates, Events, Errors and Exception – Threading.

#### **UNIT – V**

ADO.NET – Overview of ADO.NET – ADO.NET Data Access – Connected and Disconnected Database, Create Connection using ADO.NET Object Model, Connection Class, Command Class Data binding – Data List – Data Grid – Repeater – Files, Streams and Email – Using XML.

#### **Text Books**

1. James Holmes, “Struts: The Complete Reference”, McGraw Hill Professional, 2nd Edition, 2007
2. Mathew Mac Donald, “ASP.NET Complete Reference”, TMH, 2005.
3. Herbert Schildt, “The Complete Reference: C# 4.0”, Tata McGraw Hill, 2012. Christian Nagel et al. “Professional C# 2012 with .NET 4.5”, Wiley India, 2012.
4. ASP.NET Unleashed, C# programming – Wrox publication, 2010.
5. Steven Holzner, “Visual Basic. NET Black Book”, Wiley Publisher, 1<sup>st</sup> Edition, 2000.

#### **Reference Books**

1. Jesse Liberty , ‘Programming C#, “ , O’Reilly Media, 4th Edition, 2010.
2. Mario Szpuszta, Matthew MacDonald , “Pro ASP.NET 4 in C# 2010: Includes Silverlight 2, “Apress, 3<sup>rd</sup> Edition, 2010.
3. J.Liberty, D.Hurwitz, “Programming ASP.NET”, O’REILLY, 3<sup>rd</sup> Edition, 2006.
4. Tim Anderson, “Visual Basic. Net Programming in Easy Steps”, Dreamtech Press.



### Course Outcomes (COs)

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

| CO Number | CO Statement  | Knowledge Level |
|-----------|---|-----------------|
| CO1       | Describes .NET Framework and Common Language Runtime.                             | K1 & K2         |
| CO2       | Understand the development and deployment of enterprise applications.             | K2              |
| CO3       | Develop ASP.Net web services, secure web services and .Net remoting applications. | K2 & K3         |
| CO4       | Interpret concepts of constructors , inheritance and interface.                   | K4 & K5         |
| CO5       | Ability to handle data access technologies in ADO.NET for data manipulations.     | K5 & K6         |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**

### Mapping of COs with POs

| PO \ CO | PO1 | PO2 | PO3 | PO4 | PO5 |
|---------|-----|-----|-----|-----|-----|
| CO1     | M   | S   | S   | S   | S   |
| CO2     | S   | S   | S   | S   | S   |
| CO3     | M   | S   | S   | S   | S   |
| CO4     | M   | S   | S   | S   | S   |
| CO5     | M   | M   | S   | S   | S   |

**S – Strong**

**M – Medium**

**L – Low**



**Program: Bachelor of Computer Applications (BCA)**

|                            |                   |                               |                |   |  |
|----------------------------|-------------------|-------------------------------|----------------|---|--|
| <b>Core Practical – VI</b> |                   | <b>Course Code: 20UCA4P06</b> |                | <b>Course Title: .Net Programming Lab</b> |  |
| <b>Semester</b>            | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                        |  |
| IV                         | 3                 | 45                            | 2              | 100                                       |  |

**Course Objectives**

1. Creates web based applications using . net frameworks.
2. Use different server controls to create rich user interactive websites.
3. Access data from the database in data bound controls on the web page.
4. Apply master page to different pages in the website.

**List of Programs**

1. Develop a Program for simple calculator.
2. Develop a Program using classes and objects.
3. Develop an application to create, save, update, delete and search employee profile in employee database system (with database connectivity).
4. Develop an application to create inventory management system (with database connectivity).
5. Develop an application to create student mark entry system (with database connectivity).
6. Design an ASP.Net Web Forms using the Applications.
7. Develop an ASP.Net Program to illustrate Validation Controls.
8. Develop an ASP.Net Program using Web User controls.
9. Develop an ASP.Net Program using Data Binding with Server controls.
10. Develop an ASP.Net Program using Database Programming concepts in ADO.Net.



### Course Outcomes (COs)

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

| CO Number | CO Statement  | Knowledge Level |
|-----------|---|-----------------|
| CO1       | Describes .NET Framework and Common Language Runtime.                             | K1 & K2         |
| CO2       | Understand the development and deployment of enterprise applications.             | K2              |
| CO3       | Develop ASP.Net web services, secure web services and .Net remoting applications. | K2 & K3         |
| CO4       | Interpret concepts of constructors, inheritance and interface.                    | K4 & K5         |
| CO5       | Ability to handle data access technologies in ADO.NET for data manipulations.     | K5 & K6         |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**

### Mapping of COs with POs

| PO \ CO | PO1 | PO2 | PO3 | PO4 | PO5 |
|---------|-----|-----|-----|-----|-----|
| CO1     | M   | S   | S   | S   | S   |
| CO2     | S   | S   | S   | S   | S   |
| CO3     | M   | S   | S   | S   | S   |
| CO4     | M   | S   | S   | S   | S   |
| CO5     | M   | M   | S   | S   | S   |

**S – Strong**

**M – Medium**

**L – Low**





| <b>Program: Bachelor of Computer Applications (BCA)</b> |                   |                               |                |   |
|---|-------------------|-------------------------------|----------------|---|
| <b>Core – X</b>   |                   | <b>Course Code: 20UCA4C10</b> |                | <b>Course Title: Software Engineering</b> |
| <b>Semester</b>   | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                        |
| IV  | 5                 | 75                            | 4              | 100                                       |

### Course Objectives

1. To enhance the basics software engineering methods and practices.
2. To learn the techniques for developing software systems.
3. To demonstrate the ability to work effectively as a team member/leader.

#### **UNIT – I**

Introduction to Software Engineering Some Definition – Some Size Factors – Quality and Productivity Factors – Managerial Issue. Planning a Software Project: Defining the Problem – Developing a Solution Strategy – Planning the Development Process – Planning an Organization Structure – Other Planning Activities.

#### **UNIT – II**

Software Cost Estimation: Software – Cost Factors – Software Cost Estimation Techniques – Specification Techniques – Level Estimation – Estimating Software Maintenance Costs.

#### **UNIT – III**

Software Requirements Definition: The Software Requirements Specification – Formal Languages and Processors for Requirements Specification.

#### **UNIT – IV**

Software Design: Fundamental Design Concepts – Modules and Modularizing Criteria – Design Notations – Design Techniques – Detailed Design Consideration – Real Time and Distributed System Design – Test Plan – Mile Stones Walk through and Inspection – Design Guidelines

**UNIT – V**

Verification and Validation Techniques: Quality Assurance – Static Analysis – Symbolic Exception – Unit Testing and Debugging – System Testing – Formal Verification. Software Maintenance: Enhancing Maintainability During Development – Managua Aspects of Software Maintenance – Configuration Management – Source Code Metrics – Other Maintenance Tools and Techniques.

**Text Book**

1. Richard E.Fairly - Software Engineering Concepts - Tata McGraw-Hill book Company, 2001.

**Reference Books**

1. R.S. Pressman, “Software Engineering”, McGraw Hill, 4<sup>th</sup> Edition, 1997
2. Rajib Mall, “Fundamentals of Software Engineering”, PHI, 2nd Edition, 2004,

**Course Outcomes (COs)**

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

| <b>CO Number</b> | <b>CO Statement</b>  | <b>Knowledge Level</b> |
|------------------|--|------------------------|
| <b>CO1</b>       | Understand the basic concepts of Software Engineering.                     | K1                     |
| <b>CO2</b>       | Understand the SPM concepts like cost estimation & scheduling.             | K1 & K2                |
| <b>CO3</b>       | Analyse the software requirements for different projects.                  | K2 & K3                |
| <b>CO4</b>       | Apply the software engineering models in developing software applications. | K2, K3, K4 & K5        |
| <b>CO5</b>       | Understand the verification, validation and maintenance process.           | K5 & K6                |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**



**Mapping of COs with POs**

| PO<br>CO   | PO1 | PO2 | PO3 | PO4 | PO5 |
|------------|-----|-----|-----|-----|-----|
| <b>CO1</b> | S   | S   | M   | M   | S   |
| <b>CO2</b> | S   | S   | M   | M   | S   |
| <b>CO3</b> | M   | S   | S   | S   | S   |
| <b>CO4</b> | S   | S   | S   | S   | S   |
| <b>CO5</b> | M   | M   | M   | S   | S   |

**S – Strong**

**M – Medium**

**L – Low**



**Program: Bachelor of Computer Applications (BCA)**

|                      |                        |                               |                     |  |  |
|----------------------|------------------------|-------------------------------|---------------------|--|--|
| <b>Core – XI</b>     |                        | <b>Course Code: 20UCA5C11</b> |                     | <b>Course Title:</b><br>Java Programming |  |
| <b>Semester</b><br>V | <b>Hours/Week</b><br>5 | <b>Total Hours</b><br>75      | <b>Credits</b><br>4 | <b>Total Marks</b><br>100                |  |

**Course Objectives**

1. To understand the nature of Java programming.
2. To describe the core syntax and semantics of Java programming language.
3. To understand Object oriented concepts like data abstraction, encapsulation, etc.
4. To solve the real world scenarios using top down approach.
5. To understand various Java programming constructs.

**UNIT – I**

Java Overview: Introduction – Simple Java Program – Java Program Structure – Java Tokens – Java Statements – JVM – Command Line Arguments – Constants, Variables, and Data Types – Operators and Expressions.

**UNIT – II**

Decision Making and Branching: Introduction – Decision Making with if Statement – Simple if Statement – The if...else Statement – Nesting of if...else Statement – The else if Ladder – The Switch Statement – The ?: Operator. Decision Making and Looping: Introduction – The While Statement – The Do Statement – The For Statement – Jumps in Loops – Labelled Loops. Classes, Objects and Methods: Introduction – Defining a Class – Fields Declaration – Methods Declaration – Creating Objects – Accessing Class Members – Constructors – Methods Overloading – Static Members – Nesting of Methods – Inheritance – Overriding Methods – Final Variables and Methods – Final Classes – Finalizer Methods – Abstract Methods and Classes – Methods with Var args – Visibility Control.



### UNIT – III

Arrays, Strings and Vectors: Introduction – One-Dimensional Arrays – Creating an Array – Two Dimensional Arrays – Strings – Vectors – Wrapper Classes – Enumerated Types – Annotations.

Interfaces: Introduction – Defining Interfaces – Extending Interfaces – Implementing Interfaces – Accessing Interface Variables – Packages: Introduction – Java API Packages – Using System Packages – Naming Conventions – Creating Packages – Accessing a Package – Using a Package – Adding a Class to a Package – Hiding Classes – Static Import.

### UNIT – IV

Multithreaded Programming: Introduction – Creating Threads – Extending the Thread class – Stopping and Blocking a Thread - Life cycle of a Thread – Using Thread Methods – Thread Exceptions – Thread Priority – Implementing the Runnable Interface. Managing Errors and Exceptions: Introduction – Types of Errors – Exceptions – Syntax of Exception Handling Code – Multiple Catch Statements – Using Finally Statement – Throwing Our Own Exceptions. Applet Programming: Introduction – Difference Between Applets and Applications – Write Applets – Building Applet Code – Applet Life Cycle – Creating an Executable Applet – Designing a Web Page – Applet Tag – Adding Applet to HTML File – Running the applet – Applet Tags – Passing Parameters to Applets – Aligning the Display – Displaying Numerical Values – Getting Input from the User – Event Handling.

### UNIT – V

Graphics Programming: Introduction – The Graphics Class - Lines and Rectangles – Circles and Ellipses – Drawing Arcs – Drawing polygons – Line Graphs – Using Control Loops in Applets – Drawing Bar Charts. Managing I/O Files in Java: Introduction – Concept of Stream – Stream Classes – Byte Stream Classes – Character Stream Classes.

### Text Book

1. E. Balagurusamy, “Programming with Java,” Tata McGraw Hill Pub. Ltd., New Delhi, 4th Edition, 2009.



### Reference Books

1. Herbert Schild, "Java: The Complete Reference," Ninth Edition, Oracle Press, 2014
2. Rohit Khurana, "Programming with JAVA", VIKAS Publisher., 2014

### Course Outcomes (COs)

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

| CO Number | CO Statement  | Knowledge Level |
|-----------|---|-----------------|
| CO1       | Understand the need of object oriented programming, fundamental concepts. | K1 & K2         |
| CO2       | Implement relationships between classes.                                  | K2 & K3         |
| CO3       | Apply concepts for various programming applications.                      | K3, K4 & K5     |
| CO4       | Implement applets for GUI concepts.                                       | K4, K5 & K6     |
| CO5       | Developed skills in graphics programming.                                 | K4, K5 & K6     |

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

### Mapping of COs with POs

| PO \ CO | PO1 | PO2 | PO3 | PO4 | PO5 |
|---------|-----|-----|-----|-----|-----|
| CO1     | S   | S   | S   | M   | S   |
| CO2     | M   | M   | S   | M   | S   |
| CO3     | S   | S   | S   | S   | S   |
| CO4     | S   | S   | S   | S   | S   |
| CO5     | S   | S   | S   | S   | S   |

S – Strong

M – Medium

L – Low



**Program: Bachelor of Computer Applications (BCA)**

|                             |                   |                               |                |   |  |
|-----------------------------|-------------------|-------------------------------|----------------|---|--|
| <b>Core Practical – VII</b> |                   | <b>Course Code: 20UCA5P07</b> |                | <b>Course Title: Java Programming Lab</b> |  |
| <b>Semester</b>             | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                        |  |
| V                           | 3                 | 45                            | 2              | 100                                       |  |

**Course Objectives**

1. To understand the nature of Java programming.
2. To describe the core syntax and semantics of Java programming language.
3. To understand Object oriented concepts like data abstraction, encapsulation, etc.
4. To solve the real world scenarios using top down approach.
5. To understand various Java programming constructs.

**Practical Lists**

1. Write a program to find the Area of Square, Rectangle and Circle using Method Overloading.
2. Write a program to sort the list of numbers using Command Line Arguments.
3. Write a program to multiply the given two matrices.
4. Write a program to design a class to represent a bank account. Include the following:  
Data Members: Name of the depositor, Account number, Type of account, and Balance amount in the account.  
Methods: To assign initial values, To deposit an amount, To withdraw an amount after checking balance, and To display the name and balance.
5. Write a program that import the user defined package and access the Member variable of classes that contained by Package.
6. Write a program to handle the Exception using try and multiple catch blocks.
7. Write a program to illustrate the use of multi threads.
8. Write a program to create student registration form using applet with Name, Address, Sex, Class, Email-id.
9. Write a program to draw the line, rectangle, oval, text using the graphics method.



10. Write a program to create a sequential file that could store details about five products. Details include product code, cost, and number of items available and are provided through the keyboard. Compute and print the total value of all the five products.

### Course Outcomes (COs)

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

| CO Number | CO Statement  | Knowledge Level |
|-----------|---|-----------------|
| CO1       | Understand the need of object oriented programming, fundamental concepts. | K1 & K2         |
| CO2       | Implement relationships between classes.                                  | K2 & K3         |
| CO3       | Apply concepts for various programming applications.                      | K3, K4 & K5     |
| CO4       | Implement applets for GUI concepts.                                       | K4, K5 & K6     |
| CO5       | Developed skills in graphics programming.                                 | K4, K5 & K6     |

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

### Mapping of COs with POs

| PO \ CO | PO1 | PO2 | PO3 | PO4 | PO5 |
|---------|-----|-----|-----|-----|-----|
| CO1     | S   | S   | S   | M   | S   |
| CO2     | M   | M   | S   | M   | S   |
| CO3     | S   | S   | S   | S   | S   |
| CO4     | S   | S   | S   | S   | S   |
| CO5     | S   | S   | S   | S   | S   |

S – Strong

M – Medium

L – Low





| <b>Program: Bachelor of Computer Applications (BCA)</b> |                   |                               |                |  |
|---|-------------------|-------------------------------|----------------|--|
| <b>Core – XII</b>                                       |                   | <b>Course Code: 20UCA5C12</b> |                | <b>Course Title: LINUX &amp; Shell Programming</b> |
| <b>Semester</b>   | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                                 |
| V   | 5                 | 75                            | 4              | 100  |

### Course Objectives

1. To understand about Linux and Unix OS.
2. To learn about comparison and working of shell.
3. To impart knowledge about the text filtering tools, arrays and logical operators
4. To implement the functions, decision making and repetitive tasks
5. To know about the file handling and sort commands

### **UNIT – I**

Introduction to Linux: Operating System and Linux – History of Linux and UNIX – Linux Overview – Linux Distributions – VI Editors.

### **UNIT – II**

Shell – Comparison of Shells – Working in the Shell – Learning Basic Commands – Compiler and Interpreter Differences – Various Directories – Drilling Deep into Process Management, Job Control and Automation.

### **UNIT – III**

Text Processing – Text Filtering Tools – Working with Commands – Logical Operators – Local Variables and its Scope – Working with Arrays.

### **UNIT – IV**

Tricks with Shell Scripting – Interactive Shell Scripts – The Here Document and << Operator – Sort Command – WC Command – File Handling – Debugging.

**UNIT – V**

Automating Decision – Making in Scripts – Automating Repetitive Tasks – Working with Functions.

**Text Books**

1. Richard L. Petersen, “The Complete Reference LINUX”, McGraw Hill, 6<sup>th</sup> Edition 2008.
2. Ganesh Naik, “LINUX Shell Scripting”, Packt Publishing Ltd, 2<sup>nd</sup> Edition, 2018.

**Course Outcomes (COs)**

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

| CO Number | CO Statement   | Knowledge Level |
|-----------|--|-----------------|
| CO1       | Understanding the concepts of control structures in programming.   | K1              |
| CO2       | Implementing the concepts of file operation in programming.  | K1, K2 & K3     |
| CO3       | Acquired concepts of Linux operating system, its kernel and different subsystems of kernel, types of shells. | K3 & K4         |
| CO4       | Execute various types of commands and standard shell.  | K4 & K5         |
| CO5       | Implement shell scripts using this editor involving decision control, looping and control flow statements.   | K5 & K6         |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**

**Mapping of COs with POs**

| PO \ CO | PO1 | PO2 | PO3 | PO4 | PO5 |
|---------|-----|-----|-----|-----|-----|
| CO1     | S   | M   | S   | S   | S   |
| CO2     | S   | S   | S   | M   | S   |
| CO3     | S   | S   | S   | S   | S   |
| CO4     | M   | S   | S   | M   | S   |
| CO5     | M   | S   | S   | S   | M   |

**S – Strong**

**M – Medium**

**L – Low**



**Program: Bachelor of Computer Applications (BCA)**

|                              |                   |                               |                |  |  |
|------------------------------|-------------------|-------------------------------|----------------|--|--|
| <b>Core Practical – VIII</b> |                   | <b>Course Code: 20UCA5P08</b> |                | <b>Course Title: LINUX &amp; Shell Programming Lab</b> |  |
| <b>Semester</b>              | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                                     |  |
| V                            | 3                 | 45                            | 2              | 100  |  |

**Course Objectives**

1. To understand about Linux and Unix OS.
2. To learn about comparison and working of shell.
3. To impart knowledge about the text filtering tools, arrays and logical operators.
4. To implement the functions, decision making and repetitive tasks.
5. To know about the file handling and sort commands.

**List of Programs**

1. Write a shell script to stimulate the file commands: rm, cp, cat, mv, cmp, wc, split, diff.
2. Write a shell script to show the following system configuration:
  - a. Currently logged user and his log name.
  - b. Current shell, home directory, Operating System type, current Path setting, current working directory.
  - c. show currently logged number of users, show all available shells.
  - d. show CPU information like processor type, speed.
  - e. Show memory information.
3. Write a Shell Script to implement the following: pipes, Redirection and tee commands.
4. Write a shell script for displaying current date, user name, file listing and directories by getting user choice.
5. Write a shell script to implement the filter commands.
6. Write a shell script to remove the files which has file size as zero bytes.
7. Write a shell script to find the sum of the individual digits of a given number.
8. Write a shell script to find the greatest among the given set of numbers using command line arguments.



9. Write a shell script for palindrome checking.
10. Write a shell script to print the multiplication table of the given argument using for-loop.

### Course Outcomes (COs)

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

| CO Number | CO Statement   | Knowledge Level |
|-----------|--|-----------------|
| CO1       | Understanding the concepts of control structures in programming.   | K1              |
| CO2       | Implementing the concepts of file operation in programming.  | K1, K2 & K3     |
| CO3       | Acquired concepts of Linux operating system, its kernel and different subsystems of kernel, types of shells. | K3 & K4         |
| CO4       | Execute various types of commands and standard shell.  | K4 & K5         |
| CO5       | Implement shell scripts using this editor involving decision control, looping and control flow statements.   | K5 & K6         |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**

### Mapping of COs with POs

| PO \ CO | PO1 | PO2 | PO3 | PO4 | PO5 |
|---------|-----|-----|-----|-----|-----|
| CO1     | S   | M   | S   | S   | S   |
| CO2     | S   | S   | S   | M   | S   |
| CO3     | S   | S   | S   | S   | S   |
| CO4     | M   | S   | S   | M   | S   |
| CO5     | M   | S   | S   | S   | M   |

**S – Strong**

**M – Medium**

**L – Low**



| <b>Program: Bachelor of Computer Applications (BCA)</b> |                   |                               |                |  |
|---|-------------------|-------------------------------|----------------|--|
| <b>Core – XIII</b>                                      |                   | <b>Course Code: 20UCA5C13</b> |                | <b>Course Title: Computer Networks</b> |
| <b>Semester</b>   | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                     |
| V   | 6                 | 90                            | 4              | 100                                    |

### Course Objectives

1. To deal with basic ideas of networking domain.
2. To understand the principles and concepts on computer networks.
3. To describe the various communication networks and their main components.
4. To identify some of the factors driving the need for network security.

#### **UNIT – I**

Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP Models – Example Networks: Internet, 3G Mobile Phone Networks, Wireless LANs – RFID and Sensor Networks – Physical Layer – Theoretical Basis for Data Communication – Guided Transmission Media.

#### **UNIT – II**

Wireless Transmission – Communication Satellites – Digital Modulation and Multiplexing – Telephones Network Structure – Local Loop, Trunks and Multiplexing, Switching. Data Link Layer: Design Issues – Error Detection and Correction.

#### **UNIT – III**

Elementary Data Link Protocols – Sliding Window Protocols – Example Data Link Protocols – Packet Over SONET, ADSL – Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols.

**UNIT – IV**

Network Layer – Design Issues – Routing Algorithms – Congestion Control Algorithms – Quality of Service – Network Layer of Internet – IP Protocol – IP Address – Internet Control Protocol.

**UNIT – V**

Transport Layer – Transport Service – Elements of Transport Protocol – Addressing, Establishing & Releasing a Connection – Error Control, Flow Control, Multiplexing and Crash Recovery – Internet Transport Protocol – TCP – Network Security: Cryptography.

**Textbook**

1. A. S. Tanenbaum, “Computer Networks”, Pearson Education, 5<sup>th</sup> Edition, 2011

**Reference Books**

1. B. Forouzan, “Introduction to Data Communications in Networking”, Tata McGraw Hill, New Delhi, 1998,
2. F. Halsall, “Data Communications, Computer Networks and Open Systems”, Addison Wesley, 1995.
3. D. Bertsekas and R. Gallager, “Data Networks”, Prentice Hall of India, New Delhi, 1992.
4. Lamarca, “Communication Networks”, Tata McGraw Hill, New Delhi, 2002.

**Course Outcomes (COs)**

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

| CO Number | CO Statement  | Knowledge Level |
|-----------|---|-----------------|
| CO1       | Visualize the different aspects of networks, protocols and network design models. | K1 & K2         |
| CO2       | Examine various layer design issues protocols.                                    | K1 & K2         |
| CO3       | Analyze and compare different LAN protocols.                                      | K2 & K3         |
| CO4       | Compare and select appropriate routing algorithms for a network.                  | K4 & K5         |
| CO5       | Compare and select appropriate routing algorithms for a network applets.          | K4 & K5         |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**



**Mapping of COs with POs**

| <b>PO</b><br><b>CO</b> | <b>PO1</b> | <b>PO2</b> | <b>PO3</b> | <b>PO4</b> | <b>PO5</b> |
|------------------------|------------|------------|------------|------------|------------|
| <b>CO1</b>             | M          | M          | S          | S          | S          |
| <b>CO2</b>             | S          | S          | S          | S          | S          |
| <b>CO3</b>             | M          | M          | S          | S          | S          |
| <b>CO4</b>             | M          | S          | S          | M          | S          |
| <b>CO5</b>             | M          | S          | S          | S          | S          |

**S – Strong**

**M – Medium**

**L – Low**



| <b>Program: Bachelor of Computer Applications (BCA)</b> |                   |                               |                |  |
|---|-------------------|-------------------------------|----------------|--|
| <b>Core – XIV</b>                                       |                   | <b>Course Code: 20UCA6C14</b> |                | <b>Course Title: PHP<br/>withMySQL</b> |
| <b>Semester</b>   | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                     |
| VI  | 5                 | 75                            | 4              | 100                                    |

### Course Objectives

1. To understand basics of PHP.
2. To elaborate the core syntax of PHP Language.
3. To make the students to get practical knowledge of PHP with MYSQL lab.

#### **UNIT – I**

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

#### **UNIT – II**

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

#### **UNIT – III**

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

#### **UNIT – IV**

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



**UNIT – V**

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

**Text Book**

1. Vikram VASWANI, “PHP A Beginner's Guide”, Tata McGraw-Hill, 2008.

**Reference Books**

1. Steven Holzner. “The PHP Complete Reference”, Tata McGraw-Hill, 2007.
2. Steven Holzer, “Spring into PHP5”, Tata McGraw Hill Edition, 2011.

**Course Outcomes (COs)**

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

| <b>CO Number</b> | <b>CO Statement</b>   | <b>Knowledge Level</b> |
|------------------|---|------------------------|
| <b>CO1</b>       | Create small programs using basic PHP concepts.                                     | K1 & K2                |
| <b>CO2</b>       | Apply In-Built and Create User defined functions in PHP programming.                | K2 & K3                |
| <b>CO3</b>       | Design and develop a Web site using form controls for presenting web based content. | K3 & K4                |
| <b>CO4</b>       | Debug the Programs by applying concepts and error handling techniques of PHP.       | K3, K4 & K5            |
| <b>CO5</b>       | Create dynamic Website/ Web based Applications, using PHP, MySQL database.          | K5 & K6                |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**



**Mapping of COs with POs**

| <b>PO</b><br><b>CO</b> | <b>PO1</b> | <b>PO2</b> | <b>PO3</b> | <b>PO4</b> | <b>PO5</b> |
|------------------------|------------|------------|------------|------------|------------|
| <b>CO1</b>             | S          | S          | S          | S          | S          |
| <b>CO2</b>             | S          | M          | S          | S          | S          |
| <b>CO3</b>             | S          | M          | S          | S          | S          |
| <b>CO4</b>             | M          | M          | S          | S          | S          |
| <b>CO5</b>             | S          | S          | S          | S          | S          |

**S – Strong**

**M – Medium**

**L – Low**



| <b>Program: Bachelor of Computer Applications (BCA)</b> |                   |                               |                |   |
|---|-------------------|-------------------------------|----------------|---|
| <b>Core Practical – IX</b>                              |                   | <b>Course Code: 20UCA6P09</b> |                | <b>Course Title: PHP with MySQL Lab</b> |
| <b>Semester</b>   | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                      |
| VI  | 3                 | 45                            | 2              | 100                                     |

### Course Objectives

1. To learn PHP fundamentals.
2. To train the students for the basics of coding and executing PHP language.
3. To understand web development programme.
4. To learn apply network function and cookies with sessions.

### **List of Programs**

1. Create a simple HTML form and accept the user name and display the name through PHP echo statement.
2. Write a PHP script to redirect a user to a different page.
3. Write a PHP function to test whether a number is greater than 30, 20 or 10 using ternary operator.
4. Create a PHP script which display the capital and country name from the given array. Sort the list by the name of the country.
5. Write a PHP script to calculate and display average temperature, five lowest and highest temperatures.
6. Create a script using a for loop to add all the integers between 0 and 30 and display the total.
7. Write a PHP script using nested for loop that creates a chess board.
8. Write a PHP function that checks if a string is all lower case.
9. Write a PHP script to calculate the difference between two dates.
10. Write a PHP script to display time in a specified time zone.



### Course Outcomes (COs)

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

| CO Number | CO Statement  | Knowledge Level |
|-----------|---|-----------------|
| CO1       | Understand and describe PHP with MYSQL program.         | K1 & K2         |
| CO2       | Acquire the knowledge of PHP Syntax with/ without HTML. | K2 & K3         |
| CO3       | Gain the knowledge to set cookies and sessions.         | K2, K3          |
| CO4       | Connect various databases especially with MYSQL.        | K3, K4 & K5     |
| CO5       | Develop their own web application.                      | K5 & K6         |

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

### Mapping of COs with POs

| PO \ CO | PO1 | PO2 | PO3 | PO4 | PO5 |
|---------|-----|-----|-----|-----|-----|
| CO1     | S   | M   | S   | S   | S   |
| CO2     | S   | S   | S   | S   | S   |
| CO3     | M   | M   | S   | S   | S   |
| CO4     | M   | M   | S   | S   | S   |
| CO5     | S   | S   | S   | S   | S   |

S – Strong

M – Medium

L – Low



| <b>Program: Bachelor of Computer Applications (BCA)</b> |                   |                               |                |                                       |
|---|-------------------|-------------------------------|----------------|---------------------------------------|
| <b>Core – XV</b>  |                   | <b>Course Code: 20UCA6C15</b> |                | <b>Course Title: Mobile Computing</b> |
| <b>Semester</b>   | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                    |
| VI  | 5                 | 75                            | 4              | 100                                   |

### Course Objectives

1. To learn the basic concepts of mobile computing and its applications.
2. To provide various emerging technologies in Mobile computing services.
3. To gain knowledge about telecommunication systems.
4. To understand various mobile network layers.

### **UNIT – I**

Introduction – Mobile and Wireless Devices – Simplified Reference Model – Need for Mobile Computing – Wireless Transmissions – Multiplexing – Spread Spectrum and Cellular Systems – Medium Access Control – Comparisons.

### **UNIT – II**

Telecommunication Systems – GSM – Architecture – Sessions – Protocols – Hand Over and Security – UMTS and IMT – 2000 – Satellite Systems.

### **UNIT – III**

Wireless Lan – IEEE S02.11 – Hiper LAN – Bluetooth – Security and Link Management.

### **UNIT – IV**

Mobile Network Layer – Mobile IP – Goals – Packet Delivery – Strategies – Registration – Tunneling and Reverse Tunneling – Adhoc Networks – Routing Strategies

**UNIT – V**

Mobile Transport Layer – Congestion Control – Implication of TCP Improvement – Mobility – Indirect – Snooping – Mobile – Transaction Oriented TCP – TCP Over Wireless – Performance.

**Text Book**

1. J. Schiller, “Mobile Communications”, Pearson Education, Delhi, 2<sup>nd</sup> Edition, 2003.

**Reference Books**

1. Hansmann, Merk, Nicklous, Stober, “Principles of Mobile Computing”, Springer (India), 2<sup>nd</sup> Edition, 2004.
2. Pahlavan, Krishnamurthy, “Principle of wireless Networks: A unified Approach”, Pearson Education, Delhi, 2003.
3. Martyn Mallick, “Mobile and Wireless Design Essentials”, Wiley Dreamtech India Pvt. Ltd., New Delhi, 2004.

**Course Outcomes (COs)**

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

| CO Number | CO Statement  | Knowledge Level |
|-----------|---|-----------------|
| CO1       | Understand the fundamentals of mobile computing.  | K1 & K2         |
| CO2       | Analyze the unique characteristics in mobile communication.   | K2, K3 & K4     |
| CO3       | Compare and contrast multiple division techniques, mobile communication systems and existing wireless networks. | K3 & K4         |
| CO4       | Demonstrate the basic skills for cellular network design.   | K4 & K5         |
| CO5       | Apply knowledge of TCP/IP extensions for mobile and wireless networking.  | K4, K5 & K6     |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**



**Mapping of COs with POs**

| PO<br>CO   | PO1 | PO2 | PO3 | PO4 | PO5 |
|------------|-----|-----|-----|-----|-----|
| <b>CO1</b> | S   | M   | S   | S   | S   |
| <b>CO2</b> | M   | M   | S   | S   | S   |
| <b>CO3</b> | M   | M   | S   | S   | S   |
| <b>CO4</b> | S   | M   | S   | S   | S   |
| <b>CO5</b> | S   | S   | S   | S   | S   |

**S – Strong**

**M – Medium**

**L – Low**



| <b>Program: Bachelor of Computer Applications (BCA)</b> |                   |                               |                |  |
|---|-------------------|-------------------------------|----------------|--|
| <b>Core – XVI</b>                                       |                   | <b>Course Code: 20UCA6C16</b> |                | <b>Course Title: Computer Graphics</b> |
| <b>Semester</b>   | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                     |
| VI  | 5                 | 75                            | 4              | 100                                    |

### Course Objectives

1. To interpret the mathematical foundation of the concepts of computer graphics.
2. To describe the fundamentals of animation.
3. To understand a typical graphics pipeline.
4. To apply graphics programming techniques to design and create computer graphics.

### **UNIT – I**

Introduction to Graphic Devices – Picture Representation, Display Devices, Display Adapters, Types of Printers, Plotters & Input Devices

### **UNIT – II**

Transformations – Basic 2D & 3D Transformations – Translation, Scaling, Rotation, Reflection, Shearing, Multiple Transformations, Rotation About an Axis Parallel to a Coordinate Axis, Rotation About an Arbitrary Axis in Space, Affine and Perspective Geometry, Orthographic Projections and Axonometric Projections

### **UNIT – III**

Raster Scan Graphics – Bresenham's Line and Circle Drawing Algorithms, Scan Conversion, RLE, Frame Buffer, Scan Converting Polygons – Edge Fill and Seed Fill Algorithms, Anti-Aliasing and Half Toning

### **UNIT – IV**

Clipping and Display File Compilation – Sutherland – Cohen Line Clipping Algorithm, Windowing and Viewporting – Segmented Display File, Structure and Compilation – Hidden





Surface and Hidden Line Removal – Backface Removal Algorithm, Z- Buffer, Warnock Algorithm, Hidden Line Elimination.

### UNIT – V

Plane Curves and Space Curves – Curve Representation, Nonparametric and Parametric Curves, Representation of Space Curves, Cubic Spline, Parabolic Blended Curves, Bezier Curves and B-Spline Curves.

#### Text Books

1. D.F. Rogers, J.A. Adams, “Mathematical elements for Computer Graphics”, Tata McGraw-Hill, New Delhi, 2<sup>nd</sup> Edition, 2002.
2. D.F. Rogers, “Procedural elements for Computer Graphics”, Tata McGraw-Hill, New Delhi, 2<sup>nd</sup> Edition, 2001.

#### Reference Books

1. W.M. Neumann and R.F. Sproull, “Principles of Interactive Computer Graphics”, Tata McGraw-Hill, New Delhi
2. D. Hearn and M. P. Baker, “Computer Graphics (C Version)”, Pearson Education, 2<sup>nd</sup> Edition, 2004.

### Course Outcomes (COs)

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

| CO Number | CO Statement  | Knowledge Level |
|-----------|---|-----------------|
| CO1       | Formulate the design process and principles.                      | K1 & K2         |
| CO2       | Assimilate the graphics and their transformations.                | K1, K2 & K3     |
| CO3       | Generate primitives and interactive graphics.                     | K2, K3 & K4     |
| CO4       | Work with the concepts of graphics packages and geometric models. | K4 & K5         |
| CO5       | Create applications and design the three dimensional graphics.    | K6              |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**



**Mapping of COs with POs**

| <b>PO</b><br><b>CO</b> | <b>PO1</b> | <b>PO2</b> | <b>PO3</b> | <b>PO4</b> | <b>PO5</b> |
|------------------------|------------|------------|------------|------------|------------|
| <b>CO1</b>             | S          | M          | S          | S          | S          |
| <b>CO2</b>             | M          | M          | S          | S          | S          |
| <b>CO3</b>             | S          | M          | S          | S          | S          |
| <b>CO4</b>             | S          | S          | S          | S          | S          |
| <b>CO5</b>             | M          | M          | S          | S          | S          |

**S – Strong**

**M – Medium**

**L – Low**



**Program: Bachelor of Computer Applications (BCA)**

|                 |                   |                               |                |                              |  |
|-----------------|-------------------|-------------------------------|----------------|------------------------------|--|
| <b>Project</b>  |                   | <b>Course Code: 20UCA6PR1</b> |                | <b>Course Title: Project</b> |  |
| <b>Semester</b> | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>           |  |
| VI              | 4                 | 60                            | 5              | 100                          |  |

**Course Objectives**

1. To implement the concepts of SDLC.
2. To experience development of real time applications.
3. To practice the students rapid application development.

**Course Outcomes (COs)**

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

| <b>CO Number</b> | <b>CO Statement</b>   | <b>Knowledge Level</b> |
|------------------|---|------------------------|
| <b>CO1</b>       | Develop knowledge in Software project.                                  | K1                     |
| <b>CO2</b>       | Understand the concept and challenges in Software Project Management    | K1                     |
| <b>CO3</b>       | To analyses the issues in developing applications.                      | K2                     |
| <b>CO4</b>       | Gain hands-on experience on systematic approach in project development. | K3                     |
| <b>CO5</b>       | Can experience the bottlenecks of various languages and solve it.       | K4                     |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**

**Mapping of COs with POs**

| <b>PO \ CO</b> | <b>PO1</b> | <b>PO2</b> | <b>PO3</b> | <b>PO4</b> | <b>PO5</b> |
|----------------|------------|------------|------------|------------|------------|
| <b>CO1</b>     | M          | M          | M          | S          | S          |
| <b>CO2</b>     | S          | M          | S          | S          | S          |
| <b>CO3</b>     | S          | S          | S          | M          | S          |
| <b>CO4</b>     | S          | S          | S          | S          | S          |
| <b>CO5</b>     | S          | S          | S          | S          | S          |

**S – Strong**

**M – Medium**

**L – Low**



# ELECTIVE COURSES



| <b>Program: Bachelor of Computer Applications (BCA)</b> |                   |                               |                |                                     |
|---|-------------------|-------------------------------|----------------|-------------------------------------|
| <b>Elective – I</b>                                     |                   | <b>Course Code: 20UCA5E01</b> |                | <b>Course Title: Cyber Security</b> |
| <b>Semester</b>   | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                  |
| V   | 6                 | 90                            | 5              | 100                                 |

### Course Objectives

1. To know about cost of security and Ransom ware.
2. To understand the configuration and security challengers.
3. To educate the dark side of computer's.
4. To protect from outside attacks and how to use the networks safely.

### **UNIT – I**

Cyber Security: Steps for a Secure Cloud, Azure Security Center Cost Model: Shared Cost Model – License Cost of Security Center – Azure Cost of Data Storage – Other Considerations – Enterprise Security Architecture – Ransomware Lessons Learned.

### **UNIT – II**

Cloud Security Operations: Cloud Security Challenges – Security Center Overview – Security Center Placement – Select an Azure Subscription. Azure Security Center Configuration: Azure Infrastructure Design – Standard Tier Advantages – Using Security Center.

### **UNIT – III**

Dark Side of the Computer: Viruses, Trojans, and Attacks – Vulnerabilities, Risk Assessment, and Risk Management – Emerging Field of Cyber Security.

### **UNIT – IV**

Internet, Social Media, and Cyber Attacks on Critical Infrastructures – Cyber Threat Spectrum – Cyberspace Attacks and Weapons.

**UNIT – V**

Basics of Critical Infrastructure Protection – Random Nature of Faults, Failures, and Engineering – In the Presence of Attackers – Issues of Time and Sequence – Economic Impact on Regulation and Duties to Protect – Critical Infrastructure Protection Strategies and Operations – Protection Design Goals and Duties to Protect.

**Text Books**

1. Marshall Copeland, “Cyber Security on Azure\_ An IT Professional’s Guide to Microsoft Azure Security Center”, Apress, 1<sup>st</sup> Edition, 2017.
2. Taylor & Francis Group edited “Cyber-security Protecting Critical Infrastructures from Cyber Attack and Cyber Warfare”, CRC Press, 2015.

**Course Outcomes (COs)**

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

| <b>CO Number</b> | <b>CO Statement</b>   | <b>Knowledge Level</b> |
|------------------|---|------------------------|
| <b>CO1</b>       | Know about the security issues in the real world.                       | K1                     |
| <b>CO2</b>       | Prevent from attacks and cost management.                               | K1 & K2                |
| <b>CO3</b>       | Identify the threads and risk management.                               | K2 & K3                |
| <b>CO4</b>       | Know of internet, social media and cyber-attacks and how they reach us. | K4 & K5                |
| <b>CO5</b>       | Apply appropriate strategies to protect from attacks.                   | K5 & K6                |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**



**Mapping of COs with POs**

| <b>PO</b><br><b>CO</b> | <b>PO1</b> | <b>PO2</b> | <b>PO3</b> | <b>PO4</b> | <b>PO5</b> |
|------------------------|------------|------------|------------|------------|------------|
| <b>CO1</b>             | M          | M          | S          | S          | S          |
| <b>CO2</b>             | M          | M          | S          | S          | S          |
| <b>CO3</b>             | M          | M          | S          | S          | S          |
| <b>CO4</b>             | S          | M          | S          | S          | S          |
| <b>CO5</b>             | S          | S          | S          | S          | S          |

**S – Strong**

**M – Medium**

**L – Low**



| <b>Program: Bachelor of Computer Applications (BCA)</b> |                   |                               |                |  |
|---|-------------------|-------------------------------|----------------|--|
| <b>Elective – I</b>                                     |                   | <b>Course Code: 20UCA5E02</b> |                | <b>Course Title: Artificial Intelligence</b> |
| <b>Semester</b>   | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                           |
| V   | 6                 | 90                            | 5              | 100  |

### Course Objectives

1. To provide a strong foundation of fundamental concepts in Artificial Intelligence.
2. To provide a basic exposition to the goals and methods of Artificial Intelligence.
3. To develop a basic understanding of the building blocks of AI as presented in terms of intelligent agents.
4. To enable the student to apply these techniques in applications which involve perception, reasoning and learning.

### **UNIT – I**

Overview of Artificial Intelligence – Introduction – History of AI – Application of AI – Objectives of AI – Future of AI - Symbolic Logic: Normal Forms in Propositional Logic – Logical Consequences – Resolution Principal – Predicate Calculus – Well Formed Formulas – Clausal Form – Rules of Inference – Unification – Resolution – Rule-Based Expert Systems.

### **UNIT – II**

Knowledge Acquisition and Representation: Knowledge Engineering – Producer for Knowledge Acquisition – Knowledge Representation – Network Representation Schemes Reasoning and (KRR) Systems – Reasoning – Knowledge Representation and Reasoning (KRR) System – Knowledge Representation Languages – Domain Modeling – Semantic Nets (Association Network) Reasoning System.

### **UNIT – III**

Uncertainty: Introduction – Non-Monotonic and Monotonic Reasoning – Confidence Factor – Bayes Theorem – Dempster and Shafer's Theory of Evidence – Non Classical Logics Search





Techniques – Problem Representation – Problem Solving In AI – Blind Search Techniques – Heuristic Search Techniques – Game Searches.

#### UNIT – IV

AI Technologies – Computer Vision – Natural Languages Processing – Speech Recognition Expert Systems: Introduction – Basic Character of an Expert System – Knowledge Engineering – Inferencing – Expert System Tools – Applications.

#### UNIT – V

Natural Network: Introduction – Difference Between Human and Machine Intelligence – Features of Biological Neural Network – Human Neurons to Artificial Neurons – Learning Algorithms – Difference Network Architectures and Their Applications – Comparisons of Neural Networks and Rule Based Methods – Comparisons of Neural Networks and Expert System – Benefits of Neural Computing – Limitations of Neural Computing.

#### Text Book

1. Rajendra Akerkar, “Introduction to Artificial Intelligence”, PHI, 2<sup>nd</sup> Edition, 2014.

#### Course Outcomes (COs)

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

| CO Number | CO Statement  | Knowledge Level |
|-----------|---|-----------------|
| CO1       | Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.   | K1 & K2         |
| CO2       | Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models. | K2 & K3         |
| CO3       | Demonstrate an ability to share in discussions of AI, its current scope and limitations, and societal implications.   | K2, K3 & K4     |
| CO4       | Demonstrate proficiency in applying scientific method to models of machine learning.  | K4 & K5         |
| CO5       | Design a knowledge based system.  | K5 & K6         |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**



**Mapping of COs with POs**

| <b>PO</b><br><b>CO</b> | <b>PO1</b> | <b>PO2</b> | <b>PO3</b> | <b>PO4</b> | <b>PO5</b> |
|------------------------|------------|------------|------------|------------|------------|
| <b>CO1</b>             | S          | M          | S          | S          | S          |
| <b>CO2</b>             | S          | S          | M          | S          | S          |
| <b>CO3</b>             | M          | S          | S          | S          | S          |
| <b>CO4</b>             | M          | M          | S          | S          | S          |
| <b>CO5</b>             | S          | M          | S          | S          | S          |

**S – Strong**

**M – Medium**

**L – Low**



| <b>Program: Bachelor of Computer Applications (BCA)</b> |                   |                               |                |  |
|---|-------------------|-------------------------------|----------------|--|
| <b>Elective – I</b>                                     |                   | <b>Course Code: 20UCA5E03</b> |                | <b>Course Title: E-Commerce Technologies</b> |
| <b>Semester</b>   | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                           |
| V   | 6                 | 90                            | 5              | 100  |

### Course Objectives

1. To provide an introduction to information systems for business and management.
2. Designed to familiarize students with organizational and managerial foundations of systems, the technical foundation for understanding information systems.

#### **UNIT – I**

History of E-Commerce and Indian Business Context: E-Commerce – Emergence of the Internet – Emergence of the WWW – Advantages of E-Commerce – Transition to E-Commerce in India – The Internet and India – E-transition Challenges for Indian Corporate. Business Models for E-commerce: Business Model – E-business Models Based on the Relationship of Transaction Parties – E-business Models Based on the Relationship of Transaction Types.

#### **UNIT – II**

Enabling Technologies of the World Wide Web: World Wide Web – Internet Client -Server Applications – Networks and Internets – Software Agents – Internet Standards and Specifications – ISP. E-Marketing: Traditional Marketing – Identifying Web Presence Goals – Online Marketing – E-advertising – Ebranding.

#### **UNIT – III**

E-Security: Information system Security – Security on the Internet – E-business Risk Management Issues – Information Security Environment in India. Legal and Ethical Issues: Cyberstalking – Privacy is at Risk in the Internet Age – Phishing – Application Fraud – Skimming – Copyright – Internet Gambling – Threats to Children.

**UNIT – IV**

e-Payment Systems: Main Concerns in Internet Banking – Digital Payment Requirements – Digital Token-based e-payment Systems – Classification of New Payment Systems – Properties of Electronic Cash – Risk and e-Payment Systems – Designing E-Payment Systems – Digital Signature – Online Financial Services in India – Online Stock Trading.

**UNIT – V**

Information Systems for Mobile Commerce: What is Mobile Commerce? – Wireless Applications – Cellular Network – Wireless Spectrum – Technologies for Mobile Commerce – Wireless Technologies – Different Generations in Wireless Communication – Security Issues Pertaining to Cellular Technology. Portals for E-Business: Portals – Human Resource Management – Various HRIS Modules.

**Text Book**

1. P.T. Joseph, “E-Commerce - An Indian Perspective”, PHI, 4th Edition, 2012.

**Reference Book**

1. David Whiteley, “E-Commerce Strategy, Technologies and Applications”, Tata Mc-Graw-Hill, 2001.



### Course Outcomes (COs)

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

| CO Number | CO Statement  | Knowledge Level |
|-----------|---|-----------------|
| CO1       | Understand the basic concepts and technologies used in the field of management information systems. | K1 & K2         |
| CO2       | Design components, systems and/or processes to meet required specifications for a web presence.     | K2 & K3         |
| CO3       | Communicate effectively in ways appropriate to the discipline, audience and purpose.                | K3              |
| CO4       | Have the knowledge of the different types of management information systems.                        | K4 & K5         |
| CO5       | Understand the processes of developing and implementing information systems.                        | K5 & K6         |

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

### Mapping of COs with POs

| PO \ CO | PO1 | PO2 | PO3 | PO4 | PO5 |
|---------|-----|-----|-----|-----|-----|
| CO1     | M   | M   | S   | S   | S   |
| CO2     | M   | M   | S   | S   | S   |
| CO3     | S   | M   | S   | S   | S   |
| CO4     | S   | S   | S   | S   | S   |
| CO5     | S   | M   | S   | S   | S   |

S – Strong

M – Medium

L – Low



**Program: Bachelor of Computer Applications (BCA)**

|                      |                   |                               |                |                                  |  |
|----------------------|-------------------|-------------------------------|----------------|----------------------------------|--|
| <b>Elective – II</b> |                   | <b>Course Code: 20UCA6E04</b> |                | <b>Course Title: Data Mining</b> |  |
| <b>Semester</b>      | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>               |  |
| VI                   | 5                 | 75                            | 5              | 100                              |  |

**Course Objectives**

1. To learn the basic concepts of Data Mining algorithms, methods and tools.
2. To Identify appropriate data mining algorithms to solve real world problems.
3. To develop and apply critical thinking, problem-solving, and decision-making skills.
4. To discover interesting patterns, analyze supervised and unsupervised models and estimate the accuracy of the algorithms.
5. To characterize the kinds of patterns that can be discovered by association rule mining, classification and clustering.

**UNIT – I**

Introduction: Data Mining Tasks – Data Mining Versus Knowledge Discovery in Databases – Relational Databases – Data Warehouses – Transactional Databases – Object Oriented Databases – Spatial Databases – Temporal Databases – Text and Multimedia Databases – Heterogeneous Databases – Mining Issues – Metrics – Social Implications of Data Mining.

**UNIT – II**

Data Preprocessing: Why Preprocess the Data – Data Cleaning – Data Integration – Data Transformation – Data Reduction – Data Discretization.

**UNIT – III**

Data Mining Techniques: Association Rule Mining – The Apriori Algorithm – Multilevel Association Rules – Multidimensional Association Rules – Constraint Based Association Mining.

**UNIT – IV**

Classification and Prediction: Issues regarding Classification and Prediction – Decision Tree induction – Bayesian Classification – Back Propagation – Classification Methods – Prediction – Classifiers accuracy.

**UNIT – V**

Clustering Techniques: Cluster Analysis – Clustering Methods – Hierarchical Methods – Density Based Methods – Outlier Analysis – Introduction to Advanced Topics: Web Mining, Spatial Mining and Temporal Mining.

**Text Book**

1. J. Han and M. Kamber, “Data Mining: Concepts and Techniques”, Morgan Kaufmann, New Delhi, 2001,

**Reference Books**

1. M.H. Dunham, “Data Mining: Introductory and Advanced Topics”, Pearson Education, Delhi, 2003,
2. Paulraj Ponnaiah, “Data Warehousing Fundamentals”, Wiley Publishers, 2001.
3. S.N. Sivananda and S. Sumathi, “Data Mining”, Thomsan Learning, Chennai, 2006.

**Course Outcomes (COs)**

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

| CO Number | CO Statement   | Knowledge Level |
|-----------|--|-----------------|
| CO1       | Understand the data mining principles and techniques.                  | K1 & K2         |
| CO2       | Learn the concept of raw data processing using data mining algorithms. | K1, K2 & K3     |
| CO3       | Learn data mining algorithms to build analytical applications.         | K2, K3 & K4     |
| CO4       | Gain information's to extract patterns and to solve problems.          | K3, K4 & K5     |
| CO5       | To cluster the high dimensional data for better organization.          | K5 & K6         |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**



**Mapping of COs with POs**

| PO<br>CO   | PO1 | PO2 | PO3 | PO4 | PO5 |
|------------|-----|-----|-----|-----|-----|
| <b>CO1</b> | S   | M   | S   | S   | S   |
| <b>CO2</b> | M   | M   | S   | S   | S   |
| <b>CO3</b> | S   | M   | S   | S   | S   |
| <b>CO4</b> | S   | S   | S   | S   | S   |
| <b>CO5</b> | S   | S   | S   | S   | S   |

**S – Strong**

**M – Medium**

**L – Low**





| <b>Program: Bachelor of Computer Applications (BCA)</b> |                   |                               |                |  |
|---|-------------------|-------------------------------|----------------|--|
| <b>Elective – II</b>                                    |                   | <b>Course Code: 20UCA6E05</b> |                | <b>Course Title: System Administration &amp; Maintenance</b> |
| <b>Semester</b>   | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>   |
| VI  | 5                 | 75                            | 5              | 100  |

### Course Objectives

1. Understand basic concept & structure of Computer Hardware & Networking Components.
2. Identify the existing configuration of the computers & peripherals.
3. Apply their knowledge about computer peripherals to identify/rectify problems on board.
4. Integrate the PC's into Local Area Network & re-install OS.

### **UNIT – I**

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

### **UNIT – II**

Computer Assembly: Open Case – Install Power Supply – Attach Components to Motherboard – Installation: Motherboard – Internal Drives – Drives in External Bays - Adapter Cards. Internal Cables Connections – Reattach Side Panels – Connection of External Cables – Boot the Computer. Preventive Maintenance and Troubleshooting: Purpose of Preventing Maintenance – Steps of Troubleshooting Process.

### **UNIT – III**

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

**UNIT – IV**

Fundamental Laptops and Portable Devices: Common Uses – Components of Laptop – Comparison of the Components of Desktop and Laptops – Configure Laptops – Mobile Phone Standards – Preventive Maintenance Techniques – Troubleshoot Laptop and Portable Devices. Fundamental Printers and Scanners: Types of Printers and Scanners – Installation and Configuration Process of Printers and Scanners – Preventive Maintenance Techniques – Troubleshoot.

**UNIT – V**

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

**Text book**

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

**Reference Book**

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



### Course Outcomes (COs)

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

| CO Number | CO Statement  | Knowledge Level |
|-----------|---|-----------------|
| CO1       | Visualize the different aspects of networks, protocols and network design models. | K1              |
| CO2       | Examine various layer design issues protocols.                                    | K1 & K2         |
| CO3       | Analyse and compare different LAN protocols.                                      | K3 & K4         |
| CO4       | Compare and select appropriate routing algorithms for a network.                  | K4 & K5         |
| CO5       | Compare and select appropriate routing algorithms for a network applets.          | K4 & K5         |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**

### Mapping of COs with POs

| PO \ CO | PO1 | PO2 | PO3 | PO4 | PO5 |
|---------|-----|-----|-----|-----|-----|
| CO1     | S   | S   | S   | S   | S   |
| CO2     | S   | M   | S   | S   | S   |
| CO3     | M   | M   | S   | S   | S   |
| CO4     | M   | M   | S   | S   | S   |
| CO5     | M   | M   | S   | S   | S   |

**S – Strong**

**M – Medium**

**L – Low**



| <b>Program: Bachelor of Computer Applications (BCA)</b> |                   |                               |                |                                       |
|---|-------------------|-------------------------------|----------------|---------------------------------------|
| <b>Elective – II</b>                                    |                   | <b>Course Code: 20UCA6E06</b> |                | <b>Course Title: Software Testing</b> |
| <b>Semester</b>   | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                    |
| VI  | 5                 | 75                            | 5              | 100                                   |

### Course Objectives

1. Understand testing process and types of bugs occurred.
2. Recognize flow and graphing methods.
3. Accomplished to domain and knowledge of interfaces.
4. Familiar with metrics and syntax of testing paths.
5. Know all the testing types and launches everything without bugs.

### **UNIT – I**

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

### **UNIT – II**

Flow / Graphs and Path Testing – Achievable Paths – Path Instrumentation – Application – Transaction Flow Testing Techniques.

### **UNIT – III**

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

### **UNIT – IV**

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

**UNIT – V**

Logic Based Testing – Decision Tables – Transition Testing – States, State Graph, State Testing.

**Text Books**

1. B. Beizer, “Software Testing Techniques”, DreamTech India, New Delhi, 2<sup>nd</sup> Edition, 2003.
2. K.V.K. Prasad, “Software Testing Tools”, DreamTech. India, New Delhi, 2005.

**Reference Books**

1. Burnstein, “Practical Software Testing”, Springer International Edn, 2003.
2. E. Kit, “Software Testing in the Real World: Improving the Process”, Pearson Education, Delhi, 1995.
3. R. Rajani, and P.P. Oak, “Software Testing”, Tata Mcgraw Hill, New Delhi, 2004.

**Course Outcomes (COs)**

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

| CO Number | CO Statement  | Knowledge Level |
|-----------|---|-----------------|
| CO1       | Be acquainted with testing and design style.  | K1 & K2         |
| CO2       | Rich knowledge on graphs, flow of testing and choosing best techniques for testing. | K1 & K2         |
| CO3       | Intelligence acquaintance domains and interfacing testing of any software.          | K3              |
| CO4       | Thorough in depth on any test cases they achieved by themselves.                    | K3, K4 & K5     |
| CO5       | Deal the bug and matching correct testing strategies for everything.                | K5 & K6         |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**

**Mapping of COs with POs**

| <b>PO</b><br><b>CO</b> | <b>PO1</b> | <b>PO2</b> | <b>PO3</b> | <b>PO4</b> | <b>PO5</b> |
|------------------------|------------|------------|------------|------------|------------|
| <b>CO1</b>             | M          | M          | S          | S          | S          |
| <b>CO2</b>             | S          | M          | S          | S          | S          |
| <b>CO3</b>             | S          | S          | S          | S          | S          |
| <b>CO4</b>             | M          | M          | S          | S          | S          |
| <b>CO5</b>             | S          | M          | S          | S          | S          |

**S – Strong****M – Medium****L – Low**



# Skill Based Elective Course (SBEC)



**Program: Bachelor of Computer Applications (BCA)**

|  |                        |                                |                     |  |  |
|--|------------------------|--------------------------------|---------------------|--|--|
| <b>Skill Based Elective<br/>Course – I</b> |                        | <b>Course Code: 20UCA2SP01</b> |                     | <b>Course Title: Office<br/>Automation Lab</b> |  |
| <b>Semester</b><br>II                      | <b>Hours/Week</b><br>2 | <b>Total Hours</b><br>30       | <b>Credits</b><br>2 | <b>Total Marks</b><br>100                      |  |

**Course Objectives**

1. Understand the components of office automation.
2. Perform operations using MS Word, Excel, Power Point.
3. Understand and discuss about the use of Office Package.

**I. MS-WORD**

1. Text Manipulation: Write a paragraph about your institution and Change the font size and type, Spell check, Aligning and justification of Text.
2. Bio data: Prepare a Bio-data.
3. Find and Replace: Write a paragraph about yourself and do the following.  
Find and Replace - Use Numbering Bullets, Footer and Headers.
4. Tables and manipulation: Creation, Insertion, Deletion (Columns and Rows).  
Create a mark sheet.
5. Mail Merge: Prepare an invitation to invite your friends to your birthday party. Prepare at least five letters.

**II. MS-EXCEL**

1. Data sorting-Ascending and Descending (both numbers and alphabets).
2. Mark list preparation for a student.
3. Individual Pay Bill preparation.
4. Invoice Report preparation.
5. Drawing Graphs. Take your own table.

**III. MS-POWERPOINT**

1. Create a slide show presentation for a seminar.





2. Preparation of Organization Charts.
3. Create a slide show presentation to display percentage of marks in each semester for all students.
  - a. Use bar chart (X-axis: Semester, Y-axis: % marks).
  - b. Use different presentation template different transition effect for each slide.

### E-References

1. <https://ptgmedia.pearsoncmg.com/images/9780735623026/samplepages/9780735623026.pdf>
2. [https://www.dit.ie/media/ittraining/msoffice/MOAC\\_Excel\\_2016\\_Core.pdf](https://www.dit.ie/media/ittraining/msoffice/MOAC_Excel_2016_Core.pdf)
3. <https://ptgmedia.pearsoncmg.com/images/9780735697799/samplepages/9780735697799.pdf>

### Course Outcomes (COs)

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

| CO Number | CO Statement   | Knowledge Level |
|-----------|--|-----------------|
| CO1       | Recognize when to use each of the Microsoft Office programs to create professional and academic documents. | K1              |
| CO2       | Create personal, academic and business documents following current professional and/or industry standards. | K1, K2 & K3     |
| CO3       | Identify and apply the menus in MS-Word.   | K3, K4 & K5     |
| CO4       | Understand the menus in Excel.   | K3, K4 & K5     |
| CO5       | Understand the components of Power point.  | K3, K4 & K5     |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**



**Mapping of COs with POs**

| <b>PO</b><br><b>CO</b> | <b>PO1</b> | <b>PO2</b> | <b>PO3</b> | <b>PO4</b> | <b>PO5</b> |
|------------------------|------------|------------|------------|------------|------------|
| <b>CO1</b>             | M          | M          | S          | S          | S          |
| <b>CO2</b>             | M          | S          | S          | S          | S          |
| <b>CO3</b>             | S          | S          | S          | S          | S          |
| <b>CO4</b>             | S          | S          | S          | S          | S          |
| <b>CO5</b>             | S          | S          | S          | S          | S          |

**S – Strong**

**M – Medium**

**L – Low**



| <b>Program: Bachelor of Computer Applications (BCA)</b> |                   |                               |                |  |
|---|-------------------|-------------------------------|----------------|--|
| <b>Skill Based Elective Course – II</b>                 |                   | <b>Course Code: 20UCA4S02</b> |                | <b>Course Title: Quantitative Aptitude – I</b> |
| <b>Semester</b>   | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                             |
| IV  | 2                 | 30                            | 2              | 100  |

### Course Objectives

1. To enhance the interpersonal skills and problem solving skills.
2. To improve the basic mathematical skills.
3. To help students who are preparing for any type of competitive examinations.

#### **UNIT – I**

Communication: Tense – Sentence Pattern - Articles – Prepositions.

#### **UNIT – II**

Soft Skill: Self Introduction – Interpersonal Skills – Soft Skills Training – Group Discussion – Importance of GD – Types of GD – Movements and Gestures to be Avoided in a GD.

#### **UNIT – III**

Numerical Aptitude: Problems on Numbers – Problems on Ages – Percentage.

#### **UNIT – IV**

Numerical Aptitude: Profit and Loss – Ratio & Proportion – Time & Work.

#### **UNIT – V**

Verbal Reasoning: Letter Series – Number Series – Coding and Decoding.

#### **Text Books**

1. Hari Mohan Prasad & Uma Rani Sinha, “Objective English for Competitive Examinations”, Tata McGraw Hill Education Private Ltd., (Unit – I)



2. M. S. Rao, “Soft Skills Enhancing Employability-Connecting Campus with Corporate”, IK International Publishing House, NewDelhi, 2010. (Unit – II)
3. Alex.K, “Soft Skills-Know Yourself and Know the World”, S.Chand Company Ltd., 2011. (Unit – II)
4. R.S. Aggarwal, “Quantitative Aptitude”, S.Chand, 2010. (Unit – III & IV)
5. R.S. Agarwal, “A Modern Approach to Verbal Reasoning (Fully Solved)”, S.Chand Company Limited, New Delhi, Revised Edition, 2012. (Unit – V)

### Course Outcomes (COs)

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

| CO Number | CO Statement   | Knowledge Level |
|-----------|--|-----------------|
| CO1       | Improve the communication skills   | K1 & K2         |
| CO2       | Improve the interpersonal skills.  | K1 & K2         |
| CO3       | Understand the basic concepts of quantitative ability.   | K2, K3 & K4     |
| CO4       | Solve campus placements aptitude papers covering Quantitative Ability, Logical Reasoning and Verbal Ability. | K2, K3 & K4     |
| CO5       | Compete in various competitive exams like TANCET, GATE, TNPSC, UPSC, etc.                                    | K3, K4 & K5     |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**

### Mapping of COs with POs

| PO \ CO | PO1 | PO2 | PO3 | PO4 | PO5 |
|---------|-----|-----|-----|-----|-----|
| CO1     | M   | M   | M   | M   | S   |
| CO2     | M   | M   | S   | S   | S   |
| CO3     | S   | M   | M   | S   | S   |
| CO4     | S   | M   | S   | M   | S   |
| CO5     | S   | M   | S   | S   | S   |

**S – Strong**

**M – Medium**

**L – Low**



| <b>Program: Bachelor of Computer Applications (BCA)</b> |                   |                               |                |   |
|---|-------------------|-------------------------------|----------------|---|
| <b>Skill Based Elective Course – III</b>                |                   | <b>Course Code: 20UCA5S03</b> |                | <b>Course Title: Quantitative Aptitude – II</b> |
| <b>Semester</b>   | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                              |
| V   | 2                 | 30                            | 2              | 100   |

### Course Objectives

1. To enhance the Communication, interpersonal skills and problem solving skills.
2. To improve the basic mathematical skills and reasoning ability.
3. To help students who are preparing for any type of competitive examinations.

#### **UNIT – I**

Communication: Active Voice – Passive Voice – Question Tag – Reading Comprehension.

#### **UNIT – II**

Soft Skill: Employability Skills – Resume Preparation – Interview Tips and Questions – GD Skills – GD Etiquette – Essential Elements of a GD.

#### **UNIT – III**

Numerical Aptitude: Time & Distance – Simple Interest – Compound Interest.

#### **UNIT – IV**

Reasoning: Counting Figures: Squares and Triangles. Completion of Incomplete Pattern.

#### **UNIT – V**

Reasoning: Blood Relation Problems – Sense of Directions – Arrangement Problems – Syllogism.

#### **Text Books**

1. Hari Mohan Prasad & Uma Rani Sinha, “Objective English for Competitive Examinations”, Tata McGraw Hill Education Private Ltd., (Unit – I)



2. M. S. Rao, “Soft Skills Enhancing Employability-Connecting Campus with Corporate”, IK International Publishing House, NewDelhi, 2010. (Unit – II)
3. Alex.K, “Soft Skills-Know Yourself and Know the World”, S.Chand Company Ltd., 2011. (Unit – II)
4. R.S. Aggarwal, “Quantitative Aptitude”, S.Chand, 2010. (Unit – III & IV)
5. R.S. Agarwal, “A Modern Approach to Verbal Reasoning (Fully Solved)”, S.Chand Company Limited, New Delhi, Revised Edition, 2012. (Unit – V)

### Course Outcomes (COs)

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

| CO Number | CO Statement   | Knowledge Level |
|-----------|--|-----------------|
| CO1       | Improve the communication skills   | K1 & K2         |
| CO2       | Improve the interpersonal skills.  | K1 & K2         |
| CO3       | Understand the basic concepts of quantitative ability.   | K2, K3 & K4     |
| CO4       | Solve campus placements aptitude papers covering Quantitative Ability, Logical Reasoning and Verbal Ability. | K2, K3 & K4     |
| CO5       | Compete in various competitive exams like TANCET, GATE, TNPSC, UPSC, etc.                                    | K3, K4 & K5     |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**

### Mapping of COs with POs

| PO \ CO | PO1 | PO2 | PO3 | PO4 | PO5 |
|---------|-----|-----|-----|-----|-----|
| CO1     | M   | M   | M   | M   | S   |
| CO2     | M   | M   | S   | S   | S   |
| CO3     | S   | M   | M   | S   | S   |
| CO4     | S   | M   | S   | M   | S   |
| CO5     | S   | M   | S   | S   | S   |

**S – Strong**

**M – Medium**

**L – Low**



**Program: Bachelor of Computer Applications (BCA)**

|   |                        |                                |                     |  |  |
|---|------------------------|--------------------------------|---------------------|--|--|
| <b>Skill Based Elective<br/>Course – IV</b> |                        | <b>Course Code: 20UCA6SP04</b> |                     | <b>Course Title: Android<br/>Programming Lab</b> |  |
| <b>Semester</b><br>VI                       | <b>Hours/Week</b><br>3 | <b>Total Hours</b><br>45       | <b>Credits</b><br>2 | <b>Total Marks</b><br>100                        |  |

**Course Objectives**

1. To understand the basic concept of mobile devices and types of mobile operating system.
2. To know the concept of cross platform system architecture.
3. To use the development tools in the Android development environment.
4. To develop their own apps using the major components of Android API.
5. To use the Java programming language to build.

**List of Programs**

1. Sample Application about Android Resources
2. Sample Application about Layouts
3. Sample Application about Intents
4. Sample Application about user interfaces
5. Sample Application about Animations
6. Sample Application about SQLite I
7. Calculator App in Android
8. Simple Android Camera Application
9. Basic List View Demo in Android
10. Google Map in Android



### Course Outcomes (COs)

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

| CO Number | CO Statement   | Knowledge Level |
|-----------|--|-----------------|
| CO1       | Understand various mobile application development tools. | K1 & K2         |
| CO2       | Clearly known about Android.                             | K1 & K2         |
| CO3       | Understand user interface methods.                       | K1 & K2         |
| CO4       | Known about android resources.                           | K1, K2 & K3     |
| CO5       | To create mobile application.                            | K4, K5 & K6     |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**

### Mapping of COs with POs

| PO \ CO | PO1 | PO2 | PO3 | PO4 | PO5 |
|---------|-----|-----|-----|-----|-----|
| CO1     | S   | S   | S   | S   | S   |
| CO2     | S   | M   | S   | S   | S   |
| CO3     | S   | S   | S   | S   | S   |
| CO4     | S   | M   | S   | S   | S   |
| CO5     | S   | S   | S   | S   | S   |

**S – Strong**

**M – Medium**

**L – Low**





# Non Major Elective Course (NMEC)



| <b>Program: Bachelor of Computer Applications (BCA)</b> |                   |                               |                |   |
|---|-------------------|-------------------------------|----------------|---|
| <b>Non Major Elective Course – I</b>                    |                   | <b>Course Code: 20UCA3N01</b> |                | <b>Course Title: Basics of Computer</b> |
| <b>Semester</b>   | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                      |
| III   | 2                 | 30                            | 2              | 100                                     |

### Course Objectives

1. Understand the Digital number system and their conversions.
2. Identify the operations of logic Gates.
3. Comprehend the fundamental principles of simple Arithmetic Circuits.
4. Know the design and operations of Data Processing Circuits.
5. Realize the design of sequential logic circuits.
6. Gain the knowledge about the memory elements.

### **UNIT – I**

Introduction to Computer: Introduction – Types of Computers – Characteristics of Computers. Generations of Computers: First Generation – Second Generation – Third Generation – Fourth Generation – Fifth Generation. Classification of Digital Computers: Introduction – Microcomputers – Personal Computer – Portable Computers – Mini Computers – Super Computers – Main Frames.

### **UNIT – II**

Number System: Introduction – Decimal Number System – Binary Number System – Binary-Decimal Conversion – Decimal Binary Conversion – Binary Addition – Binary Subtraction – Complements – 9's Complement – 10's Complement – 1's Complements – 2's Complements – BCD – Bits, Bytes, Words – Octal – Hexadecimal Number System.

### **UNIT – III**

Anatomy of Digital Computer: Functions and Components of Computer – Central Processing UNIT – Control UNIT – Arithmetic – Logic UNIT – Memory – Registers – Addresses. Memory UNITs: RAM, ROM, PROM, EPROM, EEPROM, And Flash Memory.

**UNIT – IV**

Input Devices: Introduction – Keyboard – Mouse – Types of Mice – Connections – Mouse Pad – Trackball – Joystick – Digitizing Tablet – Scanners – Digital Camera – MICR – OCR – OMR – Bar Code Reader – Speech Input Device- Touch Screen – Touch Pad – Light Pen. Output Devices: Introduction – Monitor – Classification of Monitors – Monochrome – Gray Scale – Color – Digital Monitor – Analog Monitor – Characteristics of Monitor – Printers.

**UNIT – V**

Computer Software: Introduction – Operating System – Utilities – Compiler and Interpreters – Word Processor – Spreadsheets – Presentation Graphics – DBMS – Programming Languages: Machine Language – Assembly Language – High Level language – Types of High Level Language. Data Processing: Data VS Information – File Processing – Sequential File Processing – Direct Access file Processing.

**Text Book**

1. Alexis Leon and Mathews Leon, “Fundamentals of Computer Science and Communication Engineering”, Leon Techworld, 1998.

**Reference Books**

1. B Ram and Sanjay Kumar, “Computer Fundamentals”, New Age International Publishers, 5<sup>th</sup> Edition, 2014.
2. Pradeep K Sinha, Priti Sinha, “Computer Fundamentals”, BPB Publications, 2004.
3. Anita Goel, “Computer Fundamentals”, Pearson Education India, 1<sup>st</sup> Edition, 2010.



### Course Outcomes (COs)

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

| CO Number | CO Statement   | Knowledge Level |
|-----------|--|-----------------|
| CO1       | Understand the Number system and conversation from one system to another system. | K1 & K2         |
| CO2       | Understand the functional concepts of Logic gates.                               | K2              |
| CO3       | Analyze the concept of Boolean Algebra and Simplifying the Boolean expression.   | K3 & K4         |
| CO4       | Apply the knowledge to perform arithmetical operations using Logical circuit.    | K3 & K4         |
| CO5       | Gain the Knowledge about memory Elements.  | K5              |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**

### Mapping of COs with POs

| PO<br>CO | PO1 | PO2 | PO3 | PO4 | PO5 |
|----------|-----|-----|-----|-----|-----|
| CO1      | M   | M   | S   | S   | M   |
| CO2      | M   | M   | S   | S   | S   |
| CO3      | M   | S   | S   | S   | S   |
| CO4      | S   | S   | S   | S   | S   |
| CO5      | M   | M   | S   | S   | S   |

**S – Strong**

**M – Medium**

**L – Low**



| <b>Program: Bachelor of Computer Applications (BCA)</b> |                   |                               |                |  |
|---|-------------------|-------------------------------|----------------|--|
| <b>Non Major Elective Course – I</b>                    |                   | <b>Course Code: 20UCA3N02</b> |                | <b>Course Title: System Administration &amp; Maintenance</b> |
| <b>Semester</b>   | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>   |
| III   | 2                 | 30                            | 2              | 100  |

### Course Objectives

1. Understand basic concept & structure of Computer Hardware & Networking Components.
2. Identify the existing configuration of the computers & peripherals.
3. Apply their knowledge about computer peripherals to identify/rectify problems on board.
4. Integrate the PC's into Local Area Network & re-install OS .

### **UNIT – I**

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

### **UNIT – II**

Computer Assembly: Open Case – Install Power Supply – Attach Components to Motherboard – Installation: Motherboard – Internal Drives – Drives in External Bays – Adapter Cards. Internal Cables Connections – Reattach Side Panels – Connection of External Cables – Boot the Computer.

### **UNIT – III**

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

**UNIT – IV**

Fundamental Laptops and Portable Devices: Common Uses – Components of Laptop – Comparison of the Components of Desktop and Laptops – Configure Laptops – Mobile Phone Standards – Preventive Maintenance Techniques – Troubleshoot Laptop and Portable Devices. Fundamental Printers and Scanners: Types of Printers and Scanners – Installation and Configuration Process of Printers and Scanners – Preventive Maintenance Techniques – Troubleshoot.

**UNIT – V**

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

**Text Book**

1. David Anfinson & Ken Quamme, “IT Essentials: PC Hardware and Software Companion Guide”, Pearson Publications, 3<sup>rd</sup> Edition, 2008.

**Reference Book**

1. Quentin Docter, Emmett Dulaney and Toby Skandier, “CompTIA A+ Complete Review Guide: Exam 220-901, Exam 220 – 902”, Wiley Publications, 3<sup>rd</sup> Edition, 2015.



### Course Outcomes (COs)

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

| CO Number | CO Statement   | Knowledge Level |
|-----------|--|-----------------|
| CO1       | Enable the students to visualize the different aspects of networks, protocols and network design models. | K1 & K2         |
| CO2       | Enable the students to examine various layer design issues protocols.                                    | K1 & K2         |
| CO3       | Enable the students to analyse and compare different LAN protocols.                                      | K2 & K3         |
| CO4       | Enable the students to compare and select appropriate routing algorithms for a network.                  | K4 & K5         |
| CO5       | Enable the students to compare and select appropriate routing algorithms for a network applets.          | K4 & K5         |

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

### Mapping of COs with POs

| PO \ CO | PO1 | PO2 | PO3 | PO4 | PO5 |
|---------|-----|-----|-----|-----|-----|
| CO1     | M   | M   | S   | S   | S   |
| CO2     | S   | S   | S   | S   | S   |
| CO3     | M   | M   | S   | S   | S   |
| CO4     | M   | S   | S   | M   | S   |
| CO5     | M   | S   | S   | S   | S   |

S – Strong

M – Medium

L – Low



| <b>Program: Bachelor of Computer Applications (BCA)</b> |                   |                               |                |  |
|---|-------------------|-------------------------------|----------------|--|
| <b>Non Major Elective Course – II</b>                   |                   | <b>Course Code: 20UCA4N03</b> |                | <b>Course Title: Exploring on Word</b> |
| <b>Semester</b>   | <b>Hours/Week</b> | <b>Total Hours</b>            | <b>Credits</b> | <b>Total Marks</b>                     |
| IV  | 2                 | 30                            | 2              | 100                                    |

### Course Objectives

1. To explain the components of Microsoft Word.
2. Indicate the names and functions of the Word interface components.
3. Create, edit, save, and print documents to include documents with lists and tables.

#### **UNIT – I**

Exploring Word 2007: Working in the Word Environment – Opening, Moving Around in, and Closing a Document – Displaying Different Views of a Document – Creating and Saving a Document – Previewing and Printing a Document.

#### **UNIT – II**

Editing and Proofreading Documents: Make Changes to a Document – Insert Saved Text – Find the Most Appropriate word – Reorganize a Document Outline – Find and Replace Text.

#### **UNIT – III**

Error Corrections: Correct Spelling and Grammatical Errors – Finalize a Document – Changing the Look Quickly Format Text and Paragraphs – Manually Change the Look of Characters – Manually Change the Look of Paragraphs.

#### **UNIT – IV**

Bulleted and Numbered Lists: Create and Modify Lists – Presenting Information in Columns. Creating Table: Create a Tabular List – Present Information in a Table.



**UNIT – V**

Formatting a Table: Format Table Information – Perform Calculation in a Table – Use a Table to Control Page Layout.

**Text Book**

1. Joyce Cox and Team, “Step by Step 2007 Microsoft Office System”, PHI Learning Private limited, New Delhi, 2009.

**Reference Book**

1. Peter Weverka, “MS Office 2013 All-in-One for Dummies”, Wiley Publications, 1<sup>st</sup> Edition, 2013.

**Course Outcomes (COs)**

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

| <b>CO Number</b> | <b>CO Statement</b>  | <b>Knowledge Level</b> |
|------------------|--|------------------------|
| <b>CO1</b>       | Recognize when to use each of the Microsoft Office programs to create professional and academic documents. | K1                     |
| <b>CO2</b>       | Create personal, academic and business documents following current professional and/or industry standards. | K1, K2 & K3            |
| <b>CO3</b>       | Identify and apply the menus in MS-Word.   | K3, K4 & K5            |
| <b>CO4</b>       | Understand the editing and tables in word.   | K3, K4 & K5            |
| <b>CO5</b>       | Understand the components of Word.   | K3, K4 & K5            |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**



### Mapping of COs with POs

| PO<br>CO   | PO1 | PO2 | PO3 | PO4 | PO5 |
|------------|-----|-----|-----|-----|-----|
| <b>CO1</b> | M   | M   | S   | S   | S   |
| <b>CO2</b> | M   | S   | S   | S   | S   |
| <b>CO3</b> | S   | S   | S   | S   | S   |
| <b>CO4</b> | S   | S   | S   | S   | S   |
| <b>CO5</b> | S   | S   | S   | S   | S   |

**S – Strong**

**M – Medium**

**L – Low**



| Program: Bachelor of Computer Applications (BCA) |            |                        |         |                                  |
|--|------------|------------------------|---------|----------------------------------|
| Non Major Elective Course – II                   |            | Course Code: 20UCA4N04 |         | Course Title: Basics of Internet |
| Semester   | Hours/Week | Total Hours            | Credits | Total Marks                      |
| IV   | 2          | 30                     | 2       | 100                              |

### Course Objectives

1. Describe the important features of the Web and Web browser software.
2. Evaluate e-mail software and Web-based e-mail services.
3. Find, evaluate, and use online information resources.
4. Create HTML documents and enhance them with browser extensions.
5. Demonstrate the use of real-time chat and briefly describe the history of the wireless Internet.

### **UNIT – I**

Introduction To The Internet: Computer in Business – Networking – Internet – E-mail – Resource Sharing – Gopher – World Wide Web – Telnet – Bulletin Board Service – Wide Area Information Service.

### **UNIT – II**

Internet Technologies: Modem – Internet addressing – Physical connections – Telephone Lines – Internet browsers – Internet Explorer – Netscape Navigator.

### **UNIT – III**

Introduction to HTML: Designing a Home Page – HTML Documents – Anchor Tag – Hyper Links.

### **UNIT – IV**

Traditional Text and Formatting – Tables – Images – Frames

**UNIT – V**

Case Study: Online Passport – Online Gas Services – Online Train Reservation – Tamilnadu Government Services

**Text Books**

1. C Xavier, “World Wide Web with HTML”, Tata McGraw Hill Education, 2000.
2. H.M. Deital, P.J. Deital, “Internet and World Wide Web – How to Program”, PHI Learning, 4th Edition, 2007.

**Reference Websites**

1. <http://www.ebharatgas.com/>
2. <http://passportindia.gov.in/>
3. <https://www.irctc.co.in>
4. <http://www.tn.gov.in/>

**Course Outcomes (COs)**

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

| CO Number | CO Statement   | Knowledge Level |
|-----------|--|-----------------|
| CO1       | Learn about the Internet, Worldwide Web, as well as use Internet directories and search engines, and locate www addresses.                       | K1 & K2         |
| CO2       | find and evaluate information on the Web.  | K2 & K5         |
| CO3       | learn the basics of e-mail, such as sending, forwarding and receiving mail, attaching documents, creating mailboxes, filters, and address books. | K1, K2, K3 & K4 |
| CO4       | Create web pages using HTML.   | K5 & K6         |
| CO5       | Find, evaluate, and use online information systems.  | K2, K3 & K4     |

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**



**Mapping of COs with POs**

| <b>PO</b><br><b>CO</b> | <b>PO1</b> | <b>PO2</b> | <b>PO3</b> | <b>PO4</b> | <b>PO5</b> |
|------------------------|------------|------------|------------|------------|------------|
| <b>CO1</b>             | M          | M          | S          | S          | S          |
| <b>CO2</b>             | S          | M          | S          | S          | S          |
| <b>CO3</b>             | S          | S          | S          | S          | S          |
| <b>CO4</b>             | S          | M          | S          | S          | S          |
| <b>CO5</b>             | S          | S          | S          | M          | S          |

**S – Strong**

**M – Medium**

**L – Low**