# SRI MEENAKSHI GOVT. ARTS COLLEGE FOR WOMEN (AUTONOMOUS)

# MADURAI – 625 002.

## DEPARTMENT OF COMPUTER APPLICATIONS

# BACHELOR OF COMPUTER APPLICATIONS

## SYLLABUS TO BE INTRODUCED FOR THE ACADEMIC YEAR   2022 – 2023

## OUTCOME BASED EDUCATION

## UNDER C.B.C.S.

# SRI MEENAKSHI GOVT ARTS COLLEGE FOR WOMEN (AUTONOMOUS)
## DEPARTMENT OF COMPUTER APPLICATIONS
(Academic year 2019-20 onwards)

DEPARMENT NAME: COMPUTER APPLICATIONS

## INTRODUCTION

The Department of Computer Applications blossomed in the year 1998 offering Master of Computer Applications course approved by AICTE. The B.C.A course was started in the academic year 2018-19. The Department has an enterprising faculty team of 3 Assistant Professors, 2 Guest faculties and 1 Programmer. It has more than 100 research publications to its credit. They contribute and share their knowledge to academic community through Invited Talks and Paper presentations in National / International Conferences. The Department takes continuous efforts in upgrading the course content and enhancing student's skills.

## COURSES OFFERED:

- B.C.A
- M.C.A
- M.Phil. COMPUTER APPLICATIONS

## VISION

Enabling Students to become enterprising Academicians, Young Entrepreneurs and Responsible Citizens.

## MISSION

Imparting Quality Knowledge and Essential Virtues Treading Towards Holistic Development.

## PROGRAMME OUTCOME OF B.C.A

At the end of the Degree programme the students will be able to:

PO1: Able to design and develop reliable software applications for social needs and excel in IT enabled services.

PO2: Able to analyze and identify the customer requirements in multidisciplinary domains, create high level design and implement robust software applications using latest technological skills.( A)

PO3: Proficient in successfully designing innovative solutions for solving real life business problems and addressing business development issues with a passion for quality, competency and holistic approach ( C )

PO4: Perform professionally with social, cultural and ethical responsibility as an     individual as well as in multifaceted teams with positive attitude. (S )

PO5: Capable of adapting to new technologies and constantly upgrade their skills with an attitude towards independent and lifelong learning. ( P )

## PROGRAMME SPECIFIC OUTCOME(PSO)

PSO1: Enhance Professional Skills

PSO2: Attain the ability to Design and Develop computer applications,

PSO3: Evaluate and recognize potential risks and provide innovative solutions.

PSO4 : Acquire Successful Entrepreneurship skills

PSO5: Explore technical knowledge in diverse areas of Computer applications and experience an environment conducive in cultivating skills for higher studies.

DEPARTMENT OF COMPUTER APPLICATIONS

PROGRAMME : B.C.A

## SEMESTER–I

| Part | Course Type | CODE | Title of the Course | Hrs/ Week | Credits | Exam Hrs | Marks | | |
|------|-------------|------|---------------------|-----------|---------|----------|-------|-----|-------|
| | | | | | | | Int | Ext | Total |
| I | LC | U221A1 /U221H1 | Tamil/Hindi | 6 | 3 | 3 | 25 | 75 | 100 |
| II | ELC | U222A1 | English | 6 | 3 | 3 | 25 | 75 | 100 |
| III | CC– I | U22CU1 | Core I – Programming in C | 6 | 5 | 3 | 25 | 75 | 100 |
| III | CC– II | U22CU2P | CoreI Practical - Programming in C Lab | 6 | 3 | 3 | 40 | 60 | 100 |
| III | AC-I | U22AUU1 | Discrete Mathematics | 4 | 3 | 3 | 25 | 75 | 100 |
| IV | AEC | U22AE1 | Value Education | 2 | 2 | 3 | 25 | 75 | 100 |
| Total | | | | 30 | 19 | | | | 600 |

## SEMESTER–II

| Part | Course Type | CODE | TitleoftheCourse | Hrs/Week | Credits | Exam Hrs | Marks | | |
|------|-------------|------|------------------|----------|---------|----------|-------|-----|-------|
| | | | | | | | Int | Ext | Total |
| I | LC | U221A2 /U221H2 | Tamil/Hindi | 6 | 3 | 3 | 25 | 75 | 100 |
| II | ELC | U222A2 | English | 6 | 3 | 3 | 25 | 75 | 100 |
| III | CC– III | U22CU3 | Core III – OOP with C++ | 6 | 5 | 3 | 25 | 75 | 100 |
| III | CC– IV | U22CU4P | Core IV Practical – C++ Lab | 3 | 3 | 3 | 40 | 60 | 100 |
| III | CC-V | U22CU5P | First Allied Practical - SPSS Lab | 3 | 4 | 3 | 40 | 60 | 100 |
| III | AC-II | U22AUU2 | Probability and Statistics | 4 | 3 | 3 | 25 | 75 | 100 |
| IV | AEC | U22AE2 | Environmental Studies - EVS | 2 | 2 | 3 | 25 | 75 | 100 |
| Total | | | | 30 | 23 | | | | 700 |

## SEMESTER–III

| Part | Course Type | CODE | Title of the Course | Hrs/ Week | Credits | Exam Hrs | Int | Ext | Total |
|------|-------------|------|---------------------|-----------|---------|----------|-----|-----|-------|
| I | LC | U221A3 /U221H3 | Tamil/Hindi | 6 | 3 | 3 | 25 | 75 | 100 |
| II | ELC | U222A3 | English | 6 | 3 | 3 | 25 | 75 | 100 |
| III | CCVI | U22CU6 | Core V - JAVA | 6 | 5 | 3 | 25 | 75 | 100 |
| III | CCVII | U22CU7P | Core V Practical – JAVA Lab | 3 | 3 | 3 | 40 | 60 | 100 |
| III | AC–III | U22AUU3 | E-Commerce | 4 | 3 | 3 | 25 | 75 | 100 |
| IV | NMEC–I | U22NMU1 | Computer Fundamentals | 2 | 2 | 3 | 25 | 75 | 100 |
| IV | | | Extension Activity | | 1 | | 100 | - | 100 |
| Total | | | | 30 | 20 | | | | 700 |

## SEMESTER–IV

| Part | Course Type | CODE | Title of the Course | Hrs/ Week | Credits | Exam Hrs | Int | Ext | Total |
|------|-------------|------|---------------------|-----------|---------|----------|-----|-----|-------|
| I | LC | U221A4 /U221H4 | Tamil/Hindi | 6 | 3 | 3 | 25 | 75 | 100 |
| II | ELC | U222A4 | English | 6 | 3 | 3 | 25 | 75 | 100 |
| III | CC-VIII | U22CU8 | Core VII – Data Structure | 4 | 4 | 3 | 25 | 75 | 100 |
| III | CC–IX | U22CU9 | Core VIII – Digital Principal & Computer Organization | 3 | 3 | 3 | 40 | 60 | 100 |
| III | CC-X | U22U10P | Tally lab | 3 | 4 | 3 | 40 | 60 | 100 |
| III | AC–IV | U22AUU4 | CBFA | 4 | 3 | 3 | 25 | 75 | 100 |
| IV | NMEC–II | U22NMU2 | Internet and Its Applications | 2 | 2 | 3 | 25 | 75 | 100 |
| IV | SEC–I | U22SEU1P | Practical – Oracle | 2 | 2 | 3 | 40 | 60 | 100 |
| Total | | | | 30 | 24 | | | | 800 |

| Part | Course Type | CODE | Title of the Course | Hrs/ Week | Credits | Exam Hrs | Marks Int | Marks Ext | Marks Total |
|------|-------------|------|---------------------|-----------|---------|----------|-----|-----|-------|
| III | CC– XI | U22CU11 | Core IX – Operating system | 5 | 5 | 3 | 25 | 75 | 100 |
| III | CC– XII | U22CU12 | Core  X – Computer Networks | 5 | 5 | 3 | 25 | 75 | 100 |
| III | CC– XIII | U22CU13 | Core XI - PHP | 5 | 5 | 3 | 25 | 75 | 100 |
| III | CC– XIV | U22CU14P | Practical (Core IX, X and XI) – PHP Lab | 6 | 4 | 3 | 40 | 60 | 100 |
| III | DSEC–I | U22DSU1A | Major Based Elective I – OOAD | 5 | 5 | 3 | 25 | 75 | 100 |
| | | U22DSU1B | Artificial Intelligence | | | | | | |
| | | U22DSU1C | System software | | | | | | |
| IV | SEC– II | U22SEU2P | Skill Enhancement Course II Practical – . NET Lab | 2 | 2 | 3 | 40 | 60 | 100 |
| IV | SEC–III | U22SEU3 | Skill Enhancement Course III - Computer Graphics | 2 | 2 | 2 | 40 | 60 | 100 |
| | Total | | | 30 | 28 | | | | 700 |

SEMESTER–VI

| Part | Course Type | CODE | Title of the Course | Hrs/ Week | Credits | Exam Hrs | Marks Int | Marks Ext | Marks Total |
|------|-------------|------|---------------------|-----------|---------|----------|-----|-----|-------|
| III | CC– XV | U22CU15 | Core XIII – Software Engineering | 6 | 5 | 3 | 25 | 75 | 100 |
| III | CC– XVI | U22CU16 | Core IV – Data Mining | 6 | 5 | 3 | 25 | 75 | 100 |
| III | CC– XVII | U22CUPW | Practical  (Core XIII and XIV) - Project | 6 | 4 | 3 | 40 | 60 | 100 |
| III | DSEC– II | U22DSU2A | Major Based Elective II – Mobile Network | 4 | 4 | 3 | 25 | 75 | 100 |
| | | U22DSU2B | Artificial Neural Network | | | | | | |
| | | U22DSU2C | Digital Image Processing | | | | | | |
| III | DSEC–III | U22DSU3AP | Major Based Elective III – Client Server Lab | 4 | 4 | 3 | 25 | 75 | 100 |
| | | U22DSU3BP | Artificial Neural Network Lab | | | | | | |
| | | U22DSU3CP | Digital Image Processing Lab | | | | | | |
| III | GEC I | U22GEU1A | Generic Elective Course - HRM | 2 | 2 | 3 | 25 | 75 | 100 |
| | | U22GEU1B | Management Information System | | | | | | |
| V | AEC III | U22AE3 | Ability Enhancement Course (General Knowledge) - GK | 2 | 2 | 3 | 25 | 75 | 100 |
| | | | Total | 30 | 26 | | | | 700 |

COURSES OFFERED BY THE DEPARTMENT OF Computer Applications

| Part | Course Type | Title of the Course | Hrs/ Week | Credits | Exam Hrs | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Int | Ext | Total |
| III | AC-I | Discrete Mathematics | 4 | 3 | 3 | 25 | 75 | 100 |
| III | AC-II | Probability and Statistics | 4 | 3 | 3 | 25 | 75 | 100 |
| III | AC-III | – E-Commerce | 4 | 3 | 3 | 25 | 75 | 100 |
| III | AC-IV | CBFA | 4 | 3 | 3 | 25 | 75 | 100 |

Department Specific Elective Course (DSEC) -3

| Part | Course Type | Title of the Course | Hrs/ Week | Credits | Exam Hrs | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Int | Ext | Total |
| III | DSEC1 | 1. Object Oriented Analysis and Design (OOAD) <br> 2. Artificial Intelligence (AI) <br> 3. System Software (SS) | 4 | 5 | 3 | 25 | 75 | 100 |
| III | DSEC2 | 1. Mobile Computing <br> 2. Artificial Neural Network (ANN) <br> 3. Digital Image Processing ( DIP) | 3 | 4 | 3 | 25 | 75 | 100 |
| III | DSEC3 | 1. Client Server Lab <br><br> 2. Artificial Neural Network Lab <br><br> 3. Digital Image Processing Lab | 4 | 4 | 3 | 40 | 60 | 100 |

| Part | Course Type | Title of the Course | Hrs/ Week | Credits | Exam Hrs | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Int | Ext | Total |
| III | GEC1 | Human Resource management | 2 | 2 | 3 | 25 | 75 | 100 |

| Part | Course Type | Title of the Course | | Hrs/ Week | Credits | Exam Hrs | Marks | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Int | Ext | Total |
| IV | SEC– I | Skill Enhancement Course II | Practical – Oracle Lab | | | - | | - | 100 |
| | | | | 2 | 2 | 3 | 40 | 60 | |
| IV | SEC–III | Skill Enhancement Course III - Computer Graphics | | 2 | 2 | 2 | 40 | 60 | 100 |
| IV | SEC– III | Skill Enhancement Course | Practical – .NET lab | | | | | - | 100 |
| | | | | 2 | 2 | 3 | 40 | 60 | |

COURSE STRUCTURE ABSTRACT FOR     B.C.A.    PROGRAMME

| Part | Course | | Total No of Papers | Hours | Credit | Marks |
|---|---|---|---|---|---|---|
| I | Language Course(LC) | | 4 | 24 | 12 | 400 |
| II | English Language Course(ELC) | | 4 | 24 | 12 | 400 |
| III | Core Course(CC) | | 17 | 73 | 72 | 1500 |
| III | Allied Course ( AC) | | 4 | 28 | 12 | 600 |
| III | Department Specific Elective Course (DSEC) | | 3 | 13 | 13 | 300 |
| III | Generic Elective Course (GEC) | | 1 | 2 | 2 | 100 |
| IV | Non Major  Elective Course(NMEC) | | 2 | 4 | 4 | 200 |
| IV | Skill Enhancement Course  (SEC) | | 3 | 6 | 6 | 300 |
| IV | Ability Enhancement Course (AEC) | Value Education | 1 | 2 | 2 | 100 |
| IV | | Environmental Studies | 1 | 2 | 2 | 100 |
| IV | | General Knowledge | 1 | 2 | 2 | 100 |
| V | NCC/NSS/Extension Activities | | -1 | - | 1 | 100 |
| | Total | | 42 | 180 | 140 | 4200 |
| Extra Credit Courses* | | | | | | |

| | | | | |
|---|---|---|---|---|
| Value Added Course | 1 | | 2 | 100 |
| Self-Study Course  (SSC) | 1 | | 2 | 100 |
| Total | 44 | | 144 | 4400 |

Extra Credit Courses*  -  to be discussed

Value Added Courses

| S.No | Name of the Course | Number of Hrs | Credit | Beneficiary |
|---|---|---|---|---|
| 1. | Web programming | 30 | 2 | BCA students |
| 2. | Multimedia Application | 30 | 2 | Other major |
| 3. | Python programming | 30 | 2 | BCA students |
| 4. | Digital marketing | 30 | 2 | Other major |

Self-study courses

1. Management Information System
2. Soft Skills

## I. QUESTION PAPER PATTERN FOR EXTERNAL EXAMINATION

1. <u>Core, Major Elective and Allied Papers</u>

| Section - A | 5 compulsory questions ( 1 question from each unit) | 5 X 2 = 10 Marks |
|---|---|---|
| Section - B | 5 questions to be answered under 'either – or' pattern ( 2 questions from each unit) | 5 X 5 = 25 Marks |
| Section - C | 5 questions to be answered under either or pattern ( two from each unit) | 5 X 8 = 40 Marks |
| | Total | 75  Marks |

2. Skill Based Elective Papers

| Section - A | 5 questions to be answered under 'either – or' pattern ( 2 question from each unit) | 5 X 15 =75 Marks |
|---|---|---|
| | Total | 75  Marks |

3. Non Major Elective Papers

| Section - A | 25 compulsory questions ( 5 Multiple Choice Questions from each unit) | 25 X 1 = 25 Marks |
|---|---|---|
| Section - B | 5 questions to be answered under 'either – or' pattern ( 2 questions from each unit) | 5 X 10 = 50 Marks |
| | Total | 75  Marks |

## II. EVALUATION  PATTERN

1.  Theory Paper

Internal

| Test | 20 |
|---|---|
| Quiz/Assignment | 5 |
| Total | 25 |

Internal   -   25
External  -   75
Total      - 100

2. Practical Paper

Internal

| Record | 10 |
|---|---|
| Viva-Voce | 10 |
| Internal Practical Exam | 20 |
| Total | 40 |

Internal   - 40
External  - 60
Total      - 100

3. Project

| Internal Assessment | 20 |
|---|---|
| Viva-Voce | 80 |

| Total | 100 |
|---|---|

### III. PASSING MINIMUM

| External | | | | Project - Passing Minimum | | Internal |
|---|---|---|---|---|---|---|
| Theory - Passing Minimum | | Practical - Passing Minimum | | | | Passing Minimum |
| 35% (27 Marks) | Aggregate of 40 Marks in Total | 35% (21 Marks) | Aggregate of 40 Marks in Total | 35% (28 Marks) | Aggregate of 40 Marks in Total | No |

**Programme : BCA**                                          **Part III: Core**
**Semester    : I**                                          **Hours  :  6 P/W 75 Hrs P/S**
**Sub. Code   : U22CU1**                                **Credits : 5**

### TITLE OF THE PAPER: PROGRAMMING IN C

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|---|---|---|---|---|---|
| | 5 | 2 | 1 | 1 | 1 |

**PREAMBLE:**

To inculcate in students necessary programming skills and to design, code and implement cprograms.To learn the Files and Pointer concepts in C language.

| COURSE OUTCOME | Unit | Hrs P/S |
|---|---|---|
| At the end of the Semester, the Students will be able to | | |
| **UNIT 1 CO1**:  Understand programming concepts by learning algorithms and flowcharts. | 1 | 15 |
| **UNIT 2 CO2**: Obtain knowledge about the basics of C Programming. | 2 | 15 |
| **UNIT 3 CO3**: Apply different operations in an array. | 3 | 15 |

| | | |
|---|---|---|
| **UNIT 4 CO4**: Understand use of function , pointers, structures and unions. | 4 | 15 |
| **UNIT 5 CO5**: Acquire knowledge about the basics of file handling mechanism | 5 | 15 |

**SYLLABUS**
**UNIT I:**

Overview of C:History of C – Importance of C – Basic Structure of C Programs – Programming Style – Character Set – C Tokens – Keywords and Identifiers – Constants, Variables and Data Types – Declaration of Variables – Defining Symbolic Constants – Declaring a variable as a constant – overflow and underflow of data – Operators and Expressions: Arithmetic, relational, logical, assignment operators – increment and decrement operators, conditional operators, bitwise operators, special operators – Arithmetic Expressions- Evaluation of Expressions – Precedence of Arithmetic Operators – Type Conversions in Expressions – Operator Precedence and Associativity.

**UNIT II:** Managing I/O Operations: Reading and Writing a Character – Formatted Input, Output – Decision Making and Branching: if statement - if else statement - nesting of if else statements - else if ladder – switch statement – the ?: operator – goto statement – the while statement – do statement – the for statement – jumps in loops.

**UNIT III:** Arrays: One-Dimensional Arrays – Declaration, Initialization – Two-Dimensional Arrays
–

Multi-dimensional Arrays – Dynamic Arrays – Initialization. Strings: Declaration, Initialization of string variables – reading and writing strings – string handling functions.

**UNIT IV:**

User-defined functions: need – multi-function programs – elements of user defined functions – definition – return values and their types – function calls, declaration, category – all types of arguments and return values – nesting of functions – recursion – passing arrays, strings to functions – scope visibility and life time of variables. Structures and Unions: Defining a structure – declaring a structure variable – accessing structure members – initialization – copying and comparing – operation on individual members – array of structures – arrays within structures – structures within structures – structures and functions – unions – size of structures – bit fields.

**UNIT V:**

Pointers:Accessing the address of a variable – declaring, initialization of pointer variables – accessing a variable through its pointer – chain of pointers – pointer increments and scale factors – pointers and character strings – pointers as function arguments – pointers and structures. Files: Defining, opening, closing a file – IO Operations on files – Error handling during IO operations – command line arguments.

**TEXT BOOKS:**

Programming in ANSI C, E.Balagurusamy, 6th Edition, McGraw Hill Education (India) Pvt. Ltd., 2017.

Unit I: Chapter 1, Chapter 2, Chapter 3
Unit II: Chapters 4, Chapter 5, Chapter 6
Unit III: Chapter 7, Chapter 8
Unit IV: Chapter 9, Chapter 10
Unit V: Chapter 11, Chapter 12

**REFERENCES:**

1. B. Gottfried, "Schaum's Outline of Programming with C", 3rd Edition, Tata McGraw Hill,2010.
2. J.R. Hanly and E.B. Koffman, "Problem Solving and Program Design in C", 6th Edition, Pearson Education, 2009.
3. Programming with ANSI and Turbo C, Ashok N.Kamthane , Pearson Education, 2006
4. H. Schildt, C: The Complete Reference, 4th Edition, TMH Edition, 2000.
5. Kanetkar Y., Let us C, BPB Pub., New Delhi, 1999.

| UNITS | TOPIC | LECTURE HOURS | MODE OF TEACHING |
|---|---|---|---|
| UNIT 1 | | | |
| | Overview of C:History of C – Importance of C – Basic Structure of C Programs – Programming Style – Character Set – C Tokens – Keywords and Identifiers | 5 | Lecture |

| | | | |
|---|---|---|---|
| | – Constants, Variables and Data Types – Declaration of Variables – Defining Symbolic Constants – Declaring a variable as a constant – overflow and underflow of data | | |
| | OperatorsandExpressions:Arithmetic, relational, logical, assignment operators – increment and decrement operators, conditional operators, bitwise operators, special operators – Arithmetic Expressions- | 5 | Lecture |
| | Evaluation of Expressions – Precedence of Arithmetic Operators – Type Conversions in Expressions – Operator Precedence and Associativity. | 5 | Lecture |
| UNIT 11 | | | |
| | Managing I/O Operations:Reading and Writing a Character – Formatted Input, Output | 5 | Peer teaching |
| | Decision Making and Branching: if statement - if else statement - nesting of if else statements - else if ladder – switch statement – | 5 | Lecture and ICT |
| | the ?: operator – goto statement – the while statement – do statement – the for statement – jumps in loops. | 5 | Videos |
| UNIT III | | | |
| | Arrays:One-Dimensional Arrays – Declaration, Initialization – Two-Dimensional Arrays – Multi-dimensional Arrays – Dynamic Arrays – Initialization. | 6 | Lecture |
| | Strings: Declaration, Initialization of string variables – | 5 | Lecture |
| | reading and writing strings – string handling functions | 4 | ICT |
| UNIT IV | | | |
| | User-defined functions: need – multi-function programs – elements of user defined functions – definition – return values and their types – function calls, declaration, category – all types of arguments and return values – nesting of functions – recursion – passing arrays, strings to functions – scope visibility and life time of variables. | 5 | Lecture |
| | Structures and Unions: Defining a structure – declaring a structure variable – accessing structure members – initialization – | 5 | Videos |

| | | | |
|---|---|---|---|
| | copying and comparing – operation on individual members – array of structures – arrays within structures – structures within structures – structures and functions – unions – size of structures – bit fields. | 5 | PPT |
| UNIT V | | | |
| | Pointers: Accessing the address of a variable – declaring, initialization of pointer variables – accessing a variable through its pointer – chain of pointers – pointer increments and scale factors – pointers and character strings – pointers as function arguments – pointers and structures. | 5 | Lecture |
| | Files: Defining, opening, closing a file – IO Operations on files – | 5 | ICT |
| | Error handling during IO operations – command line arguments. | 5 | Lecture |

| Course Outcomes (Cos) | Programme Outcomes (POs) | | | | | Programme Specific Outcomes (PSOs) | | | | | Mean scores of Cos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO 1 | PSO2 | PSO3 | PSO4 | PSO5 | |
| CO1 | 5 | 4 | 5 | 1 | 2 | 4 | 5 | 2 | 3 | 5 | 3.6 |
| CO2 | 4 | 3 | 2 | 4 | 2 | 4 | 2 | 2 | 5 | 3 | 3.1 |
| CO3 | 5 | 4 | 4 | 3 | 3 | 4 | 5 | 2 | 1 | 3 | 3.4 |
| CO4 | 5 | 4 | 4 | 2 | 4 | 4 | 5 | 2 | 1 | 3 | 3.4 |
| CO5 | 5 | 3 | 4 | 2 | 2 | 4 | 5 | 2 | 2 | 2 | 3.1 |
| Mean Overall Score | | | | | | | | | | | 3.32 |

| Mapping | 1-20% | 21-40% | 41-60% | 61-80% | 81-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Relation | 0.0-1.0 | 1.1-2.0 | 2.1-3.0 | 3.1-4.0 | 4.1-5.0 |
| Quality | Very Poor | Poor | Moderate | High | Very High |

Mean Score of COs = Total of Value

Total No. of Pos & PSOs

Mean Overall Score of COs = Total of Mean Score

Total No. of COs

| BLOOM"S TAXANOMY | INTERNAL | EXTERNAL |
|---|---|---|
| KNOWLEDGE | 50% | 50% |
| UNDERSTANDING | 30% | 30% |
| APPLY | 20% | 20% |

Course Designer: Department of Computer Applications

**Programme : BCA**                                    **Part III: Allied-1**
**Semester   : I**                                     **Hours  : 4 P/W 75 Hrs P/S**
**Sub. Code  : U22AUU1**                               **Credits :3**

### TITLE OF THE PAPER: DISCRETE MATHEMATICS

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|----------|-------|---------|---------------|--------------------|-----|
|          | 4     | 4       | -             | -                  | -   |

**PREAMBLE:**

To equip the students with applications of discrete mathematics in the field of computer science. To cover sets, logic, proving techniques, combinatorial functions, relations and Graph theory.

| COURSE OUTCOME | Unit | Hrs P/S |
|----------------|------|---------|
| At the end of the Semester, the Students will be able to | | |
| **UNIT 1 CO1**:  Apply boolean algebra, the language that simplifies communication in the world of computers. | 1 | 15 |
| **UNIT 2 CO2**: Use formal logic, and will be able to identify interesting outcomes | 2 | 15 |
| **UNIT 3 CO3**: Implement mathematical structures (sets, relations, functions, sequences, series, graphs) in real world situations. | 3 | 15 |
| **UNIT 4 CO4**: Summarize principles of counting and will be able to grasp patterns in data that follows fixed set of rules. | 4 | 15 |
| **UNIT 5 CO5**: Discuss graph concepts. | 5 | 15 |

**SYLLABUS**
**UNIT I:**

Set Theory: Introduction – Sets – Notation and Description of Sets – Subsets – Venn – Euler Diagrams – Operation on sets – Properties of set operations – Verification of basic laws and algebra by Venn diagram.

**UNIT II:**

Relations and Functions: Relations – Representation of a relation – Operations on relations – equivalence relation – Closures &Warshalls Algorithm – Partial order Relation – Hasse Diagrams – Lattice.

**UNIT III:**

Logic: Introduction – IF statements – Connectives – Truth table of a formula – Tautology – Tautological implications and Equivalence of formulae – Quantifiers.

**UNIT IV:**

Recurrence relations and Generating functions: Recurrence relation – an introduction – Polynomial and their evaluations – Recurrence relations – Solutions of finite order homogeneous (linear) relations – Solutions of non-homogeneous relations – Generating functions (for all the theorem consider the statements without proofs).

**UNIT V:**

Introduction: What is a graph – Application of graphs – Finite and infinite graphs – Incidence and degree – Isolated vertex, Pendant vertex and null graph. Paths and circuits : Isomorphism – Sub graphs – A puzzle with multicolored cubes – walks, paths and circuits – Connected graphs, disconnected graphs and components – Euler Graphs – Operations on graph – Hamiltonian paths and circuits ( Excluding theorems) – The travelling salesman problem. Trees and fundamental circuits: Trees – Some properties of trees (Theorem 3.1, 3.2, 3.3 only) - Pendant vertices in a tree – Distance and centers in a tree (Theorem 3.9 only).

**TEXT BOOKS:**

1. Discrete Mathematics – M.Venkataraman, N.Sridharan and N.Chandrasekaran – The National Publishing Company, May 2009.
2. Graph Theory with applications to Engineering and Computer Science , NarsinghDeo, Prentice Hall of India Pvt. Limited, 1999
   UnitI :Text Book 1 - Chapter 1.1 to 1.8

   Unit II: Text Book 1 - Chapter 2 (2.2 to 2.6), 10.1

   Unit III: Text Book 1 - Chapter 9 (9.1 to 9.3, 9.6 to 9.8, 9.15)

   Unit IV: Text Book 1 - Chapter 5.1 to 5.6

   Unit V: Text Book 2. Chapter 1.1 – 1.5, 2.1 – 2.7, 2.9(Excluding Theorems), 2.10, 3.1 – 3.2 (Theorem 3.1,3.2,3.3 only), 3.3,3.4(Theorem 3.9 only)

**REFERENCES:**

1. B. Gottfried, "Schaum's Outline of Programming with C", 3rd Edition, Tata McGraw Hill,2010.
2. J.R. Hanly and E.B. Koffman, "Problem Solving and Program Design in C", 6th Edition, Pearson Education, 2009.
3. Programming with ANSI and Turbo C, Ashok N.Kamthane , Pearson Education, 2006
4. H. Schildt, C: The Complete Reference, 4th Edition, TMH Edition, 2000.
5. Kanetkar Y., Let us C, BPB Pub., New Delhi, 1999.

| UNITS | TOPIC | LECTURE HOURS | MODE OF TEACHING |
|---|---|---|---|
| UNIT 1 | | | |
| | Set Theory: Introduction – Sets – Notation and Description of Sets – Subsets– | 5 | Lecture |
| | – Venn – Euler Diagrams – Operation on sets – Properties of set operations | 5 | Lecture |
| | Verification of basic laws and algebra by Venn diagram. | 5 | Lecture |
| UNIT 11 | | | |
| | Relations and Functions: Relations – Representation of a relation —. | 5 | Lecture |
| | Operations on relations – equivalence relation – Closures &Warshalls Algorithm | 5 | Lecture |
| | Partial order Relation – Hasse Diagrams – Lattices | 5 | Lecture |
| UNIT III | | | |
| | Logic: Introduction – IF statements – Connectives | 5 | Lecture |
| | Truth table of a formula – Tautology | 5 | Lecture |
| | Tautological implications and Equivalence of formulae – Quantifiers. | 5 | Lecture |
| UNIT IV | | | |
| | Recurrence relations and Generating functions: Recurrence relation – an introduction – Polynomial and their evaluations — | 5 | Lecture |
| | Recurrence relations – Solutions of finite order homogeneous (linear) relations – Solutions of non-homogeneous relations | 5 | Lecture |
| | Generating functions (for all the theorem consider the statements without proofs). | 5 | Lecture |
| UNIT V | | | |
| | Introduction: What is a graph – Application of graphs – Finite and infinite graphs – Incidence and degree | 5 | Lecture |

| | | | |
|---|---|---|---|
| | – Isolated vertex, Pendant vertex and null graph. | | |
| | Paths and circuits : Isomorphism – Sub graphs – A puzzle with multicolored cubes – walks, paths and circuits – Connected graphs, disconnected graphs and components – Euler Graphs – Operations on graph – Hamiltonian paths and circuits ( Excluding theorems) – The travelling salesman problem. | 5 | Lecture |
| | Treesand fundamental circuits: Trees – Some properties of trees (Theorem 3.1, 3.2, 3.3 only) - Pendant vertices in a tree – Distance and centers in a tree (Theorem 3.9 only). | 5 | Lecture |

| Course Outcomes (Cos) | Programme Outcomes (POs) | | | | | Programme Specific Outcomes (PSOs) | | | | | Mean scores of Cos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | |
| CO1 | 5 | 4 | 5 | 4 | 2 | 4 | 5 | 3 | 3 | 5 | 4 |
| CO2 | 4 | 3 | 4 | 4 | 2 | 4 | 5 | 2 | 5 | 3 | 3.6 |
| CO3 | 4 | 4 | 5 | 3 | 5 | 4 | 5 | 2 | 1 | 3 | 3.6 |
| CO4 | 5 | 4 | 4 | 5 | 4 | 4 | 5 | 2 | 1 | 3 | 3.7 |
| CO5 | 5 | 3 | 4 | 2 | 4 | 4 | 5 | 2 | 2 | 2 | 3.3 |
| Mean Overall Score | | | | | | | | | | | 3.64 |

| Mapping | 1-20% | 21-40% | 41-60% | 61-80% | 81-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Relation | 0.0-1.0 | 1.1-2.0 | 2.1-3.0 | 3.1-4.0 | 4.1-5.0 |
| Quality | Very Poor | Poor | Moderate | High | Very High |

Mean Score of COs =      Total of Value
                                    Total No. of Pos & PSOs

Mean Overall Score of COs = Total of Mean Score
                                                Total No. of COs

| BLOOM"S TAXANOMY | INTERNAL | EXTERNAL |
|---|---|---|
| KNOWLEDGE | 50% | 50% |
| UNDERSTANDING | 30% | 30% |
| APPLY | 20% | 20% |

Course Designer:     Department of Computer Applications

| BLOOM"S TAXANOMY | INTERNAL | EXTERNAL |
|---|---|---|

**Programme : BCA**                                      **Part III:** Core-2

**Semester    : I**                                      **Hours  : 6 P/W 75Hrs P/S**
**Sub. Code    U22CU2**P                                 **Credits : 3**
### TITLE OF THE PAPER: PROGRAMMING IN C LAB

| Pedagogy | Hours | Practicals | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|----------|-------|------------|---------------|--------------------|-----|
|          | 6     | 4          | -             | 1                  | -   |

**SYLLABUS**
   1. Write a program in C to find the maximum and minimum element in an array. (user input)
   2. Write a program in C to print all unique elements in an array. (user input)
   3. Write a Program in C to Check Whether a string is Palindrome or Not (without using default string functions)
   4. Write a program in C to menu driven program for string manipulation using switch case
   5. Write a program in C to Sum of digit
   6. Write a program in C to check a given number Armstrong or not.

   7. Write a program in C to print Pascal triangle upto n rows.
      Sample Input: 5
      Sample Output:

              1

             1 1

            1 2 1

           1 3 3 1

          1 4 6 4 1

   8. Write a program in C to convert decimal number to binary number using the function
   9. Write a program in C to search an element using linear search technique.
   10. Write a program in C to add two Matrices and display matrix format with result
   11. Write a program in C to print Fibonacci Series using recursion.
   12. Write a program in C to implementation of Digital Clock
   13. Write a program in C to count the number of vowels and consonants in a string using a pointer.
   14. Write a program in C to create and store information in a text file
   15. Write a program in C to extract individual bytes from an unsigned int using union.
   16. Write a program in C for multiplication of two matrices (User input: row, column, Matrix A, Matrix B)
   17. Write a program in C to Finding the No. of characters, words and lines from a given text file
   18. Write a program in C to copy a file in another name.
   19. Write a program in C to Binary Search
   20. Write a program in C to read and write information of an employee using structure
    21. Write a Program in C to design Log In screen, check username and password using structure.

**Programme : B.C.A**                                    **Part III: Core 3**
**Semester    : II**                                      **Hours  : 6 P/W  60Hrs P/S**
**Sub. Code    : U22CU3**                                 **Credits : 5**

### TITLE OF THE PAPER: OBJECT ORIENTED PROGRAMMING WITH C++

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|---|---|---|---|---|---|
| | 6 | 2 | 1 | 1 | - |

**PREAMBLE:**
   To develop knowledge in object oriented programming concepts. To design  Programs in C++.

| COURSE OUTCOME | Unit | Hrs P/S |
|---|---|---|
| At the end of the Semester, the Students will be able to | | |
| **UNIT 1 CO1**: Design programs with object and classes. | 1 | 12 |
| **UNIT 2 CO2**: Discuss the significance of object oriented concepts for modular development. | 2 | 12 |
| **UNIT 3 CO3**: Apply Object Oriented Programming Concepts. | 3 | 12 |
| **UNIT 4 CO4**: Implement the concept of polymorphism and inheritance. | 4 | 12 |
| **UNIT 5 CO5**: Design the application software using C++. | 5 | 12 |

**SYLLABUS**
**UNIT I:**
        Software Crisis – Software Evolution – Basic Concepts of Object-Oriented Programming –
Benefits of OOP – Object-Oriented Languages - Applications of OOP – Application of C++ - Structure of
a C++ Program – Tokens – Keywords – Identifiers – Basic Data Types – User-defined Data types –
Derived data types – Symbolic constants – Type compatibility – Declaration of variables – Dynamic
initialization of variables –Reference variables – Operators in C++ - Manipulators – Type cast operator
– Expressions and their types-Implicit conversions – Control structures – The main function – Function
prototyping – inline functions – Function overloading.
**UNIT II:**
        Specifying a class – Defining member functions – Making an outside function inline – Nesting
of member functions – Private member functions – Array within a class – Memory allocation for objects
– Static data members – Static member functions – Array of objects - Objects as function arguments –
Friendly functions – Returning objects – Constant member functions – Constructors – Parameterized
constructor – Multiple constructors in a class – Constructors with default arguments – Dynamic
initialization of objects – Copy constructor – Destructors.
**UNIT III:**
        Defining operator overloading – Overloading unary operators – Overloading binary operators –
Overloading binary operators using friend function – Rules for overloading operators - Defining derived
classes – Single inheritance – Making a private member inheritable – Multilevel inheritance –

Multiple inheritance – Hierarchical inheritance – Hybrid inheritance - Virtual base classes – Constructors in derived class – Member classes: Nesting of classes.

**UNIT IV:**

Pointer to objects – this pointer – Pointers to derived classes – Virtual functions –Pure virtual functions – C++ Stream classes – Unformatted I/O operations –Managing output with manipulator

**UNIT V:**

Classes of file stream operations – Opening and Closing files – Detecting end of file – More about open() function – File modes, File pointers and their manipulation – Sequential input and output operations – Command-line arguments- Templates: class templates and function templates.

**TEXT BOOKS:**

Object Oriented Programming with C**++,** E. Balagurusamy, McGraw Hill Education (India) Private Limited, New Delhi, *Sixth Edition***-**2013

**REFERENCES:**

1. C++ - The Complete Reference, Herbert Schildt, TMH, 1998.
2. C++ How to Program, Paul Deitel, Harvey Deitel, PHI, Ninth edition (2014).
3. Ashok N.Kamthane, Object Oriented Programming with ANSI & Turbo C ++, Pearson Education, 2006.
4. Object-Oriented Programming Using C++, Alok Kumar Jagadev, Amiya Kumar Rath and SatchidanandaDehuri, Prentice-Hall of India Private Limited, New Delhi, 2007.

| UNITS | TOPIC | LECTURE HOURS | MODE OF TEACHING |
|-------|-------|---------------|------------------|
| UNIT 1 | | | |
| | Software Crisis – Software Evolution – Basic Concepts of Object-Oriented Programming – Benefits of OOP – Object-Oriented Languages - Applications of OOP – Application of C++ | 4 | Lecture |
| | - Structure of a C++ Program – Tokens – Keywords – Identifiers – Basic Data Types – User-defined Data types – Derived data types – Symbolic constants – Type compatibility – Declaration of variables – Dynamic initialization | 4 | Peer Teaching |

| | | | |
|---|---|---|---|
| | of variables –Reference variables | | |
| | Operators in C++ - Manipulators – Type cast operator – Expressions and their types-Implicit conversions – Control structures – The main function – Function prototyping – inline functions – Function overloading. | 4 | Lecture |
| UNIT 11 | | | |
| | Specifying a class – Defining member functions – Making an outside function inline – Nesting of member functions – Private member functions – Array within a class – Memory allocation for objects – Static data members – Static member functions | 4 | Lecture |
| | Array of objects - Objects as function arguments – Friendly functions – Returning objects – Constant member functions | 4 | Lecture |
| | Constructors – Parameterized constructor – Multiple constructors in a class – Constructors with default arguments – Dynamic initialization of objects – Copy constructor – Destructors. | 4 | Lecture |
| UNIT III | | | |
| | Defining operator overloading – Overloading unary operators – Overloading binary operators – Overloading binary operators using friend function – Rules for overloading operators | 4 | Lecture |
| | Defining derived classes – Single inheritance – Making a private member inheritable – Multilevel inheritance – Multiple inheritance – Hierarchical inheritance – Hybrid inheritance - | 5 | Lecture |
| | Virtual base classes – Constructors in derived class – Member classes: Nesting of classes. | 3 | Lecture |
| UNIT IV | | | |
| | Pointer to objects – this pointer – Pointers to derived classes – | 5 | Videos |
| | Virtual functions – Pure virtual functions – | 3 | Lecture |

| | C++ Stream classes – Unformatted I/O operations – Managing output with manipulators. | 4 | Lecture |
|---|---|---|---|
| UNIT V | | | |
| | Classes of file stream operations – Opening and Closing files – Detecting end of file – More about open() function – | 4 | Lecture |
| | File modes, File pointers and their manipulation – Sequential input and output operations – Command-line arguments- | 4 | PPT |
| | Templates: class templates and function templates. | 4 | Lecture |

| Course Outcomes (Cos) | Programme Outcomes (POs) | | | | | Programme Specific Outcomes (PSOs) | | | | | Mean scores of Cos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | |
| CO1 | 3 | 4 | 3 | 3 | 2 | 4 | 5 | 3 | 3 | 5 | 3.5 |
| CO2 | 4 | 3 | 2 | 2 | 3 | 4 | 5 | 2 | 5 | 3 | 3.3 |
| CO3 | 2 | 4 | 4 | 3 | 5 | 4 | 5 | 2 | 1 | 3 | 3.3 |
| CO4 | 5 | 4 | 3 | 5 | 4 | 2 | 5 | 2 | 1 | 3 | 3.4 |
| CO5 | 5 | 3 | 4 | 2 | 4 | 4 | 5 | 2 | 2 | 2 | 3.3 |
| Mean Overall Score | | | | | | | | | | | 3.36 |

| Mapping | 1-20% | 21-40% | 41-60% | 61-80% | 81-100% |
|---------|-------|--------|--------|--------|---------|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Relation | 0.0-1.0 | 1.1-2.0 | 2.1-3.0 | 3.1-4.0 | 4.1-5.0 |
| Quality | Very Poor | Poor | Moderate | High | Very High |

Mean Score of COs =  Total of Value

Total No. of Pos & PSOs

Mean Overall Score of COs = Total of Mean Score

Total No. of COs

| BLOOM"S TAXANOMY | INTERNAL | EXTERNAL |
|------------------|----------|----------|
| KNOWLEDGE | 50% | 50% |
| UNDERSTANDING | 30% | 30% |
| APPLY | 20% | 20% |

Course Designer:                        Department of Computer Applications

**Programme : BCA**                                      **Part III:** Allied – 1

**Semester     : II**                                    **Hours  : 3 P/W 75 Hrs P/S**
**Sub. Code    : U22AUU2**                               **Credits : 3**

### TITLE OF THE PAPER: PROBABILITY AND STATISTICS

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|----------|-------|---------|---------------|--------------------|-----|
|          | 5     | 5       | -             | -                  | -   |

**PREAMBLE:**
       To impart the basices of Probability and statistical.

| COURSE OUTCOME | Unit | Hrs P/S |
|----------------|------|---------|
| At the end of the Semester, the Students will be able to | | |
| **UNIT 1 CO1**: Acquire the basic concept of Probability and Conditional probability. | 1 | 15 |
| **UNIT 2 CO2**: Summarize the concept of random variables, expectations and moment generating functions. | 2 | 15 |
| **UNIT 3 CO3**: Discuss about some standard distributions. | 3 | 15 |
| **UNIT 4 CO4**: Know about correlation and regression. | 4 | 15 |
| **UNIT 5 CO5**: Understand the concept of testing of hypothesis. | 5 | 15 |

**SYLLABUS**
**UNIT I:**
       Mean Medium, Mode, Standard Deviation, Mean Deviation, and Quartile Deviation.

 **UNIT II:**
        Curve Fitting – Principle of Least Square – Fitting a Straight Line – Fitting a Second Degree
Parabola – Fitting Exponential Curve.

**UNIT III:**
       Correlation – Rank Correlation – Regression – Correlation Coefficient for a Vicariate –
Frequency Distribution.

**UNIT IV:**
       Probability – Conditional Probability – Random Variables – Discrete Random Variables –
Continuous Random Variables – Mathematical Expectations – Moment Generating Functions.

**UNIT V:**
        Some Special Distribution – Binomial Distribution – Poisson distribution – Normal
Distribution.

**TEXT BOOKS:**

Statistics, S. Arumugam and A. ThangapandiIssac , New Gamma Publishing House.

**REFERENCES:**

1. KishorS.Trivedi - Probability and statistics with reliability queuing and Computer Science Applications - Prentice Hall of India(P) Ltd., New Delhi - 1997.
2. S. Arumugam - Statistics, Gamma Publishers, Palayankotai, 1997.

| UNITS | TOPIC | LECTURE HOURS | MODE OF TEACHING |
|---|---|---|---|
| UNIT 1 | | | |
| | Mean Medium, Mode,. | 5 | Lecture |
| | Standard Deviation, | 5 | Lecture |
| | Mean Deviation, and Quartile Deviation | 5 | Lecture |
| UNIT 11 | | | |
| | Curve Fitting – Principle of Least Square – Fitting a Straight Line –. | 5 | Lecture |
| | Fitting a Second Degree Parabola | 5 | Lecture |
| | – Fitting Exponential Curve | 5 | Lecture |
| UNIT III | | | |
| | Correlation – Rank Correlation – | 5 | Lecture |
| | Regression – | 5 | Lecture |
| | Correlation Coefficient for a Vicariate – Frequency Distribution. | 5 | Lecture |
| UNIT IV | | | |
| | Probability – Conditional Probability – Random Variables — | 5 | Lecture |
| | .Discrete Random Variables – Continuous Random Variables | 5 | Lecture |
| | Mathematical Expectations – Moment Generating Functions | 5 | Lecture |
| UNIT V | | | |
| | Some Special Distribution – Binomial Distribution – | 5 | Lecture |
| | Poisson distribution | 6 | Lecture |
| | Normal Distribution. | 4 | Lecture |

| Course Outcomes (Cos) | Programme Outcomes (POs) | | | | | Programme Specific Outcomes (PSOs) | | | | | Mean scores of Cos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO 1 | PSO2 | PSO3 | PSO4 | PSO5 | |
| CO1 | 3 | 4 | 3 | 4 | 2 | 2 | 5 | 3 | 3 | 5 | 3.4 |
| CO2 | 4 | 3 | 2 | 2 | 2 | 3 | 5 | 2 | 5 | 3 | 3.1 |
| CO3 | 2 | 4 | 4 | 3 | 5 | 2 | 5 | 2 | 1 | 3 | 3.1 |
| CO4 | 5 | 4 | 3 | 5 | 4 | 3 | 5 | 2 | 1 | 3 | 3.5 |
| CO5 | 5 | 3 | 1 | 2 | 4 | 5 | 5 | 2 | 2 | 2 | 3.1 |
| Mean Overall Score | | | | | | | | | | | 3.2 |

| Mapping | 1-20% | 21-40% | 41-60% | 61-80% | 81-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Relation | 0.0-1.0 | 1.1-2.0 | 2.1-3.0 | 3.1-4.0 | 4.1-5.0 |
| Quality | Very Poor | Poor | Moderate | High | Very High |

Mean Score of COs =    $\dfrac{\text{Total of Value}}{\text{Total No. of Pos \& PSOs}}$          Mean Overall Score of COs = $\dfrac{\text{Total of Mean Score}}{\text{Total No. of COs}}$

| BLOOM"S TAXANOMY | INTERNAL | EXTERNAL |
|---|---|---|
| KNOWLEDGE | 50% | 50% |
| UNDERSTANDING | 30% | 30% |
| APPL | 20% | 20% |

Course Designer:          Department of Computer Applications.

**Programme : B.C.A**                                      **Part III: Core-5**
**Semester   : II**                                        **Hours  : 3 P/W  60Hrs P/S**
**            :**
**Sub. Code   U22CU4P**                                    **Credits :3**
### TITLE OF THE PAPER: PROGRAMMING IN C++ LAB

| Pedagogy | Hours | practical | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|----------|-------|-----------|---------------|--------------------|-----|
|          | 4     | 3         | -             | 1                  | -   |

**SYLLABUS**

1. Generate prime numbers between the given two numbers.
2. Perform arithmetic operations using Inline function.
3. Accept a three digit number and display it in words.*(*Example 123 should be printed out as One Two Three)
4. Find the sum of given numbers using function with default arguments.
5. Swap two values using methods of passing arguments in function
6. Prepare a student Record using class and object.
7. Find the area of geometric shapes using function overloading.
8. Illustrate the concept of Friend function.
9. Demonstrate default constructor or no argument constructor.
10. Demonstrate parameterized constructor.
11. Demonstrate copy constructor.
12. Demonstrate constructor overloading.
13. Demonstrate destructors.
14. Demonstrate constructor using „this" pointer.
15. Demonstrate constructor with default arguments.
16. Program using manipulators.
17. Perform operator overloading for Unary minus, unary increment and unary decrement
18. Concatenate two strings using the concept of Binary operator overloading.
19. Perform addition and subtraction of complex numbers using Binary Overloading.
20. Create student mark sheet using single inheritance.
21. Prepare employee information using multiple inheritance.
22. Process employee details using hierarchical inheritance.
23. Implement the concept of Virtual functions.
24. Implement the concept of virtual base class.
25. Sort the given set of numbers using function templates
26. Search the key element in the given set of numbers using class template.
27. Processing mark list using binary file.
28. Count number of objects in a file.
29. Demonstrating the use of Command-line arguments.
30. Implement a file handling concept using sequential access.
31. Implement file handling concept using random access

**Programme : BCA**                             **Part III: Skill BasedElective-2**
**Semester   : II**                              **Hours  : 4 P/W  30Hrs P/S**
**Sub. Code   : U22CU5P**                       **Credits : 4**

## TITLE OF THE PAPER: SPSS LAB

| Pedagogy | Hours | Practical | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|---|---|---|---|---|---|
| | 2 | 2 | - | - | - |
| **SYLLABUS** <br> 1. Frequency Tables <br> 2. Graphical Representation Of Data <br> 3. Measures Of Central Tendencies <br> 4. Methods Of Dispersion <br> 5. Simple Correlation <br> 6. Correlation Coefficient <br> 7. Regression Trend <br> 8. Test Of Significance Large Sample Test (Z-Test) <br> 9. Test Of Significance Small Sample Test (T-Test) <br> 10. Chi-square Test <br> 11. Testing Hypothesis About Two Independent Means. | | | | | |

**Programme : BCA**             **Part III: Core-7**
**Semester : III**             **Hours : 6 P/W 60Hrs P/S**
**Sub. Code : U22CU6**             **Credits : 5**

### TITLE OF THE PAPER: PROGRAMMING IN JAVA

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|---|---|---|---|---|---|
| | 4 | 2 | 1 | 1 | - |

**PREAMBLE:**
- To impart knowledge in Platform Independent programming language Java.
- To explore Package and Applet concepts.
- To enhance the knowledge in Multithread and Graphics concepts.

| COURSE OUTCOME<br><br>At the end of the Semester, the Students will be able to | Unit | Hrs P/S |
|---|---|---|
| **UNIT 1 CO1**: Develop Java application using OOP concepts with appropriate program structure. | 1 | 12 |
| **UNIT 2 CO2**: Understand the concepts of polymorphism and inheritance. | 2 | 12 |
| **UNIT 3 CO3**: Develop packages and interfaces in a Java program. | 3 | 12 |
| **UNIT 4 CO4**: Implement exception handling in java. | 4 | 12 |
| **UNIT 5 CO5**: To design an applet program using AWT. | 5 | 12 |

**SYLLABUS**

**UNIT I:**

JavaEvolution: Java Features – How Java differs from C and C++ – Java and Internet – Java and World Wide Web – Web Browsers – Hardware and Software Requirements – Java Environment. Overview of Java Language: Simple Java Program – Java Program Structure – Java Tokens – Java Statements – Implementing a Java Program – Java Virtual Machine – Command Line Arguments. Constants – Variables – Data types – Declaration of Variables – Giving Values to variables – Scope of Variables – Symbolic Constants – Type Casting. Operators and Expressions: Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operators – Bitwise Operators – Special Operators – Arithmetic Expressions – Evaluation of Expressions – Precedence of Arithmetic Operators – Operator Precedence and Associativity – Mathematical Functions. Decision Making and Branching: Decision Making with If statement – Simple If Statement – If else Statement – Nesting If Else Statement – the ElseIf Ladder – The switch Statement – The ?: operator. Decision Making and Looping: The while statement – The do statement – The for statement – Jumps in Loops.

**UNIT II:**

Class, Objects and Methods: 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 – Visibility Control. Arrays, Strings and Vectors: One – dimensional Arrays – creating an Array – Two dimensional Arrays – Strings – Vectors – Wrapper Classes – Enumerated Types. Interfaces: Multiple Inheritance : Defining Interfaces – Extending Interfaces – Implementing Interfaces – Accessing Interface Variables.

**UNIT III:**

Packages: 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. Multithreaded Programming: Creating Threads – Extending the Thread Class – Stopping and Blocking a Thread – Life Cycle of a Thread – Using Thread Methods – Thread Exceptions – Thread Priority – Synchronization – Implementing the Runnable Interface.

**UNIT IV:**

Managing Errors and Exceptions: Types of Errors – Exceptions – Syntax of Exception Handling Code – Multiple Catch Statements – Using Finally Statement – Throwing our own Exceptions – Using Exceptions for debugging. Applet Programming: How Applets differ from Applications – Preparing to write Applets – Building Applet Code – Applet Life Cycle – Creating an executable Applet – Designing a WebPage – Applet Tag – Adding Applet to HTML file – Running the Applet.

**UNIT V:**

Graphics Programming: The Graphics Class – Lines and Rectangles – Circles and Ellipses, Drawing Arcs – Drawing Polygons – Line Graphs – Using Control Loops in Applets – Drawing Bar Charts. Managing Input/Output Files in Java: Concept of Streams – Stream Classes – Byte Stream Classes – Character Stream Classes – Using Streams – Other Useful I/O Classes – Using the file Class – I/O Exceptions – Creation of Files – Reading / Writing Characters – Reading / Writing Bytes – Handling Primitive Data Types – Concatenating and Buffering Files – Random Access Files – Interactive Input and Output.

**TEXT BOOKS:**

Programming with Java, E.Balagurusamy, A primer, Tata McGraw Hill, Fourth Edition, 2008.

**REFERENCES:**

1. Object Oriented Programming Through JAVA- P.Radha Krishna, University Press, 2007.
2. Java and Object-Oriented Programming Paradigm, Debasish Jana, Prentice Hall of India Private Limited, New Delhi, 2008. Edition, July 2014 Reprint.
3. The Complete Reference, Java2, Herbert Schildt, Tata McGraw Hill, Fifth Edition, 2002.
4. Introduction to Java Programming ,K.Somasundaram, Jaico Publications, 2013.
5. Core Java - Vol. I – Fundamentals, Cay S. Horstmann, Pearson Education; Tenth edition, 2016.

| UNITS | TOPIC | LECTURE HOURS | MODE OF TEACHING |
|---|---|---|---|
| UNIT 1 | | | |
| | JavaEvolution: Java Features – How Java differs from C and C++ – Java and Internet – Java and World Wide Web – Web Browsers – Hardware and Software Requirements – Java Environment. | 5 | Lecture |
| | Overview of Java Language: Simple Java Program – Java Program Structure – Java Tokens – Java Statements – Implementing a Java Program – Java Virtual Machine – Command Line Arguments. Constants – Variables – Data types – Declaration of Variables – Giving Values to variables – Scope of Variables – Symbolic Constants – Type Casting. | 4 | PPT |
| | Operators and Expressions: Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operators – Bitwise Operators – Special Operators – Arithmetic Expressions – Evaluation of Expressions – Precedence of Arithmetic Operators – Operator Precedence and Associativity – Mathematical Functions. Decision Making and Branching: Decision Making with If statement – Simple If Statement – If else Statement – Nesting If Else Statement – the ElseIf Ladder – The switch Statement – The ?: operator. Decision Making and Looping: The while statement – The do statement – The for statement – Jumps in Loops. | 3 | Peer Teaching |
| UNIT 11 | | | |
| | Class, Objects and Methods: 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 – Visibility Control. | 4 | Lecture |
| | Arrays, Strings and Vectors: One – dimensional Arrays – creating an Array – Two dimensional Arrays – | 4 | Peer Teaching |

| | | | |
|---|---|---|---|
| | Strings – Vectors – Wrapper Classes – Enumerated Types. | | |
| | Interfaces: Multiple Inheritance : Defining Interfaces – Extending Interfaces – Implementing Interfaces – Accessing Interface Variables. | 4 | Lecture |
| **UNIT III** | | | |
| | Packages: 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. | 4 | Lecture |
| | Multithreaded Programming: Creating Threads – Extending the Thread Class – Stopping and Blocking a Thread – Life Cycle of a Thread – Using. | 4 | Lecture |
| | Thread Methods – Thread Exceptions – Thread Priority – Synchronization – Implementing the Runnable Interface | 4 | Lecture |
| **UNIT IV** | | | |
| | Managing Errors and Exceptions: Types of Errors – Exceptions – Syntax of Exception Handling Code – Multiple Catch Statements – Using Finally Statement – Throwing our own Exceptions – Using Exceptions for debugging. | 4 | Lecture |
| | Applet Programming: How Applets differ from Applications – Preparing to write Applets – Building Applet Code – Applet Life Cycle – Creating an executable Applet | 4 | PPT |
| | – Designing a WebPage – Applet Tag – Adding Applet to HTML file – Running the Applet. | 4 | Lecture |
| **UNIT V** | | | |
| | Graphics Programming: The Graphics Class – Lines and Rectangles – Circles and Ellipses, Drawing Arcs – Drawing Polygons – Line Graphs – Using Control Loops in Applets – Drawing Bar Charts. | 4 | Lecture |
| | Managing Input/Output Files in Java: Concept of Streams – Stream Classes – Byte Stream Classes – | 4 | PPT |

| | Character Stream Classes – Using Streams – Other Useful I/O Classes – Using the file Class – I/O Exceptions – Creation of Files – | | |
| | Reading / Writing Characters – Reading / Writing 4 Lecture Bytes – Handling Primitive Data Types – <br> Concatenating and Buffering Files – Random Access Files – Interactive Input and Output. | | |

| Course Outcomes (Cos) | Programme Outcomes (POs) | | | | | Programme Specific Outcomes (PSOs) | | | | | Mean scores of Cos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | |
| CO1 | 3 | 3 | 3 | 4 | 2 | 2 | 5 | 3 | 3 | 5 | 3.3 |
| CO2 | 4 | 5 | 2 | 2 | 2 | 3 | 5 | 2 | 5 | 3 | 3.3 |
| CO3 | 2 | 3 | 4 | 3 | 5 | 2 | 5 | 2 | 1 | 3 | 3 |
| CO4 | 5 | 4 | 3 | 5 | 4 | 3 | 5 | 2 | 1 | 3 | 3.5 |
| CO5 | 5 | 3 | 1 | 2 | 4 | 5 | 5 | 2 | 2 | 2 | 3.1 |
| Mean Overall Score | | | | | | | | | | | 3.24 |

| Mapping | 1-20% | 21-40% | 41-60% | 61-80% | 81-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Relation | 0.0-1.0 | 1.1-2.0 | 2.1-3.0 | 3.1-4.0 | 4.1-5.0 |
| Quality | Very Poor | Poor | Moderate | High | Very High |

Mean Score of COs = $\dfrac{\text{Total of Value}}{\text{Total No. of Pos \& PSOs}}$

Mean Overall Score of COs = $\dfrac{\text{Total of Mean Score}}{\text{Total No. of COs}}$

| BLOOM"S TAXANOMY | INTERNAL | EXTERNAL |
|---|---|---|
| KNOWLEDGE | 50% | 50% |
| UNDERSTANDING | 30% | 30% |
| APPLY | 20% | 20% |

Course Designer:             Department of Computer Applications

**Programme : BCA**  **Part III: Core-8**
**Semester : III**  **Hours : 6 P/W 45Hrs P/S**

**Sub. Code : U22CU7P**  **Credits : 3**

## TITLE OF THE PAPER: PROGRAMMING IN JAVA LAB

| Pedagogy | Hours | practical | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|----------|-------|-----------|---------------|--------------------|-----|
|          | 3     | 3         | -             | -                  | -   |

**SYLLABUS**

1. To implement a simple temperature conversion program.
2. To perform addition and subtraction of complex numbers using class and objects.
3. To perform volume calculation using method overloading.
4. Using command line arguments, test if the given string is palindrome or not.
5. String manipulation using String Methods (Use of any five String methods are preferred).
6. Write a program to fill names into a list .Also, copy them in reverse order into another list. If the name contains any numeric value throw an exception "Invalid Name"
7. Program to demonstrate the use of any two built-in exceptions in Java.
8. To perform multiplication of matrices using class and objects.
9. Using multilevel inheritance process student marks.
10. Implement multiple inheritance for payroll processing.
11. Implement interface for area calculation for different shapes.
12. Create a package called "Arithmetic" that contains methods to deal with all arithmetic operators. Also write a program to use the package.
13. Create two threads such that one of the thread generate Fibonacci series and another generate perfect numbers between two given limits.
14. Define an exception called **": Marks Out of bound:"** Exception, that is thrown if the entered marks are greater than 100.
15. Program to demonstrate the use of Wrapper class methods.
16. File Processing using Byte stream.
17. File Processing using Character Stream.
18. Write applets to draw the following Shapes:
    (a).Cone (b).Cylinder (c).Square inside a Circle (d).Circle inside a Square
19. Write an applet Program to design a simple calculator.
20. Write an Applet Program to animate a ball across the Screen.

**Programme : BCA**                                     **Part III: Allied-2**
**Semester   : III**                                    **Hours  : 4 P/W  75Hrs P/S**
**Sub. Code  : U22AUU3**                                **Credits : 3**

### TITLE OF THE PAPER: E-COMMERCE

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|----------|-------|---------|---------------|--------------------|----|
|          | 5     | 2       | -             | 1                  | 2  |

**PREAMBLE:** To impart the learners the basic concepts of Electronic Commerce and its applications. To equip the learners with knowledge about Electronic payment procedures and security issues in it.

| COURSE OUTCOME<br><br>At the end of the Semester, the Students will be able to | Unit | Hrs P/S |
|----|----|----|
| **UNIT 1 CO1**: Summarize the impact of information and Communication Technologies, on the internet in Business Operations. | 1 | 15 |
| **UNIT 2 CO2**:   Analyze Electronic Payment System and its environment. | 2 | 15 |
| **UNIT 3 CO3**: Make ethical decisions related to e-commerce based on laws, privacy, and security. | 3 | 15 |
| **UNIT 4 CO4**: Explain the steps, tools, and security considerations needed to start selling online. | 4 | 15 |
| **UNIT 5 CO5**: Discuss various types of digital documents. | 5 | 15 |

**SYLLABUS**
**UNIT I:**

Welcome to Electronic Commerce: Electronic Commerce Framework - Electronic Commerce and Media Convergence. The Network Infrastructure for Electronic Commerce: Components of I-way – Network Access equipment – Global Information Distribution Networks.

**UNIT II:**

Network Security and Firewalls: Firewalls and network Security – Data and message Security. Electronic Commerce and World Wide Web: Architectural Framework for Electronic Commerce – World Wide Web as the Architecture – Technology behind the Web – Security and the Web.

**UNIT III:**

Electronic Payment Systems: Types of Electronic Payment systems – Digital Token-based Electronic Payment Systems – Smart Cards and Electronic Payment Systems – Credit card based Electronic Payment Systems – Designing Electronic Payment Systems.

**UNIT IV:**

Inter organizational Commerce and EDI – Electronic Data Interchange – EDI: Legal, security and privacy issues. EDI Implementation, MIME and Value-Added Networks – EDI software Implementation – EDI envelope for message transport – Value-Added Network(VAN) .

**UNIT V:**

Intra organizational Electronic Commerce: Internal Information System – Workflow automation and coordination – Supply Chain Management (SCM). Corporate Digital Library: Type of Digital

Documents. Advertising and Marketing on the Internet : Advertising on the Internet – Chatting online marketing process.

**TEXT BOOKS:** Frontiers of Electronic Commerce, Ravi Kalakota, Andrew Whinston, Perarson Education, New Delhi, 1996.

**REFERENCES:**

1. E-Commerce and its applications, Dr. U.S. Pandey, Rahul Srivastava, SaurabhShukla, S. Chand & Company Ltd., New Delhi, 2008.
2. Electronic Commerce, Gary Schneider. P., Cengage Learning US, XII Edition, 2017.
3. Electronic Commerce – A Managerial Perspective, Efrain Turban, Jae Lee, David King, Michael Chung, H., Perarson Education, New Delhi, 2000.
4. Electronic Commerce, Peter Loshin, John R. Vacca, Charles River Media, 2003.
5. Electronic Commerce, Principles and Practice, HosseinBidgoli, Academic Press, 2002.
6. Electronic Commerce, Elias M. Awad, Prentice Hall, 2002.

| UNITS | TOPIC | LECTURE HOURS | MODE OF TEACHING |
|---|---|---|---|
| UNIT 1 | | | |
| | Welcome to Electronic Commerce: Electronic Commerce Framework - Electronic Commerce and MediaConvergence. | 5 | Lecture |
| | TheNetworkInfrastructureforElectronic Commerce: Components of I-way – | 5 | ICT |
| | Network Access equipment – Global Information Distribution Networks. | 5 | Lecture |
| UNIT 11 | | | |
| | Network Security and Firewalls: Firewalls and network Security – Data and message Security. | 5 | Lecture |
| | Electronic Commerce and World Wide Web: Architectural Framework for Electronic Commerce | 5 | PPT |
| | – World Wide Web as the Architecture – Technology behind the Web – Security and the Web. | 5 | PPT |

| UNIT III | | | |
|---|---|---|---|
| | Electronic Payment Systems: Types of Electronic Payment systems – Digital Token-based Electronic Payment Systems – | 6 | Lecture |
| | Smart Cards and Electronic Payment Systems – | 4 | Videos |
| | Credit card based Electronic Payment Systems – Designing Electronic Payment Systems. | 5 | Videos |
| UNIT IV | | | |
| | Interorganizational Commerce and EDI – Electronic Data Interchange – EDI: Legal, security and privacy issues. EDI Implementation, | 5 | Lecture |
| | MIME and Value-Added Networks – EDI software Implementation | 4 | Lecture |
| | – EDI envelope for message transport – Value-Added Network(VAN) . | 6 | Lecture |
| UNIT V | | | |
| | Intraorganizational Electronic Commerce: Internal Information System – | 4 | Lecture |
| | Workflow automation and coordination – Supply Chain Management (SCM). Corporate Digital Library: Type of Digital Documents. | 4 | Lecture |
| | Advertising and Marketing on the Internet : Advertising on the Internet – Chatting online marketing process. | 4 | Lecture |

| Course Outcomes (Cos) | Programme Outcomes (POs) | | | | | Programme Specific Outcomes (PSOs) | | | | | Mean scores of Cos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO 1 | PSO2 | PSO3 | PSO4 | PSO5 | |
| CO1 | 3 | 4 | 3 | 4 | 4 | 2 | 5 | 3 | 3 | 5 | 3.6 |
| CO2 | 4 | 3 | 2 | 2 | 5 | 3 | 5 | 2 | 5 | 3 | 3.4 |
| CO3 | 2 | 4 | 4 | 3 | 2 | 2 | 5 | 2 | 1 | 3 | 2.8 |
| CO4 | 5 | 4 | 3 | 5 | 2 | 3 | 5 | 2 | 1 | 3 | 3.3 |
| CO5 | 5 | 3 | 3 | 2 | 3 | 5 | 5 | 2 | 2 | 2 | 3.2 |
| Mean Overall Score | | | | | | | | | | | 3.26 |

| Mapping | 1-20% | 21-40% | 41-60% | 61-80% | 81-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Relation | 0.0-1.0 | 1.1-2.0 | 2.1-3.0 | 3.1-4.0 | 4.1-5.0 |
| Quality | Very Poor | Poor | Moderate | High | Very High |

Mean Score of COs =      Total of Value

                                    Total No. of Pos & PSOs

Mean Overall Score of COs =  Total of Mean Score

                                    Total No. of COs

| BLOOM"S TAXANOMY | INTERNAL | EXTERNAL |
|---|---|---|
| KNOWLEDGE | 50% | 50% |
| UNDERSTANDING | 30% | 30% |
| APPLY | 20% | 20% |

|  |  |  |  |
|---|---|---|---|

Course Designer: Department of Computer Applications

**Programme : BCA**                                    **Part III: Non Major Elective-1**
  **Semester    : V**                                    **Hours  : 2 P/W   30Hrs P/S**
**Sub. Code    :U22NMU1**                          **Credits : 2**

### TITLE OF THE PAPER:  COMPUTER FUNDAMENTALS

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |  |
|---|---|---|---|---|---|---|
|  | 2 | 1 | - | 1 | - |  |

**PREAMBLE:**
- To introduce about computer and its various parts
- To study about various input, output and memory devices which are widely used
- To study about variety of computer software and its functionalities

| COURSE OUTCOME<br><br>At the end of the Semester, the Students will be able to | Unit | Hrs P/S |
|---|---|---|
| **UNIT 1 CO1**:  Gain knowledge on data representation and Binary codes used. | 1 | 6 |
| **UNIT 2 CO2**: Ability to apply Boolean algebra in circuit design. | 2 | 6 |
| **UNIT 3 CO3**: Acquaintance of knowledge to design combinational and sequential circuits. | 3 | 6 |
| **UNIT 4 CO4**: Understanding the hardware used in computer arithmetic. | 4 | 6 |
| **UNIT 5 CO5**: Familiarity in information storage and retrieval concepts. | 5 | 6 |

**SYLLABUS**

**UNIT I:**

Introduction to computers: Types of computers-Characteristics of computers-What computer can"t do.

**UNIT II:**

Classification of digital computer system: Microcomputers-Mini computers-Mainframe computers-Supercomputers-Network computers.

**UNIT III:**

Anatomy of digital computer: Function and components of a computer-Central processing unit(CPU)-Memory-How the CPU and memory work.

**UNIT IV:**

Auxiliary storage devices: Hard disk-CD-ROM. Input devices: Keyboard-Mouse-Joystick-Scanners-Digital camera-Magnetic ink character recognition (MICR)-Optical character recognition (OCR)-Optical mark recognition -Bar code reader-Speech input devices –Touch screen-Light

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pen.Output devices: classification of monitors- Based on color-characteristics of monitor-printer-plotter-Sound cards and Speakers.

**UNIT V:**

Introduction to computer software: Operating systems-Utilities-compilers and interpreters- Word processors-Spreadsheets-Presentation Graphics-Database management systems (DBMS) –ImageProcessors. Operating Systems: Functions of an operating system-Classification of operating system.

**TEXT BOOKS:**

1) Fundamentals of Information Technology, Alexis Leon and Mathews Leon, Vikas Publishers.

**REFERENCES:**

1) The Internet Book, Douglas E.  Comer, Fourth Edition,  PHI Learning Pvt.  ltd.  , New Delhi, 2009.

2) Using the Internet the Easy Way, Young Kai Seng, Minerva Publications, First Edition, 2000.

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| UNITS | TOPIC | LECTURE HOURS | MODE OF TEACHING |
|---|---|---|---|
| UNIT 1 | | | |
| | Introduction to computers: Types of computers- | 2 | Peer Teaching |
| | Characteristics of computers- | 2 | Lecture |
| | What computer can"t do. | 2 | ICT |

| UNIT 11 | | | |
|---|---|---|---|
| | Classification of digital computer system: Microcomputers- | 2 | PPT |
| | Mini computers-Mainframe computers- | 2 | PPT |
| | Supercomputers-Network computers. | 2 | Lecture |
| UNIT III | | | |
| | Anatomy of digital computer: Function and components of a computer- | 2 | Videos |
| | Central processing unit(CPU)- Memory- | 2 | PPT |

| | How the CPU and memory work. | 2 | Lecture |
|---|---|---|---|
| UNIT IV | | | |
| | Auxiliary storage devices: Hard disk-CD-ROM. Input devices: Keyboard-Mouse-Joystick- Scanners-Digital camera- Magnetic ink character recognition | 2 | Lecture |
| | (MICR)-Optical character recognition (OCR)-Optical mark recognition -Bar code reader-Speech input devices – Touch screen-Light pen. | 2 | Lecture |
| | Output devices: classification of monitors- Based on color- characteristics of monitor- printer-plotter-Sound cards and Speakers. | 2 | Lecture |
| UNIT V | | | |

| | Introduction to computer software: Operating systems-Utilities-compilers and interpreters Operating Systems: Functions of an operating system-Classification of operating systems. | 2 | Lecture |
|---|---|---|---|
| | -Word processors-Spreadsheets-Presentation Graphics-Database management systems (DBMS) –Image Processors. | 2 | Lecture |
| | Operating Systems: Functions of an operating system-Classification of operating systems. | 2 | Lecture |

| Course Outcomes (Cos) | Programme Outcomes (POs) | | | | | Programme Specific Outcomes (PSOs) | | | | | Mean scores of Cos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO 4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO 5 | |
| CO1 | 2 | 4 | 3 | 4 | 3 | 2 | 5 | 3 | 3 | 5 | 3.4 |
| CO2 | 2 | 3 | 4 | 2 | 2 | 3 | 5 | 2 | 5 | 3 | 3.1 |
| CO3 | 5 | 4 | 2 | 3 | 4 | 2 | 5 | 2 | 1 | 3 | 3.1 |
| CO4 | 4 | 4 | 5 | 5 | 3 | 3 | 5 | 2 | 1 | 3 | 3.5 |
| CO5 | 4 | 3 | 5 | 2 | 1 | 5 | 5 | 2 | 2 | 2 | 3.1 |
| Mean Overall Score | | | | | | | | | | | 3.24 |

| Mapping | 1-20% | 21-40% | 41-60% | 61-80% | 81-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Relation | 0.0-1.0 | 1.1-2.0 | 2.1-3.0 | 3.1-4.0 | 4.1-5.0 |

| Quality | Very Poor | Poor | Moderate | High | Very High |
|---------|-----------|------|----------|------|-----------|

| | |
|---|---|
| Mean Score ofCOs = $\underline{\text{Total ofValue}}$<br><br>Total No. of Pos & PSOs | Mean Overall Score of COs = $\underline{\text{Total of Mean Score}}$<br><br>Total No. of COs |

| BLOOM"S TAXANOMY | INTERNAL | EXTERNAL |
|------------------|----------|----------|
| KNOWLEDGE | 50% | 50% |
| UNDERSTANDING | 30% | 30% |
| APPLY | 20% | 20% |

**Course Designer:**                    **Department of Computer Applications**

**Programme : BCA**       **Part III: Core-9**
 **Semester : IV**      **Hours : 4 P/W 60Hrs P/S**
**Sub. Code : U22CU8**     **Credits : 4**

### TITLE OF THE PAPER:DATA STRUCTURES

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT | |
|---|---|---|---|---|---|---|
| | 4 | 2 | 1 | 1 | - | |

**PREAMBLE:**
- Be exposed to sorting and searching algorithms & their analysis.

- To gain about linear data structures-List, Stack and Queue.

- To acquire about the nonlinear data structures-Tree.

| COURSE OUTCOME<br><br>At the end of the Semester, the Students will be able to | Unit | Hrs P/S |
|---|---|---|
| **UNIT 1 CO1**: Understand the sorting and searching algorithms. | 1 | 12 |
| **UNIT 2 CO2**: Apply and implement stacks and queue. | 2 | 12 |
| **UNIT 3 CO3**: Understand the different types of linked lists. | 3 | 12 |
| **UNIT 4 CO4**: Study about trees. | 4 | 12 |
| **UNIT 5 CO5**: Analyze different graphs. Its tree traversal. | 5 | 12 |

[Type here]

**SYLLABUS**
**UNIT I:**
**Introduction: Algorithm – Writing structured program, Analyzing algorithm-Divide and conquer –The general method, Binary search, Merge sort, Quick sort, Selection sort.**
**UNIT II:**
**Introduction: Arrays – Ordered List – Sparse Matrices -Representation of Arrays- Stacks andQueues – A Mazing problem – Evaluations of expressions.**
**UNIT III:**
**Linked list: Singly linked list – linked stacks and queues – polynomial addition – more onlinked list – equivalence relations – doubly linked list.**
**UNIT IV:**
**Trees: Basic terminology – binary trees – binary tree representations – binary tree traversal –**

**threaded binary trees – binary tree representation of trees – application of trees -Set Representation.**

**UNIT V:**

**Graphs: Terminology and representations – traversals, spanning trees – shortest paths.**

**TEXT BOOKS:**

1. Fundamentals of Data structures – Ellis Horrowitz, SartajSahani, Galgotia Pub., 1998.(Excluding analysis & Lemma)

2. Fundamentals of Computer Algorithms – Ellis Horrowitz, SartajSahani, SanguthevarRajasekaran, Universities Press – 2nd Edition, 2008.(Excludinganalysis & Lemma)

**REFERENCES:**

1. Data structure using C++, VARSHA H. PATIL, Oxford Higher Education/Oxford University Press, First edition, 2012.
2. Fundamentals of Data structures In C++, Ellis Horowitz, SartajSahni, Dinesh Mehta, University press, 2007.
3. Data Structures using C, Tanaenbaum A.S.,Langram Y. Augestein M.J, Pearson Education , 2004.
4. Introduction to the Design and Analysis of Algorithms, AnanyLevitin, Pearson Education 2003.

**E-LEARNING RESOURCES:**

1. https://www.w3schools

2. https://www.programiz.com/dsa

3. https://nptel.ac.in/courses/106102064/1

| UNITS | TOPIC | LECTURE HOURS | MODE OF TEACHING |
|-------|-------|---------------|------------------|
| UNIT 1 | | | |
| | Introduction: Algorithm – Writing structured program, Analyzing algorithm | 5 | Lecture |
| | Divide and conquer – The general method, Binary search, Merge sort, | 5 | Lecture |
| | Quick sort, Selection sort. | 2 | ICT |

UNIT 11

| | Introduction: Arrays – Ordered List – Sparse Matrices - | 5 | Lecture |
|---|---|---|---|
| | Representation of Arrays-Stacks and Queues – | 4 | Lecture |
| | A Mazing problem – Evaluations of expressions | 3 | ICT |

| UNIT III | | | |
|---|---|---|---|
| | Linked list: Singly linked list – linked stacks and queues – | 5 | Lecture |
| | polynomial addition – more on linked list – | 4 | ICT |
| | equivalence relations – doubly linked list. | 3 | Lecture |
| UNIT IV | | | |
| | Trees: Basic terminology – binary trees – binary tree representations – | 5 | Lecture |
| | binary tree traversal – threaded binary trees – binary tree representation of trees | 5 | ICT |
| | application of trees -Set Representation. | 2 | Videos |
| UNIT V | | | |
| | Graphs: Terminology and representations – | 5 | Videos |
| | traversals, spanning trees – | 6 | Lecture |
| | shortest paths. | 1 | Lecture |

| Course Outcomes (Cos) | Programme Outcomes (POs) | | | | | Programme Specific Outcomes (PSOs) | | | | | Mean scores of Cos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | |
| CO1 | 2 | 4 | 3 | 4 | 3 | 2 | 5 | 3 | 2 | 5 | 3 |

| CO2 | 2 | 3 | 4 | 2 | 2 | 3 | 5 | 2 | 5 | 3 | 4 |
|-----|---|---|---|---|---|---|---|---|---|---|---|

| CO3 | 5 | 4 | 2 | 3 | 4 | 2 | 5 | 2 | 5 | 3 | 2 |
|-----|---|---|---|---|---|---|---|---|---|---|---|
| CO4 | 4 | 4 | 5 | 5 | 3 | 3 | 5 | 2 | 1 | 3 | 5 |
| CO5 | 4 | 3 | 5 | 2 | 1 | 5 | 5 | 2 | 3 | 2 | 5 |
| Mean Overall Score | | | | | | | | | | | 3.32 |

| Mapping | 1-20% | 21-40% | 41-60% | 61-80% | 81-100% |
|---------|-------|--------|--------|--------|---------|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Relation | 0.0-1.0 | 1.1-2.0 | 2.1-3.0 | 3.1-4.0 | 4.1-5.0 |
| Quality | Very Poor | Poor | Moderate | High | Very High |

Mean Score of COs =     Total of Value

                   Total No. of Pos & PSOs

Mean Overall Score of COs =  Total of Mean Score

                   Total No. of COs

| LOOM"S TAXANOMY | INTERNAL | EXTERNAL |
|-----------------|----------|----------|
| KNOWLEDGE | 50% | 50% |
| UNDERSTANDING | 30% | 30% |
| APPLY | 20% | 20% |

**Course Designer:**                **Department of Computer Applications**

**Programme : BCA**                                     **Part III: Core-4**
**Semester    : IV**                           **Hours  : 3 P/W 60 Hrs P/S**
**Sub. Code   : U22CU9**                       **Credits : 3**

**TITLE OF THE PAPER: DIGITAL PRINCIPLES AND COMPUTER ORGANISATION**

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|---|---|---|---|---|---|
| | 4 | 2 | 1 | 1 | - |

**PREAMBLE:**

      To acquire knowledge in digital logic, combinational logic circuit, flip-flops and     registers. To discuss about the basic structure of computer, I/O system, memory system and processing unit

| **COURSE OUTCOME**<br><br>At the end of the Semester, the Students will be able to | Unit | Hrs P/S |
|---|---|---|
| **UNIT 1 CO1**: Define the basic components of a digital computer and their function | 1 | 12 |
| **UNIT 2 CO2**: Enhance knowledge on simplifying digital circuits. | 2 | 12 |
| **UNIT 3 CO3**: Apply Boolean algebra in design of gates. | 3 | 12 |
| **UNIT 4 CO4**: Simplify and solve the logical expressions. | 4 | 12 |
| **UNIT 5 CO5**: Design various counters. | 5 | 12 |

**SYLLABUS**

**UNIT I:**

Logic circuits**:**Binary number systems – OR gates – AND gates – Boolean Algebra –NOR gates – NAND Gates. Circuit Analysis and Design: Boolean laws and theorem – Sum of products – Truth table of Karanaugh map – Pairs, Quads and Octets – Karnaugh Simplification – Don"t care conditions - Product of Sums Method – Products of sums simplification.

**UNIT II:**

Data Processing Circuits: Multiplexers -  Demultiplexers – BCD to Decimal Decoders – Encoders – EX OR Gates. Number system and codes: Binary to decimal Conversion – Decimal to Binary conversion – Octal Numbers – Hexa Decimal Numbers.

**UNIT III:**

Flip Flops: RS Flip flops – D Flipflops – JK Flipflops – JK Master Slave Flip flops. Instruction Codes – Computer Registers – Computer Instruction – Timing and control – Instruction Cycle – Memory reference Instruction – Input – Output and Interrupt – Programming the Basic Computer – Assembly Language.

**UNIT IV:**

Central Processing Unit – General Register Organization – Stack Organization – Instruction formats

– **Addressing mode – Data Transfer and manipulation.**

## UNIT V:

**Input-Output organization – Input-Output Interface – Priority Interrupt – DMA – IOP. –**
**Memory Organisation – Memory Hierarchy –Cache memory – Virtual memory.**

## TEXT BOOKS:

**Digital Principles And Applications by D.P. Leach and A.P. Malvino, Tata McGraw Hill, New Delhi,6th Edition,.**

**Computer System Architecture by M.Morris Mano, 3$^{rd}$ Edition, 1998.**

## REFERENCES:

Digital Systems Principles and Applications by Ronald J. Tocci, Neal S. Widmer, Gregory L.Moss, Pearson Prentice Hall, 6

dition.Computure Organization by Carl Hamacher, Zvonko Vranesic,

Safwat Zaky, Tata McGraw Hill, 5$^{th}$ Edition

## E-LEARNING RESOURCES:

1.  http://nptel.ac.in/courses/117106086/1

2.  https://swayam.gov.in/courses/1392-digital-circuits-and-systems

3.  http://nptel.ac.in/courses/106102062/

4.  https://www.tutorialspoint.com/computer_organization/index.asp

| UNITS | TOPIC | LECTURE HOURS | MODE OF TEACHING |
|---|---|---|---|
| UNIT 1 | | | |
| | Logic circuits:Binary number systems – OR gates – AND gates – Boolean Algebra –NOR gates – NAND Gates. | 4 | Lecture |
| | Circuit Analysis and Design: Boolean laws and theorem – Sum of products – Truth table of Karanaugh map – Pairs, Quads and Octets – | 4 | Lecture |
| | Karnaugh Simplification – Don"t care conditions - 4Product of Sums Method – Products of sums simplification. | 4 | Lecture |
| UNIT 11 | | | |
| | Data Processing Circuits: Multiplexers - Demultiplexers – BCD to Decimal Decoders – Encoders – EX OR Gates. | 4 | Lecture |

| | Number system and codes: Binary to decimal | 4 | Lecture |

|  | Conversion –. |  |  |
|---|---|---|---|
|  | Decimal to Binary conversion – Octal Numbers – Hexa Decimal Numbers | 4 | Lecture |
| **UNIT III** |  |  |  |
|  | Flip Flops: RS Flip flops – D Flipflops – JK | 4 | Lecture |

|  | Flipflops – JK Master Slave Flip flops. |  |  |
|---|---|---|---|
|  | Instruction Codes – Computer Registers – Computer Instruction – Timing and control – | 4 | Lecture |
|  | Instruction Cycle – Memory reference Instruction – Input – Output and Interrupt – Programming the Basic Computer – Assembly Language | 4 | PPT |
| **UNIT IV** |  |  |  |
|  | Central Processing Unit – General Register Organization – Stack Organization – | 6 | Lecture |
|  | Instruction formats – Addressing mode – | 6 | Lecture |
|  | Data Transfer and manipulation |  | Video |
| **UNIT V** |  |  |  |
|  | Input-Output organization – Input-Output Interface – Priority Interrupt – | 6 | Lecture |
|  | DMA – IOP. – Memory Organisation – Memory Hierarchy | 6 | Lecture |
|  | –Cache memory – Virtual memory. |  | PPT |

| Course Outcomes (Cos) | Programme Outcomes (POs) | | | | | Programme Specific Outcomes (PSOs) | | | | | Mean scoresof Cos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO 4 | PO 5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | |
| CO1 | 2 | 4 | 3 | 4 | 3 | 2 | 5 | 3 | 3 | 5 | 3.4 |
| CO2 | 2 | 3 | 4 | 2 | 2 | 3 | 5 | 2 | 5 | 3 | 3.1 |
| CO3 | 5 | 4 | 2 | 3 | 4 | 2 | 5 | 2 | 1 | 3 | 3.1 |
| CO4 | 4 | 4 | 5 | 5 | 3 | 4 | 5 | 2 | 1 | 3 | 3.6 |
| CO5 | 4 | 3 | 5 | 2 | 1 | 5 | 5 | 2 | 2 | 2 | 3.1 |
| Mean Overall Score | | | | | | | | | | | 3.26 |

| Mapping | 1-20% | 21-40% | 41-60% | 61-80% | 81-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Relation | 0.0-1.0 | 1.1-2.0 | 2.1-3.0 | 3.1-4.0 | 4.1-5.0 |
| Quality | Very Poor | Poor | Moderate | High | Very High |

Mean Score of COs =    Total of Value
                    Total No. of Pos & PSOs

Mean Overall Score of COs = Total of Mean Score
                                Total No. of COs

| BLOOM"S TAXANOMY | INTERNAL | EXTERNAL |
|---|---|---|
| KNOWLEDGE | 50% | 50% |
| UNDERSTANDING | 30% | 30% |
| APPLY | 20% | 20% |

**Course Designer:**          **Department of Computer Applications**

**Programme : BCA**                                            **Part III: Allied-2**
**Semester    : IV**                                            **Hours  : 3 P/W   45Hrs P/S**
**Sub. Code   : U22AUU4**                                       **Credits :3**

### TITLE OF THE PAPER:COMPUTER BASED FINANCIAL ACCOUNTING

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|----------|-------|---------|---------------|--------------------|-----|
|          | 5     | 3       | 1             | -                  | 1   |

**PREAMBLE:**
- To enable the students gain insights into the fundamental principles of accounting and use them in day-to-day business scenarios.

| COURSE OUTCOME | Unit | Hrs P/S |
|----------------|------|---------|
| At the end of the Semester, the Students will be able to | | |
| **UNIT 1 CO1**:  Knowing the fundamentals accounting. | 1 | 9 |
| **UNIT 2 CO2**: Preparation of journal, ledger and trial balance. | 2 | 9 |
| **UNIT 3 CO3**: Understanding the types of subsidiary books. | 3 | 9 |
| **UNIT 4 CO4**: Acquiring knowledge on Tally. | 4 | 9 |
| **UNIT 5 CO5**: Having clear idea of preparing final accounts of individuals. | 5 | 9 |

**SYLLABUS:**
**UNIT I:**

Nature and Scope of Management Accounting- Meaning- Definition- Scope of Management Accounting- Functions of Management Accounting- Management Accounting Vs Financial Accounting- Management Accounting Vs Cost Accounting- Limitation of Financial Accounting- Advantages of Management Accounting- Limitation of Management Accounting.

**UNIT II:**

Introduction to Accountancy- Definition- Concepts and Conventions- Types  of Accounts and the rules- Preparation of Journal, Ledger, Trail Balance- Subsidiary Books

**UNIT III:**

Final Accounts- Preparation of Trading Account- Preparation of Profit and Loss account- Preparation of Trading, Profit and Loss account and Balance Sheet with Simple Adjustments (Only Simple Problems)

**UNIT IV:**

Introduction to Tally: Features of Tally 9 – Company info: Create, Select, Alter and Close or Shut Company – Ledger Creation: Creating, Displaying, Altering and Deleting. F11 – Features and F12 – Configuration.

**UNIT V:**

Voucher Creation: Receipt, Payment, Contra, Journal, Sales, Purchase, Memo, Display, Alter, Delete, Insert, Statement of Reports: Trail balance, Profit and Loss account, Balance sheet.

**TEXT BOOKS:**

1. Financial and Management AccountingMADE SIMPLE– Dr.P.S.Boopathi Manickam, P.S.G. Publications,2009, Fifth Edition.
   Unit I: Chapter 1
   Unit II : Chapter 2
   Unit III: Chapter 3
2. Tallly (version 9) – C.NellaiKannan, 2007
   Unit IV : Pg. Numbers – 5 to 61
   Unit V : Pg. Numbers – 62 to 102

**REFERENCES:**

1. Comdex Tally 9 – Dr. NamrataAgrawal, Dream Tech Publications
2. Tally ( Accounting Software)  S.Palanivel, Margham Publications, 2010

| UNITS | TOPIC | LECTURE HOURS | MODE OF TEACHING |
|-------|-------|---------------|------------------|
| UNIT 1 | | | |
| | Financial Accounting: Meaning, Nature and scope, Limitations – | 3 | Lecture |
| | Accounting Principles: Basic Concepts and Conventions – | 3 | ICT |
| | Objectives of accounting – Accounting rules. | 3 | Lecture |

| UNIT 11 | | | |
|---|---|---|---|
| | Books and records : Recording of business transactions – | 3 | Videos |
| | Types of accounts – Journal – Ledger – Journal Vs Ledger, | 4 | Lecture |
| | Subsidiary books – Trial balance. | 2 | Lecture |
| UNIT III | | | |
| | Final Accounts: Introduction – Trading account – | 3 | ICT |
| | Profit and loss account – | 4 | Videos |
| | Balance sheet. (Simple problems) | 2 | Lecture |
| UNIT IV | | | |
| | Introduction to Tally: Features of Tally 9 – Company info: Create, Select, Alter and Close or Shut Company – | 3 | Lecture |
| | Ledger Creation: Creating, Displaying, Altering and Deleting. | 4 | ICT |
| | F11 – Features and F12 – Configuration. | 2 | Lecture |
| UNIT V | | | |
| | Voucher Creation: Receipt, Payment, Contra, Journal, Sales, Purchase, | 3 | Lecture |
| | Memo, Display, Alter, Delete, Insert, | 2 | Videos |
| | Statement of Reports: Trail balance, Profit and Loss | 4 | Lecture |

| | account, Balance sheet. | | |
|---|---|---|---|

| Course Outcomes (Cos) | Programme Outcomes (POs) | | | | | Programme Specific Outcomes (PSOs) | | | | | Mean scores of Cos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | |
| CO1 | 2 | 4 | 3 | 4 | 3 | 2 | 2 | 3 | 3 | 5 | 3.1 |
| CO2 | 2 | 3 | 4 | 2 | 2 | 3 | 5 | 2 | 5 | 3 | 3.1 |
| CO3 | 5 | 4 | 2 | 3 | 4 | 2 | 5 | 2 | 1 | 3 | 3.1 |
| CO4 | 4 | 4 | 5 | 5 | 3 | 3 | 2 | 2 | 1 | 3 | 3.2 |
| CO5 | 4 | 3 | 5 | 2 | 1 | 5 | 5 | 2 | 2 | 2 | 3.1 |
| Mean Overall Score | | | | | | | | | | | 3.12 |

| Mapping | 1-20% | 21-40% | 41-60% | 61-80% | 81-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Relation | 0.0-1.0 | 1.1-2.0 | 2.1-3.0 | 3.1-4.0 | 4.1-5.0 |
| Quality | Very Poor | Poor | Moderate | High | Very High |

Mean Score of COs =     Total of Value

Total No. of Pos & PSOs

Mean Overall Score of COs = Total of Mean Score

Total No. of COs

| BLOOM"S TAXANOMY | INTERNAL | EXTERNAL |
|---|---|---|
| KNOWLEDGE | 50% | 50% |
| UNDERSTANDING | 30% | 30% |
| APPLY | 20% | 20% |

**Course Designer:**                    **Department of Computer Applications**

**Programme :BCA**                               **Part III: Allied  Lab**
**Semester     : IV**                       **Hours  : 4 P/W   45Hrs P/S**
**Sub. Code    : U22U10P**                **Credits : 4**

<div align="center">

**TITLE OF THE PAPER: TALLY LAB**

</div>

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|----------|-------|---------|---------------|--------------------|-----|
|          | 3     | 2       | -             | 1                  | -   |

**List of Programs**

I. Company Creation

II.  Ledger Creation

III.  Voucher Creation

       a) Contra voucher

       b) Payment voucher

       c) Receipt voucher

       d) Journal voucher

       e) Purchase voucher

       f) Sales counter

IV.  Reports

       a) Day book

       b) Trail balance

       c) Final Accounts

       d) Purchase Register

       e) Sales Register

       f) Outstanding Receivable

       g) Outstanding Payable

       h) Cheque Printing

       i) Bank Reconciliation Statement

## TITLE OF THE PAPER: INTERNET AND ITS APPLICATIONS

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT | |
|----------|-------|---------|---------------|--------------------|-----|--|
|          | 2     | 1       | -             | 1                  | -   |  |

**PREAMBLE:**

- To learn the basic concepts of internet and its applications.

- To familiarize on internet protocols, E-mail services, intranet andextranet.

| COURSE OUTCOME<br><br>At the end of the Semester, the Students will be able to | Unit | Hrs P/S |
|---|---|---|
| **UNIT 1 CO1**: learning the basic concepts of computer network and its topologies to accesss | 1 | 6 |
| **UNIT 2 CO2**: introducing communication media and its principles | 2 | 6 |
| **UNIT 3 CO3**: Able to understand the internet accessing methodologies | 3 | 6 |
| **UNIT 4 CO4**: Able to realize the revolution of Internet in Mobile Devices, Clouds using mail services | 4 | 6 |
| **UNIT 5 CO5**: · Understand the value added networks with its working principle and applications | 5 | 6 |

**SYLLABUS UNIT I:**

Computer Networks: Introduction-overview of network – Communication processors – Modem – Message Switchers - Communication media – Types of networks – Network Topologies – Networkprotocols – network architecture

**UNIT II:**

Communication systems: Microwave systems – Communication satellites – Cross link – Componentof a satellite - Radar – Fiber optics.

**UNIT III:**

Internet and World Wide Web: Whats special about internet – Internet Access – Internet Protocols – Internet Addressing – The World Wide Web (WWW) – Web Pages and HTML – Searching the Web.UNIT IV:

Electronic Mail: Why use E-Mail? – How private is E-Mail? – How E-Mail Works? – E-Mail Namesand Addresses – Mailing Basis – Spamming- Mailing Lists – News Groups.

**UNIT V:**

Intranets: Introduction – Characteristics of Intranet – Advantages of Intranet- Business Benefits of Intranet – Drawbacks of Intranet – Extranet . Introduction to Multimedia: Multimedia in entertainment

– multimedia in education and training – multimedia on the web – multimedia in office work –multimedia servers and databases.

**TEXT BOOKS:**

**1.** Fundamentals of Information Technology, Alexis Leon and Mathews Leon, Vikas publishers.

**REFERENCES:**

1. The Internet Complete Reference, Harley Hahn,2nd Ed.
2. Internet in a Nut Shell, Alexis Leon, Mathew Leon, Leon Press, 1st Edition

**E-LEARNING RESOURCES:**

1.www.pubnub.com/blog/2015-05-27-internet-of-things-101-getting-started-w-raspberry-pi/

2.www.theinternetofthings.eu/what-is-the-internet-of-things

3.www.ibm.com/blogs/bluemix/2015/04/tutorial-using-a-raspberry-pi-python-iot-twilio-bluemix/

| UNITS | TOPIC | LECTURE HOURS | MODE OF TEACHING |
|-------|-------|---------------|------------------|
| UNIT 1 | | | |
| | Computer Networks: Introduction-overview of network – Communication– | 2 | Lecture |

| | | | |
|---|---|---|---|
| | processors – Modem – Message Switchers - Communication media – Types of networks | 2 | Lecture |
| | Network Topologies – Network protocols – network architecture. | 2 | PPT |
| UNIT 11 | | | |
| | Communication systems: Microwave systems – Communication satellites – | | Lecture |
| | Cross link – Component of a satellite | | Lecture |
| | - Radar – Fiber optics. | | Videos |
| UNIT III | | | |
| | Internet and World Wide Web: Whats special about internet | | PPT |
| | Internet Access – Internet Protocols – Internet Addressing | | Videos |
| | The World Wide Web (WWW) – Web Pages and HTML – Searching the Web. | | PPT |
| UNIT IV | | | |
| | Electronic Mail: Why use E-Mail? – How private is E-Mail? — | | Videos |

| | How E-Mail Works? – E-Mail Namesand Addresses – Mailing Basis | 2 | PPT |
|---|---|---|---|
| | Spamming- Mailing Lists – NewsGroups. | 2 | Lecture |
| UNIT V | | | |
| | Intranets:Introduction – Characteristics of Intranet – Advantages of Intranet- Business Benefits of Intranet – Drawbacks ofIntranet | 2 | Lecture |
| | Extranet . Introduction to Multimedia: Multimedia in entertainment – multimedia in education andtraining | 2 | Lecture |
| | multimedia on the web – multimedia in office work – multimedia servers anddatabases. | 2 | PPT |

| Course Outcomes (Cos) | Programme Outcomes (POs) | | | | | Programme Specific Outcomes (PSOs) | | | | | Mean scores of Cos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | |
| CO1 | 2 | 4 | 3 | 4 | 3 | 2 | 5 | 3 | 3 | 5 | 3.4 |
| CO2 | 2 | 3 | 4 | 2 | 2 | 3 | 5 | 2 | 5 | 3 | 3.1 |
| CO3 | 5 | 4 | 2 | 3 | 4 | 2 | 5 | 2 | 1 | 3 | 3.1 |
| CO4 | 4 | 4 | 5 | 5 | 3 | 4 | 5 | 2 | 1 | 3 | 3.6 |
| CO5 | 4 | 3 | 5 | 2 | 1 | 5 | 5 | 2 | 2 | 2 | 3.1 |
| Mean Overall Score | | | | | | | | | | | 3.26 |

| Mapping | 1-20% | 21-40% | 41-60% | 61-80% | 81-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Relation | 0.0-1.0 | 1.1-2.0 | 2.1-3.0 | 3.1-4.0 | 4.1-5.0 |
| Quality | Very Poor | Poor | Moderate | High | Very High |

Mean Score of COs =    Total of Value
                      Total No. of Pos & PSOs

Mean Overall Score of COs =  Total of Mean Score
                             Total No. of COs

| BLOOM"S TAXANOMY | INTERNAL | EXTERNAL |
|---|---|---|
| KNOWLEDGE | 50% | 50% |
| UNDERSTANDING | 30% | 30% |
| APPLY | 20% | 20% |

**CourseDesigner:**                     **Department of ComputerApplications**

| Programme : BCA | | | Part III:  SBE 3 | |
| Semester    : V | | | Hours  : 2 P/W   30Hrs P/S | |
| Sub. Code:    : SU53 | | | Credits :2 | |

**TITLE OF THE PAPER:  DATABASE MANAGEMENT SYSTEMS**

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|---|---|---|---|---|---|
|  | 2 | 1 | - | -- | 1 |

**PREAMBLE:**
- To understand the concept of creating accessing and storing of database.
-  To study about relational database design, Constraints, DDL, DML, SQL and triggers.
- To impart knowledge on Normalization.

| COURSE OUTCOME<br><br>At the end of the Semester, the Students will be able to | Unit | Hrs P/S |
|---|---|---|
| **UNIT 1 CO1:** .Familiar with the file database management systems and its applications. | 1 | 6 |
| **UNIT 2 CO2**: Understand the various models like E-R model. | 2 | 6 |
| **UNIT 3 CO3**: Master the basics of SQL and construct queries using SQL. | 3 | 6 |
| **UNIT 4 CO4**: Design a relational database schema using SQL for a given problem-domain | 4 | 6 |
| **UNIT 5 CO5**:Understand the concept of concurrency control of database processing | 5 | 6 |

**SYLLABUS**
**UNIT I:**
Overview of database systems: Managing Data – A Historical Perspective – File Systems Versus a DBMS – Advantages of a DBMS – Describing and Storing Data in a DBMS – Queries in a DBMS – Transaction Management – Structure of a DBMS – People Who Work with Databases.
**UNIT II:**
Introduction to database design: Database Design and ER Diagrams – Entities, Attributes, and Entity Sets – Relationships and Relationship Sets – Additional Features of ER Model – Conceptual Design with the ER Model.
**UNIT III:**
The relational model: Introduction to the Relational Model – Integrity Constraints over Relations – Enforcing Integrity Constraints – Querying Relational Data – Logical Database Design: ER to

Relational – Introduction to Views – Destroying / Altering Tables and Views

**UNIT IV:**

Relational algebra and calculus: Preliminaries – Relational Algebra: Selection and Projection – Set Operations –Renaming – Joins - Division Relational Calculus: Tuple Relational Calculus – Domain Relational Calculus. SQL:QUERIES, CONSTRAINTS, TRIGGERS: The Form of a Basic SQL Query - UNION, INTERSECT, and EXCEPT – Nested Queries – Aggregate Operators – Null Values – Complex Integrity Constraints in SQL – Triggers and Active Databases – Designing Active Databases

UNIT V:

Schema refinement and normal forms: Introduction to Schema Refinement – Functional Dependencies – Reasoning about FD"s – Normal Forms – Properties of Decompositions – Normalization – Schema Refinement in Database Design

**TEXT BOOKS:**

Database Management Systems – Raghu Ramakrishnan& Johannes Gehrke, McGraw Hill International Edition – Third Edition – 2003

**REFERENCES:**

1. Database Management Systems - Alexis leon&mathews Leon, "Leon Vikas Publishing, Chennai, 2002.
2. Modern Database Management - Frad R. McFadden, Jeffrey A.Hoffer& Mary. B. Prescott, 5th Edition, Pearson Education Asia, 2001.
3. Database System Concepts – Abraham Silberschatz, Henry F.Korth, S.Sudarshan, McGraw Hill, 2006

| UNITS | TOPIC | LECTURE HOURS | MODE OF TEACHING |
|-------|-------|---------------|------------------|
| UNIT - I | | | |
| | Overview of database systems: Managing Data – A Historical Perspective – File Systems Versus a DBMS — | 2 | Lecture |
| | Advantages of a DBMS – Describing and Storing Data ina DBMS – Queries in a DBMS – Transaction Management | 2 | Lecture |
| | Structure of a DBMS – PeopleWho Work with Databases. | 2 | ICT |
| UNIT- II | | | |

| | Introduction to database design:Database Design and. | 2 | PPT |
|---|---|---|---|
| | ER Diagrams – Entities, Attributes, and Entity Sets – Relationships and Relationship Sets – | 2 | PPT |
| | . Additional Features of ERModel – Conceptual Design with the ER Model | 2 | Lecture |
| UNIT III | | | |
| | The relational model: Introduction to the RelationalModel – Integrity Constraintsover Relations – | 2 | Videos |
| | Enforcing Integrity Constraints – Querying Relational Data –Logical | 2 | PPT |
| | Database Design: ER to Relational – Introduction to Views – Destroying / Altering Tables and Views | 2 | Lecture |
| UNIT IV | | | |
| | Relational algebra and calculus:Preliminaries – RelationalAlgebra: Selection and Projection – Set Operations –Renaming – Joins - Division Relational Calculus: Tuple T – | 2 | Lecture |
| | Relational Calculus – DomainRelational Calculus. SQL:QUERIES, CONSTRAINTS, TRIGGERS: The Form of a Basic SQL Query - UNION, INTERSECT, and EXCEP | 2 | Lecture |

| | . Nested Queries – AggregateOperators – Null Values – Complex Integrity Constraints in SQL – Triggers and Active Databases – Designing Active Databases | 2 | Lecture |
|---|---|---|---|
| UNIT V | | | |
| | . Schema refinement and normal forms: Introduction to Schema Refinement – | 2 | Lecture |
| | . Functional Dependencies –Reasoning about FD"s – Normal Forms – | 2 | Lecture |
| | Properties of Decompositions –Normalization – Schema Refinement in Database Design | 2 | Lecture |

| Course Outcomes (Cos) | Programme Outcomes (POs) | | | | | Programme Specific Outcomes (PSOs) | | | | | Mean scores of Cos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | |
| CO1 | 2 | 4 | 3 | 4 | 3 | 4 | 5 | 3 | 3 | 5 | 3.6 |
| CO2 | 4 | 3 | 4 | 2 | 2 | 4 | 5 | 2 | 5 | 3 | 3.4 |
| CO3 | 5 | 4 | 2 | 3 | 4 | 4 | 5 | 2 | 1 | 3 | 3.3 |
| CO4 | 4 | 4 | 5 | 5 | 3 | 3 | 5 | 2 | 1 | 3 | 3.5 |
| CO5 | 4 | 3 | 5 | 2 | 1 | 4 | 5 | 2 | 2 | 2 | 3 |
| Mean Overall Score | | | | | | | | | | | 3.36 |

| Mapping | 1-20% | 21-40% | 41-60% | 61-80% | 81-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Relation | 0.0-1.0 | 1.1-2.0 | 2.1-3.0 | 3.1-4.0 | 4.1-5.0 |
| Quality | Very Poor | Poor | Moderate | High | Very High |

Mean Score ofCOs =     Total ofValue

                Total No. of Pos & PSOs

Mean Overall Score of COs = Total of Mean Score

                Total No. of COs

| BLOOM"S TAXANOMY | INTERNAL | EXTERNAL |
|---|---|---|
| KNOWLEDGE | 50% | 50% |
| UNDERSTANDING | 30% | 30% |
| APPLY | 20% | 20% |

**Course Designer:**                    **Department of Computer Applications.**

**Programme : BCA**　　　　　　　　　　　　　　**Part III:  SBE 5**
**Semester　: V**　　　　　　　　　　　　　　　**Hours　: 2P/W　30Hrs P/S**
**Sub. Code　:SUP5**　　　　　　　　　　　　　**Credits :2**

## TITLE OF THE PAPER:  ORACLE LAB

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|----------|-------|---------|---------------|--------------------|-----|
|          | 2     | 1       | -             | 1                  | -   |

**SYLLABUS**

1. Working with DDL Commands
2. Working with DML Commands
3. Working with date and time handling functions
4.  Working with  Constraints – NotNull, Primary Key, Check, Unique, Foreign Key
5. Working with simple SQL commands
6. Working with GROUP..BY , HAVING queries
7. Working with Aggregate Queries – COUNT, MIN, MAX, SUM and AVG
8. Working with set operations – UNION, INTERSECTION and MINUS
9. Working with OUTER JOINS ( left outer, right outer and full outer)
10. Working with nested queries
11. Fibonacci series generation using PL/SQL
12. Factorial calculation using PL/SQL
13. Raising Build in Exceptions
14. Raising User defined exceptions
15 Creating and Calling functions
16. Creating and Calling Procedures
17. Creating triggers

**Programme ; BCA**　　　　　　**Part III; Core**

**Semester : V**　　　　　　　　　　　　**Hours : 5 P/W  60Hrs P/S**

**Sub. Code: U22CU11**　　　　　　　　**Credits : 5**

### TITLE OF THE PAPER: OPERATING SYSTEMS

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|---|---|---|---|---|---|
| | 4 | 2 | 1 | 1 | - |

**PREAMBLE:**

　　　To discuses the operating system evolution and its major rule. To understand the various operating system components like process management, memory management, I/O management and file management. To know about issues in resource allocation and management.

| COURSE OUTCOME | Unit | Hrs P/S |
|---|---|---|
| At the end of the Semester, the Students will be able to | | |
| **UNIT 1 CO1**:  Analyze the concepts of file management. | 1 | 12 |
| **UNIT 2 CO2**: Implement security aspects in appropriate situations. | 2 | 12 |
| **UNIT 3 CO3**: Discuss various other operating systems. | 3 | 12 |
| **UNIT 4 CO4**: Apply knowledge gained through processor scheduling to other applications. | 4 | 12 |
| **UNIT 5 CO5**: Analyze limitations of operating systems. | 5 | 12 |

**SYLLABUS**

**UNIT I:**

　　　Introduction to Operating Systems:Introduction, What is an Operating systems, Operating system components and goals, Operating systems architecture. Process Concepts: Introduction, ProcessStates, Process Management, Interrupts, Interprocess Communication.

**UNIT II:**

　　　Asynchronous Concurrent Execution:Introduction, Mutual Exclusion, Implementing Mutual Exclusion Primitives, Software solutions to the Mutual Exclusion Problem, Hardware solution to the Mutual Exclusion Problem, Semaphores. Concurrent Programming: Introduction, Monitors.

**UNIT III:**

　　　Deadlock and Indefinite Postponement:Introduction, Examples of Deadlock, Related Problem Indefinite Postponement, Resource concepts, Four Necessary conditions for Deadlock, Deadlock solution, Deadlock Prevention, Deadlock Avoidance with Dijkstra‟s Banker‟s algorithm, Deadlock Detection, Deadlock Recovery. Processor Scheduling:Introduction, Scheduling levels, Preemptive Vs Non-Preemptive Scheduling Priorities, Scheduling objective, Scheduling criteria, Scheduling algorithms.

UNIT IV:

Real Memory Organization and Management:Introduction, Memory organization, Memory Management, Memory Hierarchy, Memory Management Strategies, Contiguous Vs Non-Contiguous Memory allocation, Fixed Partition Multiprogrammimg, Variable Partition multiprogramming. Virtual Memory Management:Introduction, Page Replacement, Page Replacement Strategies, Page Fault Frequency (PFF) Page replacement, Page Release, Page Size.

UNIT V:

Disk Performance Optimization:Introduction, Why Disk Scheduling is necessary, Disk Scheduling strategies, Rotational optimization. File and Database Systems:Introduction, Data Hierarchy, Files, File Systems, File Organization, File Allocation, Free Space Management, File Access control.

TEXT BOOKS:

Operating Systems, Deitel&DeitelChoffnes, Pearson education, Third edition, 2008.

REFERENCES:

1. An introduction to Operating systems concepts and Practice, Pramod Chandra P. Bhatt, PHI, Second Edition, 2008.
2. Operating System Concepts, Abraham Silberschatz Peter Galvin Greg Gagne, 6th edition Windows XP Update, Wiley India edition, 2007.
3. Operating Systems Principles and Design, PalChoudhury, PHI Learning, 2011.
4. Operating Systems, A Concept Based Approach DhananjayM.Dhamdhere Tata McGraw Hill, 3rd Edition, 2012.

E-LEARNING RESOURCES:

1. nptel.ac.in/courses/106108101/
2. w3schools.in/operating-system-tutorial
3. https://swayam.gov.in/course/237-operating-system

| UNITS | TOPIC | LECTURE HOURS | MODE OF TEACHING |
|-------|-------|---------------|------------------|
| UNIT - I | | | |
| | Introduction to Operating Systems: Introduction, What is an Operating systems, Operating system components and goals, Operating systems architecture. | 4 | Lecture |
| | Process Concepts: Introduction, Process States, | 4 | Lecture |
| | Process Management, Interrupts, Inter process Communication. | 4 | PPT |

| | | | |
|---|---|---|---|
| UNIT – II | | | |
| | Asynchronous                   Concurrent Execution:Introduction,     Mutual        Exclusion, Implementing Mutual Exclusion Primitives, , | 4 | Lecture |
| | Software solutions to the Mutual Exclusion Problem, Hardware solution to the Mutual Exclusion Problem | 3 | Videos |
| | Semaphores. Concurrent Programming: Introduction, Monitors | 5 | Lecture |
| UNIT – III | | | |
| | Deadlock and Indefinite Postponement:Introduction, Examples of Deadlock, Related Problem Indefinite Postponement, Resource concepts, Four Necessary conditions for Deadlock, Deadlock solution, Deadlock Prevention, Deadlock Avoidance with Dijkstra‟s Banker‟s algorithm, Deadlock Detection, Deadlock Recovery. | 6 | Lecture |
| | Processor Scheduling:Introduction,   Scheduling levels, Preemptive Vs Non-Preemptive Scheduling | 2 | PPT |
| | Priorities,  Scheduling  objective,   Scheduling criteria, Scheduling algorithms. | 2 | Lecture |
| UNIT – IV | | | |
| | Real Memory Organization and Management:Introduction, Memory organization, Memory Management, Memory Hierarchy, Memory Management. | 4 | Lecture |
| | Strategies, Contiguous Vs Non-Contiguous Memory allocation, Fixed Partition Multiprogrammimg, Variable Partition multiprogramming | 4 | PPT |
| | Virtual Memory Management:Introduction, Page Replacement, Page Replacement Strategies, Page Fault Frequency (PFF) Page replacement, Page Release, Page Size. | 4 | Videos |

UNIT - V

| | | | |
|---|---|---|---|
| | Disk Performance Optimization: Introduction, Why Disk Scheduling is necessary, Disk Scheduling | 4 | Lecture |
| | strategies, Rotational optimization. | | |
| | File and Database Systems: Introduction, Data Hierarchy, Files, File Systems, File Organization, | 3 | PPT |
| | File Allocation, Free Space Management, File Access control. | 4 | Video |

| Course Outcomes (Cos) | Programme Outcomes (POs) | | | | | Programme Specific Outcomes (PSOs) | | | | | Mean scores of Cos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | |
| CO1 | 2 | 3 | 3 | 4 | 3 | 2 | 5 | 3 | 3 | 5 | 3.3 |
| CO2 | 2 | 5 | 4 | 2 | 2 | 3 | 5 | 2 | 5 | 3 | 3.3 |
| CO3 | 5 | 3 | 2 | 3 | 4 | 2 | 5 | 2 | 1 | 3 | 3 |
| CO4 | 4 | 4 | 5 | 5 | 3 | 3 | 5 | 2 | 1 | 3 | 3.5 |
| CO5 | 4 | 3 | 5 | 2 | 1 | 5 | 5 | 2 | 2 | 2 | 3.1 |
| Mean Overall Score | | | | | | | | | | | 3.24 |

| Mapping | 1-20% | 21-40% | 41-60% | 61-80% | 81-100% |
|---------|-------|--------|--------|--------|---------|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Relation | 0.0-1.0 | 1.1-2.0 | 2.1-3.0 | 3.1-4.0 | 4.1-5.0 |
| Quality | Very Poor | Poor | Moderate | High | Very High |

Mean Score of COs =      Total of Value

                Total No. of Pos & PSOs

Mean Overall Score of COs = Total of Mean Score

                Total No. of COs

**Course Designer:**　　　　　**Department of Computer Applications**

| BLOOM"S TAXANOMY | INTERNAL | EXTERNAL |
|------------------|----------|----------|
| KNOWLEDGE | 50% | 50% |
| UNDERSTANDING | 30% | 30% |
| APPLY | 20% | 20% |

**Programme : BCA**                                      **Part III: Core-10**
**Semester: V**                                          **Hours  : 5 P/W   60Hrs P/S**
**Sub. Code: U22CU12**                                   **Credits :5**

### TITLE OF THE PAPER:COMPUTER NETWORKS

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|----------|-------|---------|---------------|--------------------|-----|
|          | 4     | 2       | 1             | -                  | 1   |

**PREAMBLE:**
- To Learn about network models and transmission techniques.
- To study about  Communication types of routing algorithms and internet accessing.

| COURSE OUTCOME<br><br>At the end of the Semester, the Students will be able to | Unit | Hrs P/S |
|---|---|---|
| **UNIT 1 CO1**: Discuss the introduction of networking concepts. | 1 | 12 |
| **UNIT 2 CO2**: Analyze in detail transmission media . | 2 | 12 |
| **UNIT 3 CO3**: Examine the layers design and CRC. | 3 | 12 |
| **UNIT 4 CO4**: Recognize the network routing algorithm and their effectiveness. | 4 | 12 |
| **UNIT 5 CO5**:Assess the internet domains and its services for any domain. | 5 | 12 |

**SYLLABUS**
**UNIT I:**

 Introduction: Use of Computer Networks – Network Hardware – Network Software – Reference Models – Example Networks: The Internet, Ethernet.

**UNIT II:**

 Physical Layer: Transmission Media – Wireless Transmission – The Public Switched Telephone Network.

**UNIT III:**

Data Link Layer: Data Link Layer Design Issues – Error Correction and Detection – Elementary Data Link Protocols.

**UNIT IV:**

 Network Layer: Network Layer Design Issues – Routing Algorithms: Shortest Path Routing,

Flooding, Distance Vector Routing, Broadcasting, Multicast Routing – Congestion Control Algorithms-Quality of Service- Techniques for achieving good quality of service-Traffic shaping-The leaky bucket algorithm-The token bucket algorithm.

UNIT V:

The Transport Layer   : Elements of Transport Protocols -The   Application Layer: Domain Name System – Electronic Mail – The World Wide Web – Multimedia.

TEXT BOOKS:

Computer Networks , Andrew S. Tanenbaum, 4th  Edition, Prentice Hall, India.

REFERENCES:

1.  Computer Communication &Network , John Fuer, Pitman, Computer System Series.

2.  Data & Communication Network ,E. Stallings , PHI, 4thEdition.

E-LEARNING RESOURCES:

1. http://nptel.ac.in/courses/106105081/

2. http://nptel.ac.in/courses/106106091/
3. http://nptel.ac.in/courses/106105080
/

4. https://www.studytonight.com/computer-networks/

5. https://swayam.gov.in/courses/4066-computer-networks

| UNITS | TOPIC | LECTURE HOURS | MODE OF TEACHING |
|---|---|---|---|
| UNIT 1 | | | |
| | Introduction: Use of ComputerNetworks – Network Hardware – | 4 | Lecture |
| | Network  Software  –  ReferenceModels –. | 4 | Lecture |
| | Example Networks: The Internet,Ethernet | 4 | Peer Teaching |
| UNIT 11 | | | |

| | | | |
|---|---|---|---|
| | Physical Layer: TransmissionMedia – | 4 | Lecture |
| | Wireless Transmission – | 4 | Videos |
| | The Public Switched Telephone Network. | 4 | Peer Teaching |

| UNIT III | | | |
|---|---|---|---|
| | Data Link Layer: Data Link Layer Design Issues – | 4 | Videos |
| | Error Correction and Detection – | 4 | ICT |
| | Elementary Data Link Protocols. | 4 | Lecture |
| UNIT IV | | | |
| | Network Layer: Network Layer Design Issues – | 2 | Videos |
| | Routing Algorithms: Shortest Path Routing, Flooding, Distance Vector Routing, Broadcasting, Multicast Routing – | 4 | Lecture |
| | Congestion Control Algorithms-Quality of Service- Techniques for achieving good quality of service-Traffic shaping-The leaky bucket algorithm-The token bucket algorithm. | 6 | Lecture |
| UNIT V | | | |
| | The Transport Layer : Elements of Transport Protocols | 4 | Lecture |
| | The Application Layer: Domain Name System – | 4 | ICT |
| | Electronic Mail – The World Wide Web –Multimedia. | 4 | Videos |

| Course Outcomes (Cos) | Programme Outcomes (POs) | | | | | Programme Specific Outcomes (PSOs) | | | | | Mean scores of Cos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | |
| CO1 | 2 | 4 | 3 | 4 | 3 | 2 | 5 | 3 | 2 | 5 | 3.3 |
| CO2 | 2 | 3 | 4 | 2 | 2 | 3 | 5 | 2 | 5 | 3 | 3.1 |
| CO3 | 5 | 4 | 2 | 3 | 4 | 2 | 5 | 2 | 5 | 3 | 3.5 |
| CO4 | 4 | 4 | 5 | 5 | 3 | 3 | 5 | 2 | 1 | 3 | 3.5 |
| CO5 | 4 | 3 | 5 | 2 | 1 | 5 | 5 | 2 | 3 | 2 | 3.2 |
| Mean Overall Score | | | | | | | | | | | 3.32 |

| Mapping | 1-20% | 21-40% | 41-60% | 61-80% | 81-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Relation | 0.0-1.0 | 1.1-2.0 | 2.1-3.0 | 3.1-4.0 | 4.1-5.0 |
| Quality | Very Poor | Poor | Moderate | High | Very High |

Mean Score of COs =     Total of Value

Total No. of Pos & PSOs

Mean Overall Score of COs = Total of Mean Score

Total No. of COs

| BLOOM"S TAXANOMY | INTERNAL | EXTERNAL |
|---|---|---|
| KNOWLEDGE | 50% | 50% |
| UNDERSTANDING | 30% | 30% |
| APPLY | 20% | 20% |

**Course Designer:** **Department of Computer Applictaions**

**Programme : BCA**                                      **Part III: Core 12**
**Semester: V**                                          **Hours  : 5 P/W   75Hrs P/S**
**Sub. Code: U22CU14P**                                  **Credits :5**
**TITLE OF THE PAPER: WEB PROGRAMMING WITH PHP**

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|---|---|---|---|---|---|
| | 5 | 2 | 1 | 1 | 1 |

**PREAMBLE:**
- To introduce the web programming with the open source PHP.
- To learn the program building constructs using SQL and PHP.
- To learn about client and server data using open source.

| COURSE OUTCOME | Unit | Hrs P/S |
|---|---|---|
| At the end of the Semester, the Students will be able to | | |
| **UNIT 1 CO1**: Understand the general concepts of PHP three-tier architecture and PHP. | 1 | 15 |
| **UNIT 2 CO2**: Use PHP logical and comparison operators, branching structures programs for developing(if/switch), and loop structures (for, for each, do, do/while) Programs. | 2 | 15 |
| **UNIT 3 CO3**: Erecit Database using MySQL for any required applications with OOPS concepts. | 3 | 15 |
| **UNIT 4 CO4**: Construct PHP program to connect and query database. | 4 | 15 |
| **UNIT 5 CO5**:  Understand, develop to web application using PHP and validate them. | 5 | 15 |

**SYLLABUS**
**UNIT I:**

Database applications and the web – The Web – Three tier Architecture, PHP Scripting language – Introducing PHP – Condition and Branches – Loops.

**UNIT II:**

 PHP Scripting Language – Functions – Types – User Defined functions- Arrays, Strings and Advanced Data Manipulation in PHP – Arrays, strings, Regular Expressions, Dates and Times, Integers and Floats.

**UNIT III:**
        Introduction to Object Oriented Programming with PHP – Classes and Objects, Inheritance,

Throwing and Caching Exceptions, SQL and MySQL – Database Basics, My SQL Command Interpreter, Managing Databases and Tables, Inserting, Updating, and Deleting Data, Querying with SQL SELECT, Join Queries.

UNIT IV:

Querying Web Databases – Querying a MySQL Database using PHP, Processing User Input, PEAR Overview, Core Components, Packages, Writing to Web databases- Database Inserts, Updates, and Deletes.

UNIT V:

Issues in Writing Data to Databases, Validation with PHP and Java Script – Validation and Error Reporting Principles. Server-Side Validation with PHP, JavaScript and Client Side Validation.

TEXT BOOKS:

Web Database Applications with PHP and Mysql by Hugh E. Williams & David Lane, II Edition, SPD O" REILLY

REFERENCES:

1. PHP , MYSQL and APACHE, Julie . C .Meloni.
2. PHP 5 and MYSQL Bible, Joyce park , CharleMorgon

| UNITS | TOPIC | LECTURE HOURS | MODE OF TEACHING |
|-------|-------|---------------|------------------|
| UNIT 1 | | | |
| | Database applications and the web – The Web | 4 | Videos |
| | Three tier Architecture, PHP Scripting language | 5 | Lecture |
| | Introducing PHP – Condition and Branches – Loops. | 6 | Peer Teaching |
| UNIT 11 | | | |
| | PHP Scripting Language – Functions – Types – User Defined functions- | 5 | Lecture |
| | Arrays, Strings and Advanced Data Manipulation in PHP– | 5 | Videos |

| | | | |
|---|---|---|---|
| | Arrays, strings, Regular Expressions, Dates and Times, Integers and Floats. | 5 | ICT |
| UNIT III | | | |
| | Introduction to Object Oriented Programming with PHP – | 5 | Videos |
| | Classes and Objects, Inheritance, | 5 | Peer Teaching |
| | Throwing and Caching Exceptions, | 5 | Lecture |
| UNIT IV | | | |
| | Querying Web Databases – Querying a MySQL Database using PHP, Processing User Input, | 5 | Lecture |
| | PEAR Overview, Core Components, Packages, | 5 | Lecture |
| | Writing to Web databases-Database Inserts, Updates, and Deletes. | 5 | Lecture |
| UNIT V | | | |
| | Issues in Writing Data to Databases, Validation with PHP and Java Script – | 5 | Lecture |
| | Validation and Error Reporting Principles. Server- | 5 | Lecture |
| | Side Validation with PHP, JavaScript and Client SideValidation. | 5 | Lecture |

| ourse Outcomes (Cos) | Programme Outcomes (POs) | | | | | Programme Specific Outcomes (PSOs) | | | | | Mean scores of Cos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | |
| CO1 | 4 | 4 | 3 | 4 | 3 | 2 | 5 | 3 | 3 | 5 | 3.6 |
| CO2 | 5 | 3 | 4 | 2 | 2 | 3 | 5 | 2 | 5 | 3 | 3.4 |
| CO3 | 2 | 4 | 2 | 3 | 4 | 2 | 5 | 2 | 1 | 3 | 2.8 |
| CO4 | 2 | 4 | 5 | 5 | 3 | 3 | 5 | 2 | 1 | 3 | 3.3 |
| CO5 | 3 | 3 | 5 | 2 | 3 | 5 | 5 | 2 | 2 | 2 | 3.2 |
| Mean Overall Score | | | | | | | | | | | 3.26 |

| Mapping | 1-20% | 21-40% | 41-60% | 61-80% | 81-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Relation | 0.0-1.0 | 1.1-2.0 | 2.1-3.0 | 3.1-4.0 | 4.1-5.0 |
| Quality | Very Poor | Poor | Moderate | High | Very High |
| Mean Score of COs =   Total of Value  Total No. of Pos & PSOs | | | Mean Overall Score of COs = Total of Mean Score  Total No. of COs | | |

| BLOOM"S TAXANOMY | INTERNAL | EXTERNAL |
|---|---|---|
| KNOWLEDGE | 50% | 50% |
| UNDERSTANDING | 30% | 30% |
| APPLY | 20% | 20% |

**Course Designer:**                         **Department of Computer Applications**

Programme : BCA                    Part III: Elective 1

Semester: V                        Hours : 5 P/W   75Hrs P/S

Sub. Code: EU51                    Credits :5

## TITLE OF THE PAPER: PROGRAMMING WITH .NET

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|---|---|---|---|---|---|
| | 5 | 2 | 1 | 1 | 1 |

**PREAMBLE:**
- To introduce .NET framework and its components.
- To learn about ASP.Net concepts and its applications.
- To inculcate the techniques to connect clients and webdata.

| COURSE OUTCOME<br><br>At the end of the Semester, the Students will be able to | Unit | Hrs P/S |
|---|---|---|
| **UNIT 1 CO1**:  Knowledge about  the .NET framework. | 1 | 15 |
| **UNIT 2 CO2**: Ability to analyze the structure of a .NET. | 2 | 15 |
| **UNIT 3 CO3**:  Programming skills development for n-tier architecture. | 3 | 15 |
| **UNIT 4 CO4**: Design and develop Web based applications and its validations. | 4 | 15 |
| **UNIT 5 CO5**: Capable of integrating webpages with database using ADO.Net. | 5 | 15 |

**SYLLABUS**

**UNIT I:**

The .NET Framework: The .NET Programming Framework – VB.NET, C# and the .NET Languages – The common language runtime –The .NET Class Library – ASP.NET – Visual Studio.NET. Learning the .NET Languages: The .NET Languages – Data Types – Declaring variables – Scope and accessibility – Variable operations – Object oriented manipulations – conditional structures – loop structures – functions and subroutine.

**UNIT II:**

Types, Objects and Namespaces: The basics about classes – value types and reference types – advances class programming – understanding namespaces and assemblies. ASP.NET applications: ASP.NET applications – ASP.NET file types –the bin directory – Application updates – Code behind – The Global.asax application file – ASP.NET configuration – The web.configfile .

**UNIT III:**

Web form fundamentals: A simple Page applet – The page class. Web Controls: Web Controls Classes – Autopostback and web control events.

**UNIT IV:**

Validation and rich controls: The calendar control – formatting the calendar – restricting dates – the Adrotator – The Advertisement file – Validation – The validation controls – The validation process –A simple validation example – Server side validation – Understanding regular expression – literals and metacharacters– finding a regular expression.

UNIT V:

Overview of ADO.NET: Characteristics of ADO.NET – Disconnected model – native XML – Extended data format – managed code – comparing ADO and ADO.NET. ADO.NET data access: About the ADO.NET examples – Obtaining the sample database – The SQL select statement – A sample select statement – The Where clause – The SQL update statement – The SQL insert statement – The SQL delete statement. TheDatalist, DataGrid and Repeater: comparing the template controls – the DataList – The DataGrid – The Repeater.

TEXT BOOKS:

1. ASP.NET : The Complete Reference, Matthew MacDonald, Tata McGraw-Hill Publishing Company Ltd, NewDelhi 2008.

REFERENCE BOOKS

1. ASP.Net VB.Net Web Programming, Matt.J.Crouch - Pearson Education.
2. ASP.Net for Developers - Michael Amundsen Paul Litwin

**E-LEARNING RESOURCES:**

3. http://vb.net-informations.com/framework/framework_tutorials.htm.

4. https://www.tutorialspoint.com/vb.net/index.htm.

5. https://www.javatpoint.com/asp-net-tutorial.

| UNITS | TOPIC | LECTURE HOURS | MODE OF TEACHING |
|-------|-------|---------------|------------------|
| UNIT 1 | | | |
| | The .NET Framework: The .NET Programming Framework – VB.NET, C# and the .NET Languages – The common language runtime – | 5 | Lecture |

| | | | |
|---|---|---|---|
| | The .NET Class Library – ASP.NET – Visual Studio.NET. Learning the .NET Languages: | 5 | Videos |
| | The .NET Languages – Data Types – Declaring variables – Scope and | 5 | Lecture |
| | accessibility – Variable operations – Object oriented manipulations – conditional structures – loop structures – functions and subroutine. | | |
| UNIT 11 | | | |
| | Types, Objects and Namespaces: The basics about classes – value types and reference types – advances class programming – understanding namespaces and assemblies. – | 6 | Lecture |
| | ASP.NET applications: ASP.NET applications – ASP.NET file types – the bin directory – Application updates – Code behind | 6 | Lecture |

| | The Global.asax application file – ASP.NET configuration – The web.configfile . | 3 | Lecture |
|---|---|---|---|
| **UNIT III** | | | |
| | Web form fundamentals: A simple Page applet – The page class.. | 6 | Lecture |

| | Web Controls: Web Controls Classes – | 6 | PPT |
|---|---|---|---|
| | Autopostback and web control events | 3 | Lecture |
| **UNIT IV** | | | |
| | Validation and rich controls: The calendar control – formatting the calendar – restricting dates – the Adrotator – The Advertisement file – | 5 | PPT |
| | Validation – The validation controls – The validation process –A simple validation example – Server side validation – | 5 | Lecture |
| | Understanding regular expression – literals and metacharacters – finding a regular expression. | 5 | Lecture |
| **UNIT V** | | | |

| | Overview of ADO.NET: Characteristics of ADO.NET – Disconnected model – native XML – Extended data format – managed code – comparing ADO and ADO.NET. | 6 | PPT |
|---|---|---|---|
| | ADO.NET data access: About the | 4 | Videos |

| | ADO.NET examples – Obtaining the sample database – The SQL select statement – A sample select statement – The Where clause – The SQL update statement – The SQL insert statement – The SQL delete statement. | | |
|---|---|---|---|
| | TheDatalist, DataGrid and Repeater: comparing the template controls – the DataList – The DataGrid – The Repeater. | 5 | Lecture |

| Course Outcomes (Cos) | Programme Outcomes (POs) | | | | | Programme Specific Outcomes (PSOs) | | | | | Mean scores of Cos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | |

| | | | | | | | | | | | |
|------|---|---|---|---|---|---|---|---|---|---|------|
| CO1 | 2 | 4 | 5 | 3 | 3 | 4 | 2 | 3 | 3 | 5 | 3.4 |
| CO2 | 2 | 3 | 4 | 4 | 4 | 4 | 3 | 2 | 5 | 3 | 3.4 |
| CO3 | 5 | 4 | 2 | 3 | 5 | 4 | 5 | 2 | 1 | 3 | 3.4 |
| CO4 | 4 | 4 | 2 | 5 | 4 | 4 | 5 | 2 | 1 | 3 | 3.4 |
| CO5 | 4 | 3 | 3 | 2 | 4 | 4 | 5 | 2 | 2 | 2 | 3.1 |
| Mean Overall Score | | | | | | | | | | | 3.34 |

| Mapping | 1-20% | 21-40% | 41-60% | 61-80% | 81-100% |
|---------|-------|--------|--------|--------|---------|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Relation | 0.0-1.0 | 1.1-2.0 | 2.1-3.0 | 3.1-4.0 | 4.1-5.0 |
| Quality | Very Poor | Poor | Moderate | High | Very High |

Mean Score of COs =     Total of Value

　　　　　　　　Total No. of Pos & PSOs

Mean Overall Score of COs = Total of Mean Score

　　　　　　　　　　　　Total No. of COs

| BLOOM"S TAXANOMY | INTERNAL | EXTERNAL |
|------------------|----------|----------|
| KNOWLEDGE | 50% | 50% |
| UNDERSTANDING | 30% | 30% |
| APPLY | 20% | 20% |

**Course Designer:**　　　　　　　　**Department of Computer Applications**

**Programme : BCA**            **Part III: Elective 1**

**Semester   :VI**                    **Hours  : 4 P/W   75Hrs P/S**

**Sub. Code: P22DSU2B**           **Credits : 4**

**TITLE OF THE PAPER: ARTIFICIAL NEURAL NETWORKS**

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|----------|-------|---------|---------------|--------------------|-----|
|          | 5     | 2       | 1             | 1                  | 1   |

**PREAMBLE:**
- To study and design artificial neural network and its working methodology.
- To explore various neural network models for traning various domains.

| COURSE OUTCOME<br><br>At the end of the Semester, the Students will be able to | Unit | Hrs P/S |
|---|---|---|
| **UNIT 1 CO1**: Introductions of learning and training neurons. | 1 | 15 |
| **UNIT 2 CO2**: Understanding various models of neural networks. | 2 | 15 |
| **UNIT 3 CO3**: Explore applications network models for various domains. | 3 | 15 |
| **UNIT 4 CO4**: Analysis of back propagation methods scrutiny. | 4 | 15 |
| **UNIT 5 CO5**:Implementation Applications of neural network concepts | 5 | 15 |

**SYLLABUS**

**UNIT I:**
Introduction: Brain as a neural network – Basic properties of neurons – Artificial Neural Networks. Learning: Learning and training – Learning rules – Stability and plasticity

**UNIT II:**
Hopfield, Perceptron and Related models: Hop field model – basic model of hop-field network – cellular neural networks – perceptron – Other associative models – Bidirectional Associative memory

**UNIT III:**
Self Organization Map: Kohenen map – adaptive of learning vector quantization – multilayer self organizing feature map.

**UNIT IV:**
      Feed-Forward back propagation networks: Training of multilayer feed –forward – training aspects and variations of back propagation method – Back propagation of stochastic approximation.

**UNIT V:**
      Hybrid learning Neural Network: counter propagation network – radial basis functional networks. Probabilistic models, fuzzy ART map and recurrent networks – Probabilistic neural

networks.

TEXT BOOKS: Neural Networks Algorithms and Applications, M.AnandaRao, J .Srinivas, Narosa Publishing House, 2010.

REFERENCES:

1. Neural networks, James A.Freeman, David N.Skepura.
2. Neural Networks Fundamentals with Graphs, Algorithms and Applications, N.K.Bose, P.Liang

| UNITS | TOPIC | LECTURE HOURS | MODE OF TEACHING |
|---|---|---|---|
| UNIT 1 | | | |
| | Introduction: Brain as a neural network – Basic properties of neurons | 5 | PPT |
| | Artificial Neural Networks. Learning: Learning and training – | 7 | Lecture |
| | Learning rules – Stability and plasticity. | 3 | Lecture |
| UNIT 11 | | | |
| | Hopfield, Perceptron and Related models: Hop field model | 6 | Lecture |
| | basic model of hop-field network – cellular neural networks – perceptron | 6 | Lecture |
| | Other associative models – Bidirectional Associative memory | 3 | PPT |
| UNIT III | | | |
| | Self Organization Map: Kohenen map – | 4 | Lecture |
| | adaptive of learning vector quantization – | 5 | Lecture |
| | multilayerself organizing feature map. | 6 | Lecture |

| UNIT IV | | | |
|---|---|---|---|
| | Feed-Forward back propagation networks: Training of multilayer feed | 6 | PPT |
| | –forward – training aspects and variations of back propagation method – | 3 | Lecture |
| | Back propagation of stochastic approximation. | 6 | Lecture |
| UNIT V | | | |
| | Hybrid learning Neural Network: counter propagation network — | 6 | Lecture |
| | radial basis functional networks. Probabilistic models, fuzzy ART map and recurrent networks | 6 | Lecture |
| | Probabilistic neural networks. | 3 | PPT |

| Course Outcomes (Cos) | Programme Outcomes (POs) | | | | | Programme Specific Outcomes (PSOs) | | | | | Mean scoresof Cos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO 2 | PO3 | PO 4 | PO 5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | |
| CO1 | 2 | 4 | 3 | 4 | 3 | 2 | 5 | 3 | 3 | 4 | 3.3 |
| CO2 | 2 | 3 | 4 | 2 | 2 | 3 | 5 | 2 | 5 | 3 | 3.1 |
| CO3 | 5 | 4 | 2 | 3 | 4 | 2 | 5 | 2 | 1 | 2 | 3 |
| CO4 | 4 | 4 | 5 | 5 | 3 | 3 | 5 | 2 | 1 | 3 | 3.5 |
| CO5 | 4 | 3 | 5 | 2 | 1 | 5 | 5 | 2 | 2 | 5 | 3.4 |
| Mean Overall Score | | | | | | | | | | | 3.26 |

| Mapping | 1-20% | 21-40% | 41-60% | 61-80% | 81-100% |
|---------|-------|--------|--------|--------|---------|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Relation | 0.0-1.0 | 1.1-2.0 | 2.1-3.0 | 3.1-4.0 | 4.1-5.0 |
| Quality | Very Poor | Poor | Moderate | High | Very High |

Mean Score of COs =    <u>Total of Value</u>

                   Total No. of Pos & PSOs

Mean Overall Score of COs =  <u>Total of Mean Score</u>

                                   Total No. of COs

| BLOOM‟S TAXANOMY | INTERNAL | EXTERNAL |
|------------------|----------|----------|
| KNOWLEDGE | 50% | 50% |
| UNDERSTANDING | 30% | 30% |
| APPLY | 20% | 20% |

**programme :**                  **BCA**     **Part III: Elective-2**

**Semester   : V**                  **Hours    : 2 P/W   90Hrs P/S**

**Sub. Code: U22SEU2P**          **Credits :2**

### TITLE OF THE PAPER: .NET PROGRAMMING LAB

| Pedagogy | Hours | practical | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|----------|-------|-----------|---------------|--------------------|-----|
| | 6 | 5 | - | 1 | - |

**SYLLABUS**

1) Illustrating various loops
2) Programs to manipulate objects
3) Creation and using name spaces
4) Illustrating function and subroutine concepts
5) Handling global.asax file in web page like showing numbers of visitors of the web page
6) Illustrating web controls of .NET
7) Handling Calendar – Highlighting a specific date, view setting in calendar, setting a schedule on a specific date, restricting calendar.
8) Validating web page using validator controls
9) Implementing Disconnected data model of .ADO.NET
10) Implementing connected data model of ADO.NET
11) Illustrating Data Grid, Data List and Repeater Control
12) Illustration of Regular Expression
13) Performing Server side Validation
14) Handling Literals and meta characters

**Programme : BCA**          **Part III: Core -13**

**Semester    : V**                       **Hours     : 6 P/W   90Hrs P/S**

**Sub. Code:U22CU14P**          **Credits : 4**

**TITLE OF THE PAPER:  PHP LAB**

| Pedagogy | Hours | practical | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|----------|-------|-----------|---------------|--------------------|-----|
|          | 6     | 5         | -             | 1                  | -   |

**SYLLABUS**

1. Working with Branching statements
2. Working with Looping Statements
3. Working with 1 Dimensional, 2 Dimensional Arrays.
4. Working with Strings and String handling functions
5. Working with Date and Time functions
6. Working with Regular Expressions
7. Working with DDL commands of MYSQL
8. Working with DML commands of MYSQL
9. Working with SQL Commands of MYSQL
10. Working with PEAR database
11. Client side Validation
12. Server side validation
13. Reporting errors

| **Semester** | **:V** | **Hours : 2 P/W 60HrsP/S** |

| **Sub.Code** | **:U22SEU3** | **Credits :2** |

**TITLE OF THE PAPER: COMPUTER GRAPHICS**

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|---|---|---|---|---|---|
| | 2 | 2 | - | - | - |

| **PREAMBLE:** | |
|---|---|
| | • To know about the basics of computer graphics fundamentals. <br><br> • To train the 2D and 3D transformations foranimation. |

| **COURSE OUTCOME** <br> At the end of the Semester, the Students will be able to | Unit | Hrs P/S |
|---|---|---|
| **UNIT 1 CO1**: Gain proficiency computer graphics and graphics devices | 1 | 12 |
| **UNIT 2 CO2**: Understand about the primitive drawing and its generation algorithms | 2 | 12 |
| **UNIT 3 CO3**: Enhance the perspective of modern computer system with modeling, analysis and interpretation of 2D and 3D visual information. | 3 | 12 |
| **UNIT 4 CO4**: Able to develop clipping and viewing process | 4 | 12 |
| **UNIT 5 CO5**: Gain the knowledge of  3D and its transformations | 5 | 12 |

**SYLLABUS**
**UNIT I:**

A survey of computer graphics: Computer-Aided Design – Presentation Graphics Computer Art – Entertainment – Education and Training. Overview of Graphic Systems: Video Display Devices –Raster Scan Systems - Random Scan Systems.

**UNIT II:**

Output Primitives: Points and Lines – Line Drawing Algorithms – Circle Generation Algorithm

**UNIT III:**

Two-Dimensional Geometric Transformations: Basic Transformations – Matrix Representations – Composite Transformations – OtherTransformations
**UNIT IV:**

Two dimensional viewing: The viewing pipeline –clipping operations – point clipping – Line clipping - Cohen Sutherland line clipping only – Polygon clipping - Sutherland Hodgmann polygon clipping only – Curve clipping - Text clipping – Exterior clipping.

**UNIT V:**

Three dimensional geometric and modeling transformations: Translation – rotation – scaling.

**TEXT BOOKS:**

1) Computer graphics – Donald Hearn, M.Pauline Baker, PHI, 2$^{nd}$Edition
**REFERENCES:**

1) Principles of Interactive Computer Graphics , William M. Newman andF.Sproull.

2) Computer Graphics , Steven Harrigton, McGraw Hill InternationalEdition,2$^{nd}$Ed.

| UNITS | TOPIC | LECTURE HOURS | MODE OF TEACHING |
|---|---|---|---|
| UNIT 1 | | | |
| | A survey of computer graphics: Computer- Aided Design – Presentation Graphics Computer Art – Entertainment – Education and Training.– | 4 | Lecture |
| | Overview of Graphic Systems: Video Display Devices | 4 | PPT |
| | Raster Scan Systems - Random Scan Systems. | 4 | Lecture |
| UNIT 11 | | | |
| | Output Primitives: Points and Lines — | 4 | Lecture |
| | Line Drawing Algorithms | 4 | Lecture |
| | Circle Generation Algorithm | 4 | Lecture |
| UNIT III | | | |
| | Two-Dimensional Geometric Transformations:– | 4 | PPT |

| | | | |
|---|---|---|---|
| | Basic Transformations – Matrix Representations – Composite Transformations | 4 | PPT |
| | Other Transformations | 4 | PPT |
| **UNIT IV** | | | |
| | Two dimensional viewing: The viewing pipeline | 4 | Lecture |
| | –clipping operations – point clipping – Line clipping - Cohen Sutherland line clipping only – Polygon clipping - | 4 | Lecture |
| | Sutherland Hodgmann polygon clipping only – Curve clipping - Text clipping – Exterior clipping. | 4 | Videos |
| **UNIT V** | | | |
| | Three dimensional geometric andmodeling | 4 | Video |
| | transformations: Translation – | 4 | PPT |
| | rotation – scaling. | 4 | Lecture |

| Course Outcomes (Cos) | Programme Outcomes (POs) | | | | | Programme Specific Outcomes (PSOs) | | | | | Mean scoresof Cos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO 1 | PSO 2 | PSO3 | PSO 4 | PSO 5 | |
| CO 1 | 2 | 4 | 3 | 3 | 3 | 4 | 5 | 3 | 3 | 5 | 3.5 |
| CO 2 | 3 | 3 | 4 | 2 | 2 | 4 | 5 | 2 | 5 | 3 | 3.3 |
| CO 3 | 5 | 4 | 2 | 3 | 4 | 4 | 5 | 2 | 1 | 3 | 3.3 |
| CO 4 | 4 | 4 | 5 | 5 | 3 | 2 | 5 | 2 | 1 | 3 | 3.4 |
| CO 5 | 4 | 3 | 5 | 2 | 4 | 4 | 5 | 2 | 2 | 2 | 3.3 |
| Mean Overall Score | | | | | | | | | | | 3.36 |

| Mapping | 1-20% | 21-40% | 41-60% | 61-80% | 81-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Relation | 0.0-1.0 | 1.1-2.0 | 2.1-3.0 | 3.1-4.0 | 4.1-5.0 |
| Quality | Very Poor | Poor | Moderate | High | Very High |

| Mean Score of COs = Total of Value Total No. of Pos & PSOs | Mean Overall Score of COs = Total of Mean Score Total No. of COs |
|---|---|

| BLOOM"S TAXANOMY | INTERNAL | EXTERNAL |
|---|---|---|
| KNOWLEDGE | 50% | 50% |
| UNDERSTANDING | 30% | 30% |
| APPLY | 20% | 20% |

**CourseDesigner:**          **Department of ComputerApplications**

**Programme:BCA**                                        **Part III:Elective-3**

**Semester  :V**                                    **Hours : 5 P/W 90 Hrs P/S**

**Sub.Code   : P22DSU1C**                               **Credits :5**

### TITLE OF THE PAPER: SYSTEM SOFTWARE

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|----------|-------|---------|---------------|--------------------|-----|
|          | 5     | 2       | 1             | 1                  | 1   |

**PREAMBLE:**
- To introduce the low level functioning softwares
- To present about translators - assemblers andcompliers
- To learn about the working principle of Loaders andLinkers

| COURSE OUTCOME | Unit | Hrs P/S |
|----------------|------|---------|
| At the end of the Semester, the Students will be able to | | |
| **UNIT 1 CO1**: . To know about the translation process with various types of instructions and computers | 1 | 18 |
| **UNIT 2 CO2**: . To study about the assembler and its functions | 2 | 18 |
| **UNIT 3 CO3**: Understand and identify the types of loaders and their functions | 3 | 18 |
| **UNIT 4 CO4**: Analyse about macro processors | 4 | 18 |
| **UNIT 5 CO5**: Know about the working principle of compiler | 5 | 18 |

SYLLABUS

UNIT I:

System Software and Machine Architecture-Simplified Instructional Computer (SIC), SIC/XE, CISC machines and RISC machine.

UNIT II:

Basic Assembler functions – Assembler algorithm and data structures – Machine Dependent Assembler features – Machine Independent Assembler features – one pass assemblers – multi pass assemblers

UNITIII:

Basic Loader functions – Design of Absolute Loader – Bootstrap Loader – Machine Dependent Loader features – Machine Independent Loader features – Loader design options – Linkage editors – Dynamic linking.

UNIT IV:

Basic Macro processor functions – Machine independent macro processor features – Macro processor design options.

UNIT V:

Basic Compiler functions – grammars – lexical analysis – Syntactic analysis – code generation – Machine dependent compiler features – machine Independent compiler features.

**1. TEXT BOOKS:**
2) System Software an Introduction to System Programming - by Leland L. Beck, Addison – Wesley,
III Edition 1999.

| UNITS | TOPIC | LECTURE HOURS | MODE OF TEACHING |
|---|---|---|---|
| UNIT 1 | | | |
| | System Software and Machine Architecture- | 6 | Lecture |
| | Simplified Instructional Computer (SIC), SIC/XE, | 6 | Lecture |
| | CISC machines and RISC machine. | 6 | PPT |

| UNIT 11 | | | |
|---|---|---|---|
| | Basic Assembler functions – Assembler algorithm and data structures – | 6 | Lecture |
| | Machine Dependent Assembler features – Machine Independent | 6 | Lecture |
| | . Assembler features– one pass assemblers– multi passassemblers | 6 | Videos |
| UNIT III | | | |
| | Basic Loader functions – Design of Absolute Loader – Bootstrap Loader – | 6 | PPT |
| | Machine Dependent Loader features – Machine Independent | 6 | Videos |
| | Loader features – Loader design options – Linkage editors – Dynamic linking | 6 | PPT |
| UNIT IV | | | |
| | Basic Macro processor functions– | 6 | Videos |
| | Machine independent macro processor features – | 6 | PPT |
| | . Macro processor designoptions. | 6 | Lecture |
| UNIT V | | | |

| | | | |
|---|---|---|---|
| | Basic Compiler functions –grammars – lexical analysis – Machine dependent | 6 | Lecture |
| | Syntactic analysis – code generation – | 6 | Lecture |
| | compiler features – machine Independent compiler features | 6 | PPT |

| Course Outcomes (Cos) | Programme Outcomes (POs) | | | | | Programme Specific Outcomes (PSOs) | | | | | Mean scoresof Cos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO 1 | PSO2 | PSO3 | PSO4 | PSO5 | |
| CO 1 | 2 | 4 | 3 | 4 | 3 | 4 | 5 | 3 | 3 | 5 | 3.6 |
| CO 2 | 2 | 3 | 4 | 2 | 2 | 4 | 5 | 2 | 5 | 3 | 3.2 |
| CO 3 | 5 | 4 | 2 | 3 | 4 | 4 | 5 | 2 | 1 | 3 | 3.3 |
| CO 4 | 4 | 4 | 5 | 5 | 3 | 2 | 5 | 2 | 1 | 3 | 3.4 |
| CO 5 | 4 | 3 | 5 | 2 | 1 | 4 | 5 | 2 | 2 | 2 | 3 |
| Mean Overall Score | | | | | | | | | | | 3.3 |

| Mapping | 1-20% | 21-40% | 41-60% | 61-80% | 81-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Relation | 0.0-1.0 | 1.1-2.0 | 2.1-3.0 | 3.1-4.0 | 4.1-5.0 |
| Quality | Very Poor | Poor | Moderate | High | Very High |

Mean Score of COs =     Total of Value
                                      Total No. of Pos & PSOs

Mean Overall Score of COs = Total of Mean Score
                                                Total No. of COs

| BLOOM‟S TAXANOMY | INTERNAL | EXTERNAL |
|---|---|---|
| KNOWLEDGE | 50% | 50% |
| UNDERSTANDING | 30% | 30% |
| APPLY | 20% | 20% |

**CourseDesigner:**            **Department of ComputerApplications**

**Programme:BCA**                                  **Part III:Core-14**

Semester    : VI                                   Hours : 6 P/W 90HrsP/S

Sub.Code    : U22CU15                              Credits : 5

**TITLE OF THE PAPER: SOFTWARE ENGINEERING**

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|----------|-------|---------|---------------|--------------------|-----|
|          | 5     | 2       | 1             | 1                  | 1   |

**PREAMBLE:**
- To introduce the software life cycle and development approaches
- To explore various estimation techniques, requirement analysis, software designing and testingstrategies

| COURSE OUTCOME<br><br>At the end of the Semester, the Students will be able to | Unit | Hrs P/S |
|-----------------------------------------------------------------------------|------|---------|
| **UNIT 1 CO1**: Acquire fundamental knowledge in software engineering. | 1 | 18 |
| **UNIT 2 CO2**: Estimating and analysing the cost for software. | 2 | 18 |
| **UNIT 3 CO3**: Effectively demonstrate competence in communication, planning, analysis, design, construction, testing and deployment | 3 | 18 |
| **UNIT 4 CO4**: Adapt to design notations and techniques | 4 | 18 |
| **UNIT 5 CO5**: Incorporating .testing , verification and validation techniques into a software | 5 | 18 |

## SYLLABUS

UNIT I:

Introduction to Software Engineering and Planning: Introduction - definition - some size factors - quality and Productivity factors.Planning a Software Project: Introduction - Defining the problem - Developing a solution strategy - Planning the development process - Planning an organizationalstructur

UNIT II:

Software Cost Estimation: Introduction - Software cost factors - software cost estimation techniques - staffing - level estimation .

UNIT III:

SoftwareRequirementDefinition:Introduction - the software requirement specification– formal specification techniques - languages and processors for requirements.

UNIT IV:

Software Design: Introduction - fundamental design concepts - modules and modularization criteria - design notations - design techniques .

UNIT V:

Verification and Validation Techniques:Introduction - quality assurance - walkthroughs and inspection - unit testing and debugging - system testing -Software Maintenance.

TEXT BOOKS:

1) Software engineering concepts, Richard Fairley, Tata McGraw Hillpublications, 1997.

**REFERENCES:**

1) Software Engineering, Roger S.Pressman, McGraw Hill Publications, 4<sup>th</sup>Edition.

2) Software Engineering, Ian Somerville, Addison Wesley PublishingCo.

**E-LEARNING RESOURCES:**

1. nptel.ac.in/courses/106101061
2. tutorialspoint.com

| UNITS | TOPIC | LECTURE HOURS | MODE OF TEACHING |
|---|---|---|---|
| UNIT 1 | | | |
| | Introduction toSoftware Engineering and Planning: Introduction - definition - some size factors - quality and Productivity factors- | 6 | Lecture |
| | .Planning a Software Project: Introduction - Defining the problem - Developing a solution strategy | 6 | Lecture |
| | Planning the development process - Planning an organizationalstructure. | 6 | Lecture |
| UNIT II | | | |
| | Software Cost Estimation:Introduction - Software cost factors- | 6 | PPT |
| | software cost estimation techniques | 6 | Lecture |
| | staffing - level estimation | 6 | Lecture |
| UNIT III | | | |
| | Software Requirement Definition:Introduction - | 6 | PPT |
| | thesoftware requirement | 4 | ICT |

| | | | |
|---|---|---|---|
| | specification - formal specificationtechniques - languages and processors for requirements. | 8 | Lecture |
| UNIT IV | | | |
| | Software Design: Introduction - | 6 | ICT |
| | fundamental design concepts - modules and modularization criteria - | 6 | PPT |
| | design notations - design techniques . | 6 | Lecture |
| UNIT V | | | |
| | Verification and Validation Techniques:Introduction - quality assurance - | 5 | Lecture |
| | walkthroughs and inspection --. | 4 | |
| | unit testing and debugging | 4 | PPT |
| | system testing - Software Maintenance | 5 | PPT |

| Course Outcomes (Cos) | Programme Outcomes (POs) | | | | | Programme Specific Outcomes (PSOs) | | | | | Mean scores of Cos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PSO 5 | |
| CO1 | 2 | 4 | 3 | 4 | 3 | 4 | 5 | 3 | 3 | 5 | 3.6 |
| CO2 | 2 | 3 | 4 | 2 | 2 | 4 | 5 | 2 | 5 | 3 | 3.2 |
| CO3 | 5 | 4 | 2 | 3 | 4 | 4 | 5 | 2 | 1 | 3 | 3.3 |
| CO4 | 4 | 4 | 5 | 5 | 3 | 2 | 5 | 2 | 1 | 3 | 3.4 |
| CO5 | 4 | 3 | 5 | 2 | 1 | 4 | 5 | 2 | 2 | 2 | 3 |
| Mean Overall Score | | | | | | | | | | | 3.3 |

| Mapping | 1-20% | 21-40% | 41-60% | 61-80% | 81-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Relation | 0.0-1.0 | 1.1-2.0 | 2.1-3.0 | 3.1-4.0 | 4.1-5.0 |
| Quality | Very Poor | Poor | Moderate | High | Very High |

Mean Score ofCOs =      Total ofValue

      Total No. of Pos & PSOs

Mean Overall Score of COs = Total of Mean Score

      Total No. of COs

| BLOOM"S TAXANOMY | INTERNAL | EXTERNAL |
|---|---|---|
| KNOWLEDGE | 50% | 50% |
| UNDERSTANDING | 30% | 30% |
| APPLY | 20% | 20% |

**CourseDesigner:**　　　　　　　**Department of ComputerApplications**

| **Programme : BCA** | **Part III : Elective-3** |
|---|---|
| **Semester : VI** | **Hours : 6 P/W    90 HrsP/S** |
| **Sub.Code : U22CU16** | **Credits : 5** |

**TITLE OF THE PAPER: DATA WAREHOUSING ANDMINING**

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|---|---|---|---|---|---|
| | 5 | 2 | 1 | 1 | 1 |

**PREAMBLE:**

- To recognize the need of huge, voluminous datastorage

- To learn about storing, accessing data from datawarehouse

- To learn how to mine data from warehouse using different methodologies

| COURSE OUTCOME | Unit | Hrs P/S |
|---|---|---|
| At the end of the Semester, the Students will be able to | | |
| **UNIT 1 CO1**: Know about the data warehouse and its architecture | 1 | 18 |
| **UNIT 2 CO2**: Understand the data mining definitions, techniques and its challenges | 2 | 18 |
| **UNIT 3 CO3**: Familiar with how to find and group any  data set | 3 | 18 |
| **UNIT 4 CO4**: Designing and using various classification methods and prediction methods | 4 | 18 |
| **UNIT 5 CO5**:Apply data mining techniques to all real time applications | 5 | 18 |

**SYLLABUS**

**UNIT I:**

Data Warehousing: Introduction – What is data warehouse? – Definition – Multidimensional datamodel – OLAP operation – Warehouse schema – Data Warehousing Architecture – Warehouse server – Mata data – OLAP engine – Datawarehouse backend process.

**UNIT II:**

Data mining: introduction – what is data mining – data mining definitions – KDD Vs Data mining - DBMSVs Data mining – Other related areas – DM techniques – Issues and challenges in data mining.

**UNIT III:**

Association rules: introduction – what is an Associative Rule? – Method to discover

**Association Rules – Apriori Algorithm – Dynamic itemset counting algorithm – FP growth algorithm –Border Algorithm. Clustering Techniques: Introduction – clustering paradigms – partitioning algorithms – K medoid algorithms – Hierarchial Clustering – DBSCAN –CURE.**

## UNIT IV:

**Classification Based Concept: Basic Concepts – Decision tree induction - Bayes Classification methods: Bayes Theorem – Naïve Bayesian Classification.**

## UNIT V:

**Other Techniques: Introduction – What is Neural Network? – Learning in NN – Unsupervised Learning – Datamining using NN: A case study – Genetic Algorithm – Rough Sets – Support Vector Machines.**

## TEXT BOOKS:

1. Data Mining Techniques ,Arun K. Pujari , University Press. ( For Unit I, II, III andV)

**Data Mining concepts and techniques, Jawei Han, MichelineKamber, Jian Pei, Margan Kaufmann Publishers – imprint of Elsevier, 3rd Edition. – (For Unit IV only)**

## REFERENCES:

1. Advances in Knowledge Discovery and Data Mining Usama M. Farrad, GeogoryPiatetsky –Shapiro, padhrai Smyth and RamasamyUthurusamy, The M.I.T.press.

2. The Data Warehouse Life Cycle Toolhit, Ralph Kimball, John Wiley & SonsInc.

3. Data warehousing in Action, Sean Kelly, John Wiley & SonsInc.

4. Insights into data Mining, Theory and Practice, K.P. Soman, ShyamDiwakar, V. Ajay PHI Publications Eastern Economy Edition 6th Printing,2012

| UNITS | TOPIC | LECTURE HOURS | MODE OF TEACHING |
|-------|-------|---------------|------------------|
| UNIT 1 | | | |
| | Data Warehousing: Introduction – What is data warehouse? – Definition – Multidimensional datamodel – OLAP operation – Warehouse schema– | 6 | Lecture |

| | | | |
|---|---|---|---|
| | Data Warehousing Architecture – Warehouse server – | 6 | Videos |
| | Mata data – OLAP engine – Datawarehouse backend process. | 6 | Lecture |
| **UNIT 11** | | | |
| | Data mining: introduction – what is data mining – data mining definitions— | 6 | Lecture |
| | KDD Vs Data mining - DBMS Vs Data mining – Other related areas | 6 | Lecture |
| | DM techniques – Issues and challenges in data mining. | 6 | PPT |
| **UNIT III** | | | |
| | Association rules: introduction – what is an Associative Rule? – Method to discover Association Rules – Apriori Algorithm – | 6 | Lecture |
| | Dynamic itemset counting algorithm– FP growthalgorithm – BorderAlgorithm. | 6 | PPT |
| | Clustering Techniques: Introduction – clustering paradigms – partitioning algorithms – K medoid algorithms – | 6 | Lecture |

| | Hierarchial Clustering – DBSCAN – CURE | | |
|---|---|---|---|
| **UNIT IV** | | | |
| | Classification Based Concept: Basic Concepts – Decision tree induction -– | 6 | Lecture |
| | Bayes Classification methods: Bayes Theorem | 6 | Lecture |
| | Naïve Bayesian Classification. | 6 | PPT |
| **UNIT V** | | | |
| | Other Techniques: Introduction – What is Neural Network? – Learning in NN – Unsupervised Learning– | 6 | Lecture |
| | Datamining using NN: A case study– | 6 | PPT |
| | Genetic Algorithm – Rough Sets – Support Vector Machines. | 6 | PPT |

| Course Outcomes (Cos) | Programme Outcomes (POs) | | | | | Programme Specific Outcomes (PSOs) | | | | | Mean scores of Cos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | |
| CO1 | 2 | 4 | 3 | 4 | 5 | 4 | 5 | 3 | 3 | 5 | 3.8 |
| CO2 | 2 | 3 | 4 | 2 | 4 | 4 | 5 | 2 | 5 | 3 | 3.4 |
| CO3 | 5 | 4 | 2 | 3 | 5 | 4 | 5 | 2 | 1 | 3 | 3.4 |
| CO4 | 4 | 4 | 5 | 5 | 2 | 2 | 5 | 2 | 1 | 3 | 3.3 |
| CO5 | 4 | 3 | 5 | 2 | 4 | 4 | 5 | 2 | 2 | 2 | 3.3 |
| Mean Overall Score | | | | | | | | | | | 3.44 |

| Mapping | 1-20% | 21-40% | 41-60% | 61-80% | 81-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Relation | 0.0-1.0 | 1.1-2.0 | 2.1-3.0 | 3.1-4.0 | 4.1-5.0 |
| Quality | Very Poor | Poor | Moderate | High | Very High |

Mean Score ofCOs =       Total ofValue

         Total No. of Pos & PSOs

Mean Overall Score of COs = Total of Mean Score

         Total No. of COs

| BLOOM"S TAXANOMY | INTERNAL | EXTERNAL |
|---|---|---|
| KNOWLEDGE | 50% | 50% |
| UNDERSTANDING | 30% | 30% |
| APPLY | 20% | 20% |

**CourseDesigner:**          **Department Of Computer Applications**

**Programme : BCA**                      **Part III: Elective 1**
**Semester : VI**                          **Hours  : 4 P/W   75Hrs P/S**
**Sub. Code: U22DSU2C**             **Credits : 4**

## TITLE OF THE PAPER: DIGITAL IMAGE PROCESSING

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|---|---|---|---|---|---|
| | 5 | 2 | 1 | 1 | 1 |

**PREAMBLE:**
- To learn the image formation model and various representations of an image.

- To inculcate  the image and feature extraction processing techniques.

- To learn the image segmentation and various analysis methodologies.

| COURSE OUTCOME | | Unit | Hrs P/S |
|---|---|---|---|
| At the end of the Semester, the Students will be able to | | | |
| **UNIT 1 CO1**:  Understand the image conversion approaches. | | 1 | 15 |
| **UNIT 2 CO2**: Build knowledge about pixels and signal passing methodologies. | | 2 | 15 |
| **UNIT 3 CO3**: Learn to develop color image processing approaches using Image | | 3 | 15 |
| **UNIT 4 CO4**: Understands various processing involved in analyzing digital images. | | 4 | 15 |
| **UNIT 5 CO5**: Capable of segmating image based on its boundaries. | | 5 | 15 |

**SYLLABUS**
**UNIT I:**

Introduction: Fundamental steps in Digital Image Processing – Image sensing and acquisition - Simple image formation - Image Sampling and Quantization – Basic concepts in sampling and quantization – Representing Digital Image.

**UNIT II:**

Some basic relationships between pixels - Histogram processing – Histogram equalization. Filtering in the frequency domain : Image Smoothing using frequency domain – Ideal Low pass Filter – Butter worth low pass filter – Guassian low pass filter.

**UNIT III:**

Image Sharpening using frequency domain filters – Ideal high pass filter – butter worth high pass filter – Gaussian high pass filter. Color fundamentals - Color models -  Full color image processing

**UNIT IV:**

Erosion and Dilation - Opening and Closing - Hit or Miss Transformation - Basic Morphological algorithm –Boundary extraction – Hole filling.

**UNIT V:**

Fundamentals - Point, Line and Edge detection - Region based Segmentation - Segmentation using Morphological Watersheds.

**TEXT BOOKS:**

Digital Image Processing, Rafael C.Gonzalez, Richard E.Woods, Prentice Hall 3$^{rd}$ Edition, 2008

**REFERENCES:**

Digital Image Processing Using MATLAB, Rafael C.Gonzalez, Richard E.Woods, Steven L.Eddins, Prentice Hall, 2004.

1.  Digital Image Processing, Bernd Jahne, Springer, 5$^{th}$ revised edition.

2.  Digital image processing, Jayaraman S, Veerakumar T, Esakkirajan S, McGrawHill, 2009.

3.  Digital Image Processing, PoonamYadav, AbhishekYadav, University Science Press, 2010.

| UNITS | TOPIC | LECTURE HOURS | MODE OF TEACHING |
|---|---|---|---|
| UNIT 1 | | | |
| | Introduction: Fundamental steps in Digital Image Processing | 6 | PPT |
| | Image sensing and acquisition - Simple image formation - Image Sampling and Quantization | 6 | Lecture |

|  | Basic concepts in sampling and quantization – Representing Digital Image. | 3 | Lecture |
|---|---|---|---|
| **UNIT 11** | | | |
|  | Some basic relationships between pixels - | 7 | Videos |
|  | Histogram processing – Histogram equalization. Filtering in the frequency domain : | 3 | Lecture |
|  | Image Smoothing using frequency domain – Ideal Low pass Filter – Butter worth low pass filter – Guassian low pass filter. | 5 | PPT |
| **UNIT III** | | | |
|  | Image Sharpening using frequency domain filters – Ideal high pass filter – | 6 | Lecture |
|  | butter worth high pass filter – Gaussian high pass filter. | 6 | Lecture |
|  | Color fundamentals - Color models - Full color image processing. | 3 | Lecture |
| **UNIT IV** | | | |
|  | Erosion and Dilation - Opening and Closing - Hit or Miss Transformation - | 6 | PPT |
|  | Basic Morphological algorithm – | 6 | Lecture |
|  | Boundary extraction – Hole | 3 | Lecture |

| | filling. | | |
|---|---|---|---|
| UNIT V | | | |
| | Fundamentals - Point, Line and Edge detection | 6 | PPT |
| | Region based Segmentation -. | 5 | Video |
| | Segmentation using Morphological Watersheds | 4 | Lecture |

| Course Outcomes (Cos) | Programme Outcomes (POs) | | | | | Programme Specific Outcomes (PSOs) | | | | | Mean scores of Cos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO 4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO 5 | |
| CO1 | 2 | 4 | 3 | 4 | 3 | 4 | 5 | 3 | 3 | 5 | 3.6 |
| CO2 | 2 | 3 | 4 | 2 | 2 | 4 | 5 | 2 | 5 | 3 | 3.2 |
| CO3 | 5 | 4 | 2 | 3 | 4 | 4 | 5 | 2 | 1 | 3 | 3.3 |
| CO4 | 4 | 4 | 5 | 5 | 3 | 2 | 5 | 2 | 1 | 3 | 3.4 |
| CO5 | 4 | 3 | 5 | 2 | 1 | 4 | 5 | 2 | 2 | 2 | 3 |
| Mean Overall Score | | | | | | | | | | | 3.3 |

| Mapping | 1-20% | 21-40% | 41-60% | 61-80% | 81-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Relation | 0.0-1.0 | 1.1-2.0 | 2.1-3.0 | 3.1-4.0 | 4.1-5.0 |
| Quality | Very Poor | Poor | Moderate | High | Very High |

Mean Score ofCOs =      Total ofValue

          Total No. of Pos & PSOs

Mean Overall Score of COs = Total of Mean Score

          Total No. of COs

| BLOOM"S TAXANOMY | INTERNAL | EXTERNAL |
|---|---|---|
| KNOWLEDGE | 50% | 50% |
| UNDERSTANDING | 30% | 30% |
| APPLY | 20% | 20% |

**Programme : BCA**                          **Part III: Elective 1**
**Semester   :VI**                              **Hours  : 4 P/W   75Hrs P/S**
**Sub. Code: P22DSU2B**              **Credits : 4**

**TITLE OF THE PAPER: ARTIFICIAL NEURAL NETWORKS**

| Pedagogy | Hours | Lecture | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|----------|-------|---------|---------------|--------------------|-----|
|          | 5     | 2       | 1             | 1                  | 1   |

**PREAMBLE:**
- To study and design artificial neural network and its working methodology.
- To explore various neural network models for traning various domains.

| COURSE OUTCOME | Unit | Hrs P/S |
|----------------|------|---------|
| At the end of the Semester, the Students will be able to | | |
| **UNIT 1 CO1**: Introductions of learning and training neurons. | 1 | 15 |
| **UNIT 2 CO2**: Understanding various models of neural networks. | 2 | 15 |
| **UNIT 3 CO3**: Explore applications network models  for various domains. | 3 | 15 |
| **UNIT 4 CO4**: Analysis of back propagation methods scrutiny. | 4 | 15 |
| **UNIT 5 CO5**:Implementation Applications of neural network concepts | 5 | 15 |

**SYLLABUS**
**UNIT I:**
Introduction: Brain as a neural network – Basic properties of neurons – Artificial Neural Networks.
Learning: Learning and training – Learning rules – Stability and plasticity
**UNIT II:**
Hopfield, Perceptron and Related models: Hop field model – basic model of hop-field network – cellular neural networks – perceptron – Other associative models – Bidirectional Associative memory

**UNIT III:**
Self Organization Map: Kohenen map – adaptive of learning vector quantization – multilayer self organizing feature map.
**UNIT IV:**
        Feed-Forward back propagation networks: Training of multilayer feed –forward – training aspects and variations of back propagation method – Back propagation of stochastic approximation.

**UNIT V:**
        Hybrid learning Neural Network: counter propagation network – radial basis functional networks. Probabilistic models, fuzzy ART map and recurrent networks – Probabilistic neural

**networks.**

TEXT BOOKS: **Neural Networks Algorithms and Applications, M.AnandaRao, J .Srinivas, NarosaPublishing House, 2010.**

**REFERENCES:**

3. **Neural networks, James A.Freeman, David N.Skepura.**

4. **Neural Networks Fundamentals with Graphs, Algorithms and Applications, N.K.Bose, P.Liang**

| UNITS | TOPIC | LECTURE HOURS | MODE OF TEACHING |
|-------|-------|---------------|------------------|
| UNIT 1 | | | |
| | Introduction: Brain as a neural network – Basic properties of neurons | 5 | PPT |
| | Artificial Neural Networks. Learning: Learning and training – | 7 | Lecture |
| | Learning rules – Stability and plasticity. | 3 | Lecture |
| UNIT 11 | | | |
| | Hopfield, Perceptron and Related models: Hop field model | 6 | Lecture |
| | basic model of hop-field network – cellular neural networks – perceptron | 6 | Lecture |
| | Other associative models – Bidirectional Associative memory | 3 | PPT |
| UNIT III | | | |
| | Self Organization Map: Kohenen map – | 4 | Lecture |
| | adaptive of learning vector quantization – | 5 | Lecture |
| | multilayerself organizing feature map. | 6 | Lecture |

| UNIT IV | | | |
|---|---|---|---|
| | Feed-Forward back  propagation networks: Training of multilayer feed | 6 | PPT |
| | –forward – training aspects and variations of back propagation method – | 3 | Lecture |
| | Back propagation of stochastic approximation. | 6 | Lecture |
| UNIT V | | | |
| | Hybrid  learning  Neural Network:  counter  propagation network — | 6 | Lecture |
| | radial basis functional networks. Probabilistic models, fuzzy ART map and recurrent networks | 6 | Lecture |
| | Probabilistic neural networks. | 3 | PPT |

| Course Outcomes (Cos) | Programme  Outcomes (POs) | | | | | Programme Specific Outcomes (PSOs) | | | | | Mean scores of Cos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO 2 | PO3 | PO 4 | PO 5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | |
| CO1 | 2 | 4 | 3 | 4 | 3 | 2 | 5 | 3 | 3 | 4 | 3.3 |
| CO2 | 2 | 3 | 4 | 2 | 2 | 3 | 5 | 2 | 5 | 3 | 3.1 |
| CO3 | 5 | 4 | 2 | 3 | 4 | 2 | 5 | 2 | 1 | 2 | 3 |
| CO4 | 4 | 4 | 5 | 5 | 3 | 3 | 5 | 2 | 1 | 3 | 3.5 |
| CO5 | 4 | 3 | 5 | 2 | 1 | 5 | 5 | 2 | 2 | 5 | 3.4 |
| Mean Overall Score | | | | | | | | | | | 3.26 |

| Mapping | 1-20% | 21-40% | 41-60% | 61-80% | 81-100% |
|---------|-------|--------|--------|--------|---------|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Relation | 0.0-1.0 | 1.1-2.0 | 2.1-3.0 | 3.1-4.0 | 4.1-5.0 |
| Quality | Very Poor | Poor | Moderate | High | Very High |

| Mean Score of COs =     Total of Value <br><br>        Total No. of Pos & PSOs | Mean Overall Score of COs = Total of Mean Score <br><br>        Total No. of COs |
|---|---|

| BLOOM"S TAXANOMY | INTERNAL | EXTERNAL |
|---|---|---|
| KNOWLEDGE | 50% | 50% |
| UNDERSTANDING | 30% | 30% |
| APPLY | 20% | 20% |

Programme : BCA                                    Part III:  Elective-2
 Semester   : VI                                     Hours  : 4 P/W   90Hrs P/S
Sub. Code     : U22DSU3BP                            Credits : 4

**TITLE OF THE PAPER: ARTIFICIAL NEURAL NETWORKUSING MATLAB**

| Pedagogy | Hours | practical | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|----------|-------|-----------|---------------|--------------------|-----|
|          | 6     | 5         | -             | 1                  | -   |

**SYLLABUS**

1) Implementation of Perceptron
2) Implementation of Hop field network
3) Implementation of Associative Neural Network model
4) Implementation of Self Organizing Memory(SOM) Neural Network
5) Implementation of multi-layer SOM.
6) Implementation of simple Feed forward Neural Network
7) Implementation of Feed Forward with Back Propagation Training
8) Implementation of Counter Propagation Neural Network
9) Implementation of Radial Basis Functional Networks
10) Implementation of recurrent Neural Network

**Programme : BCA**                                    **Part III: Core/Allied/Elective-2**
**Semester : VI**                                        **Hours  : 4 P/W   90Hrs P/S**
**Sub. Code : U22DSU3CP**                      **Credits : 4**

### TITLE OF THE PAPER: DIGITAL IMAGE PROCESSING USING MATLAB

| Pedagogy | Hours | practical | Peer Teaching | GD/VIDOES/TUTORIAL | ICT |
|----------|-------|-----------|---------------|--------------------|-----|
|          | 6     | 5         | -             | 1                  | -   |

**SYLLABUS**

1) Generating Histogram of given Image
2) Performing Histogram Equalization
3) Smoothing an image with
   - I)    Ideal Low pass filter
   - II)   Butter Worth Low pass Filter
   - III)  Gaussian Low Pass Filter
4) Image Sharpening with
   - I)    Ideal High pass filter
   - II)   Butter Worth High pass Filter
   - III)  Gaussian High Pass Filter

5) Color image processing like, various color representation of the given image RGB, HSI, CMYK and Gray scale.
6) Performing Erosion
7) Performing Dilation
8) Working with morphological algorithm
9) Extracting the Boundary of the given image
10) Detecting points and lines in the given image
11) Implementation of Region based segmentation
12) Segmentation using Morphological Watershed.