



# **MUSLIM ARTS COLLEGE**

**(Autonomous)**

(Accredited by NAAC with B+ grade & Affiliated to Manonmaniam Sundaranar University,  
Tirunelveli; Recognized US 2(f) 12 (B) of UGC Act.)

Thiruvithancode, Kanyakumari District, Tamil Nadu - 629174.

## **DEPARTMENT OF COMPUTER APPLICATIONS**

### **CBCS SYLLABUS**

Learning Outcome-based Curriculum Framework for

### **COMPUTER APPLICATIONS (B.C.A.)**

*Applicable for students admitted from June 2026 as per the Resolutions of the Academic Council Meeting held  
on 01.06.2026*



## **Vision**

- To strive towards becoming a centre of excellence in education, transforming students' lives through innovation, professionalism, and lifelong learning.

## **Mission**

- To provide innovative and quality educational opportunities
- To create a learning environment that enables students to learn, grow, and succeed
- To develop technical skills and professional competence
- To prepare students to contribute effectively to the digital world

## **Academic and Professional Attributes of the Graduates**

1. **Computing Knowledge and Technical Competence**  
Demonstrate sound knowledge of computer science fundamentals, programming, software development, databases, networking, web technologies, and emerging computing trends.
2. **Problem-Solving and Analytical Skills**  
Identify, analyze, and solve computing and real-world problems using logical thinking, computational techniques, and appropriate software tools.
3. **Programming and Software Development Skills**  
Design, develop, test, and maintain software applications using modern programming languages, development methodologies, and industry-standard practices.
4. **Research and Innovation**  
Apply research skills, critical inquiry, and innovative thinking to develop technology-based solutions and adapt to emerging technologies.
5. **Communication and Interpersonal Skills**  
Communicate technical concepts effectively through oral, written, and digital media while working efficiently in multidisciplinary teams.
6. **Professional Ethics and Social Responsibility**  
Uphold ethical principles, cyber security awareness, professional integrity, and social responsibility in the development and use of information technology.
7. **Leadership and Teamwork**  
Demonstrate leadership qualities, collaborative abilities, project management skills, and the capacity to work effectively in diverse professional environments.
8. **Digital Competence and Lifelong Learning**  
Continuously update knowledge and technical skills to adapt to advancements in information technology, artificial intelligence, cloud computing, data science, and other emerging fields.
9. **Employability and Entrepreneurial Skills**  
Develop professional competencies, industry readiness, entrepreneurial mindset, and innovation capabilities for careers in software development, IT services, research, and higher education.
10. **Global Perspective and Sustainability**  
Understand the societal, environmental, and global impact of computing technologies and contribute to sustainable and inclusive technological development.

### **PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)**

| <b>PEOs</b> | <b>Upon completion of the B.C.A. Degree Programme, graduates are expected to</b>                                                                                                                                 | <b>Mapping with Mission</b> |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| <b>PEO1</b> | Demonstrate strong knowledge in computer science fundamentals, programming, software development, databases, networking, and emerging information technologies to pursue successful careers or higher education. | <b>M1, M2 &amp; M3</b>      |
| <b>PEO2</b> | Apply analytical thinking, problem-solving skills, computational techniques, and modern software tools to design and develop efficient computing solutions for real-world challenges.                            | <b>M2, M3 &amp; M4</b>      |
| <b>PEO3</b> | Exhibit professional ethics, effective communication, teamwork, leadership, and social responsibility while contributing to the IT industry and society.                                                         | <b>M3, M4 &amp; M5</b>      |
| <b>PEO4</b> | Engage in lifelong learning, innovation, research, entrepreneurship, and continuous professional development to adapt to evolving technologies and global opportunities.                                         | <b>M1, M4 &amp; M5</b>      |

### **Programme Outcomes (POs)**

| <b>POs</b>                                      | <b>Upon completion of the B.C.A. Degree Programme, students will be able to</b>                                                                                                                   | <b>Mapping with PEOs</b> |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| <b>PO1: Disciplinary Knowledge</b>              | Demonstrate comprehensive knowledge of computer science fundamentals, programming languages, software engineering, databases, networking, operating systems, and emerging computing technologies. | <b>PEO1</b>              |
| <b>PO2: Critical Thinking</b>                   | Analyze computing problems, evaluate alternative solutions, and apply logical reasoning and computational thinking to develop effective software solutions.                                       | <b>PEO1, PEO2</b>        |
| <b>PO3: Problem Solving</b>                     | Design, implement, test, and maintain software applications using appropriate algorithms, programming techniques, development tools, and modern technologies to solve real-world problems.        | <b>PEO1, PEO2</b>        |
| <b>PO4: Analytical Reasoning</b>                | Apply analytical skills, mathematical concepts, and data-driven approaches to interpret information, optimize solutions, and support decision-making in computing environments.                   | <b>PEO2</b>              |
| <b>PO5: Scientific Reasoning</b>                | Conduct basic research, investigate computing problems, analyze experimental results, and apply scientific methods to technology-based solutions.                                                 | <b>PEO2, PEO4</b>        |
| <b>PO6: Self-directed and Lifelong Learning</b> | Engage in continuous learning, acquire new technical competencies, and adapt to rapidly evolving technologies, industry practices, and professional requirements.                                 | <b>PEO4</b>              |
| <b>PO7: Reflective</b>                          | Demonstrate self-assessment, ethical decision-                                                                                                                                                    | <b>PEO3,</b>             |

|                                                           |                                                                                                                                                                                                                  |                   |
|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| <b>Thinking</b>                                           | making, and reflective practices for continuous personal, academic, and professional growth.                                                                                                                     | <b>PEO4</b>       |
| <b>PO8: Project Management and Development Skills</b>     | Plan, develop, document, test, and manage software projects individually and collaboratively using appropriate project management practices and software development methodologies.                              | <b>PEO2, PEO4</b> |
| <b>PO9: Communication and Professional Competence</b>     | Communicate technical information effectively through oral, written, and digital media while demonstrating professionalism, teamwork, and interpersonal skills in diverse work environments.                     | <b>PEO3</b>       |
| <b>PO10: Ethics, Leadership and Social Responsibility</b> | Apply ethical principles, leadership qualities, environmental awareness, cybersecurity practices, and social responsibility while contributing to sustainable technological development and societal well-being. | <b>PEO3, PEO4</b> |

### **Programme Specific Outcomes (PSOs)**

| <b>PSOs</b> | <b>Upon completion of the B.C.A. Degree Programme, students will be able to</b>                                                                                                                                                                  | <b>Mapping with POs</b>    |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| <b>PSO1</b> | Demonstrate comprehensive knowledge of computer science fundamentals, programming languages, database management systems, operating systems, computer networks, and software engineering principles to develop efficient computing solutions.    | <b>PO1, PO2, PO3</b>       |
| <b>PSO2</b> | Design, develop, test, and deploy software applications, web applications, and database-driven systems using modern programming languages, development frameworks, and software engineering practices.                                           | <b>PO2, PO3, PO8, PO9</b>  |
| <b>PSO3</b> | Apply analytical thinking, computational techniques, data structures, algorithms, and emerging technologies such as Artificial Intelligence, Cloud Computing, Data Analytics, and Cyber Security to solve real-world computing problems.         | <b>PO2, PO3, PO4, PO5</b>  |
| <b>PSO4</b> | Demonstrate research aptitude, innovation, entrepreneurship, and lifelong learning by adapting to emerging technologies and pursuing higher education, professional certifications, or entrepreneurial ventures in the IT domain.                | <b>PO5, PO6, PO7, PO8</b>  |
| <b>PSO5</b> | Exhibit professional ethics, effective communication, leadership, teamwork, and social responsibility while working in multidisciplinary environments and contributing to the sustainable development of society through information technology. | <b>PO6, PO7, PO9, PO10</b> |
| <b>PSO6</b> | Apply technical competence and professional skills to pursue successful careers in software development, system administration, web and mobile application development, data management, IT-enabled services, and related computing professions. | <b>PO3, PO6, PO9, PO10</b> |

## Mapping of Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)

| POs / PSOs                                         | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | PSO6 |
|----------------------------------------------------|------|------|------|------|------|------|
| PO1: Disciplinary Knowledge                        | 3    | 2    | 2    | 1    | 1    | 2    |
| PO2: Critical Thinking                             | 3    | 3    | 3    | 2    | 2    | 2    |
| PO3: Problem Solving                               | 3    | 3    | 3    | 2    | 2    | 3    |
| PO4: Analytical Reasoning                          | 2    | 2    | 3    | 2    | 1    | 2    |
| PO5: Scientific Reasoning                          | 2    | 2    | 3    | 3    | 1    | 2    |
| PO6: Self-directed and Lifelong Learning           | 2    | 2    | 2    | 3    | 3    | 3    |
| PO7: Reflective Thinking                           | 1    | 2    | 2    | 3    | 3    | 2    |
| PO8: Project Management and Development Skills     | 2    | 3    | 2    | 3    | 2    | 2    |
| PO9: Communication and Professional Competence     | 2    | 3    | 2    | 2    | 3    | 3    |
| PO10: Ethics, Leadership and Social Responsibility | 1    | 2    | 2    | 2    | 3    | 2    |

•3 – High Correlation

•2 – Moderate Correlation

•1 – Low Correlation

## **COURSES OFFERED**

### **SEMESTER I**

| Part            | Course Code                  | Title of the Course                                                  | Credits   | Hours / Week |
|-----------------|------------------------------|----------------------------------------------------------------------|-----------|--------------|
| <b>Part I</b>   | A1TL11/<br>A1MY11/<br>A1AB11 | Language: Tamil /Malayalam/Arabic                                    | 3         | 6            |
| <b>Part II</b>  | A2EN11                       | English:                                                             | 3         | 6            |
| <b>Part III</b> | AMCA11                       | Core Course I: Python Programming                                    | 5         | 5            |
|                 | AMCAP1                       | Core Course II: Python Lab                                           | 5         | 5            |
|                 | AECA11                       | Elective Course I: Mathematical Foundation for Computer Applications | 3         | 4            |
| <b>Part IV</b>  | ASCA11                       | Non-Major Elective I: MS Office Lab                                  | 2         | 2            |
|                 | AFCA11                       | Foundation Course: Fundamentals of Information Technology            | 2         | 2            |
| <b>Total</b>    |                              |                                                                      | <b>23</b> | <b>30</b>    |

## SEMESTER I

### CORE COURSE I: PYTHON PROGRAMMING

Course Code:

| Subject Code | Category | L | T | P | S | Credits | Inst. Hours | Marks |          |       |
|--------------|----------|---|---|---|---|---------|-------------|-------|----------|-------|
|              |          |   |   |   |   |         |             | CIA   | External | Total |
| AMCA11       | Core     | Y | Y | - | - | 4       | 5           | 25    | 75       | 100   |

#### Pre-requisite

Students need basic computer literacy (file management, software installation), a laptop/PC, and fundamental high-school algebra and logical problem-solving skills.

#### Learning Objectives

The course aims to:

1. To understand the concepts of Python programming.
2. To develop Python program using control, iterative statements.
3. To impart knowledge on functions, function arguments and python strings.
4. To get knowledge on lists and dictionaries.
5. To know about file handling.

#### Course Outcomes (COs)

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

| CO No. | Course Outcomes                                                                                                                       | BT Level |
|--------|---------------------------------------------------------------------------------------------------------------------------------------|----------|
| CO1    | Learn the basics of python, do simple programs on python, Learn how to use an array.                                                  | K1       |
| CO2    | Develop programs using selection statement, Loops, jump statements work with Looping and jump statements.                             | K2       |
| CO3    | Concept of function, function arguments, implementing the concept of strings in various application, work with functions and strings. | K3       |
| CO4    | Work with list, dictionary, write program using list and dictionary.                                                                  | K4       |
| CO5    | Usage of File handlings in Python, concept of reading and writing files, do programs using files.                                     | K3       |

#### Bloom's Taxonomy Levels

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

### Course Content

| Units | Contents                                                                                                                                                                                                                                                                                                                                                         | No. of Hours |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| I     | <b>Basics of Python Programming:</b> History of Python-Features of Python Literal-Constants-Variables - Identifiers–Keywords-Built-in Data Types Output Statements – Input Statements- Operators Expressions. <b>Python Arrays:</b> Defining and Processing Arrays – Array methods                                                                               | 15           |
| II    | <b>Control Statements:</b> Selection/Conditional Branching statements: if, if-else, nested if and if-else if-else statements. Iterative Statements: while loop, for loop, else suite in loop and nested loops. <b>Jump Statements:</b> break, continue and pass statements.                                                                                      | 15           |
| III   | <b>Functions:</b> Function Definition – Function Call – Variable Scope and its Lifetime-Return Statement. <b>Function Arguments:</b> Required Arguments, Keyword Arguments, Default Arguments and Variable Length Arguments- Recursion. <b>Python Strings:</b> String operations- Immutable Strings - Built-in String Methods and Functions - String Comparison. | 15           |
| IV    | <b>Lists:</b> Creating a list -Access values in List-Updating values in Lists-Nested lists - Basic list operations-List Methods. <b>Dictionaries:</b> Creating, Accessing, Updating and Deleting Elements in a Dictionary – Dictionary Functions and Methods - Difference between Lists and Dictionaries.                                                        | 15           |
| V     | <b>Python File Handling:</b> Types of files in Python - Opening and Closing files Reading and Writing files: write() and writelines() methods- append() method – read() and readlines() methods – with keyword – Splitting words – File methods - File Positions- Renaming and deleting files.                                                                   | 15           |
|       | <b>Total</b>                                                                                                                                                                                                                                                                                                                                                     | 75           |

| S. No. | Text Book                                                                                                        |
|--------|------------------------------------------------------------------------------------------------------------------|
| 1      | Reema Thareja, “Python Programming using problem solving approach”, First Edition, 2017, Oxford University Press |
| 2      | Dr. R. Nageswara Rao, “Core Python Programming”, First Edition, 2017, Dream tech Publishers.                     |

| S. No. | Reference Books                                                                     |
|--------|-------------------------------------------------------------------------------------|
| 1      | Vamsi Kurama, “Python Programming: A Modern Approach”, Pearson Education,2017.      |
| 2      | Mark Lutz, ”Learning Python”, 5 <sup>th</sup> Edition,Orielly,.2013.                |
| 3      | Adam Stewarts, “Python Programming”, 2017.                                          |
| 4      | Fabio Nelli, “Python Data Analytics”, A Press,2015.                                 |
| 5      | Kenneth A. Lambert, “Fundamentals of Python – First Programs”, CENGAGE Publication. |

| S. No. | Web Resources                                                                                                                         |
|--------|---------------------------------------------------------------------------------------------------------------------------------------|
| 1      | <a href="https://www.programiz.com/python-programming">https://www.programiz.com/python-programming</a>                               |
| 2      | <a href="https://www.guru99.com/python-tutorials.html">https://www.guru99.com/python-tutorials.html</a>                               |
| 3      | <a href="https://www.w3schools.com/python/python_intro.asp">https://www.w3schools.com/python/python_intro.asp</a>                     |
| 4      | <a href="https://www.geeksforgeeks.org/python-programming-language/">https://www.geeksforgeeks.org/python-programming-language/</a>   |
| 5      | <a href="https://en.wikipedia.org/wiki/Python_(programming_language)">https://en.wikipedia.org/wiki/Python_(programming_language)</a> |

### Mapping with Programme Outcomes

| CO / PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| CO1     | 3   | 2   | 2   | 1   | 1   | 2   | 1   | 1   | 2   | 1    |
| CO2     | 3   | 3   | 3   | 2   | 1   | 2   | 1   | 2   | 2   | 1    |
| CO3     | 3   | 3   | 3   | 2   | 2   | 2   | 1   | 2   | 2   | 1    |
| CO4     | 3   | 3   | 3   | 3   | 2   | 2   | 2   | 2   | 2   | 1    |
| CO5     | 2   | 2   | 3   | 2   | 3   | 2   | 1   | 3   | 2   | 2    |

3 – Strong, 2 – Medium, 1 - Low

### Mapping with Programme Specific Outcomes

| CO / PSO                                                   | PSO1       | PSO2       | PSO3       | PSO4      | PSO5       | PSO6       |
|------------------------------------------------------------|------------|------------|------------|-----------|------------|------------|
| CO1                                                        | 3          | 2          | 2          | 1         | 1          | 2          |
| CO2                                                        | 3          | 3          | 3          | 2         | 2          | 2          |
| CO3                                                        | 3          | 3          | 3          | 2         | 2          | 2          |
| CO4                                                        | 3          | 3          | 3          | 2         | 2          | 3          |
| CO5                                                        | 2          | 3          | 2          | 3         | 2          | 3          |
| <b>Weightage</b>                                           | <b>14</b>  | <b>14</b>  | <b>13</b>  | <b>10</b> | <b>9</b>   | <b>12</b>  |
| <b>Weightage Percentage of Course Contribution to PSOs</b> | <b>2.8</b> | <b>2.8</b> | <b>2.6</b> | <b>2</b>  | <b>1.8</b> | <b>2.4</b> |

Mapping Scale: 3 – Strong Correlation, 2 – Moderate Correlation, 1 – Low Correlation

**FIRST YEAR - SEMESTER I****CORE II – PYTHON LAB**

| Subject Code | Category | L | T | P | S | Credits | Inst. Hours | Marks |          |       |
|--------------|----------|---|---|---|---|---------|-------------|-------|----------|-------|
|              |          |   |   |   |   |         |             | CIA   | External | Total |
| AMCAP1       | Core     | Y | Y | - | - | 4       | 5           | 25    | 75       | 100   |

**Learning Objectives**

The course aims to:

1. Construct the basic concepts of Python programming.
2. Experiment with the Looping, Jump and Conditional Statement.
3. Design Function and pass arguments.
4. Develop the concept of List and Dictionaries.
5. Develop the file handling process using Python function.

**Course Outcomes**

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

| CO No. | Course Outcomes                                                | BT Level |
|--------|----------------------------------------------------------------|----------|
| CO1    | Apply the I/O statement in python programming                  | K2       |
| CO2    | Apply the concept of python looping and conditional statements | K4       |
| CO3    | Develop Function, Array and String in Python Programming       | K2       |
| CO4    | Make up a python program for List and Dictionaries             | K4       |
| CO5    | Make up a python program for test cases using files            | K5       |

**Bloom's Taxonomy Levels**

**K1** – Remember, **K2** – Understand, **K3** – Apply, **K4** – Analyse, **K5** – Evaluate, **K6** – Create  
**Course Content**

| Units         | Contents                                                                                                                                                                                                                                                                                                                                                                     | No. of Hours |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>I</b>      | <b>PRACTICAL PROGRAMS</b><br>1. Program using variables, constants, I/O statements in Python.<br>2. Program using Operators in Python.<br>3. Program using Conditional Statements.<br>4. Program using Functions.<br>5. Program using Recursion.<br>6. Program using Arrays.<br>7. Program using Strings.<br>8. Program using Dictionaries.<br>9. Program for File Handling. | <b>75</b>    |
|               | <b>Total</b>                                                                                                                                                                                                                                                                                                                                                                 | <b>75</b>    |
| <b>S. No.</b> | <b>Text Book</b>                                                                                                                                                                                                                                                                                                                                                             |              |
| 1             | Reema Thareja, Python Programming: Using Problem Solving Approach, Oxford University Press, Latest Edition.                                                                                                                                                                                                                                                                  |              |
| 2             | Y. Daniel Liang, Introduction to Programming Using Python, Pearson Education, Latest Edition.                                                                                                                                                                                                                                                                                |              |
| 3             | Allen B. Downey, Think Python: How to Think Like a Computer Scientist, 2nd Edition, O'Reilly Media.                                                                                                                                                                                                                                                                          |              |
| <b>S. No.</b> | <b>Reference Books</b>                                                                                                                                                                                                                                                                                                                                                       |              |

|   |                                                                                                   |
|---|---------------------------------------------------------------------------------------------------|
| 1 | Wesley J. Chun, Core Python Programming, 2nd Edition, Pearson Education.                          |
| 2 | Kenneth A. Lambert, Fundamentals of Python: First Programs, Cengage Learning.                     |
| 3 | John V. Guttag, Introduction to Computation and Programming Using Python, 3rd Edition, MIT Press. |
| 4 | Paul Barry, Head First Python, 2nd Edition, O'Reilly Media.                                       |

| S. No. | Web Sources                                                                                                                         |
|--------|-------------------------------------------------------------------------------------------------------------------------------------|
| 1      | <a href="https://www.geeksforgeeks.org/python-programming-language/">https://www.geeksforgeeks.org/python-programming-language/</a> |
| 2      | <a href="https://docs.python.org/3/">https://docs.python.org/3/</a>                                                                 |
| 3      | <a href="https://www.python.org/">https://www.python.org/</a>                                                                       |
| 4      | <a href="https://docs.python.org/3/tutorial/">https://docs.python.org/3/tutorial/</a>                                               |
| 5      | <a href="https://www.py4e.com/">https://www.py4e.com/</a>                                                                           |

### Mapping with Programme Outcomes

| CO / PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| CO1     | 3   | 2   | 3   | 1   | 1   | 2   | 1   | 2   | 2   | 1    |
| CO2     | 3   | 3   | 3   | 2   | 2   | 2   | 1   | 2   | 2   | 1    |
| CO3     | 3   | 3   | 3   | 2   | 2   | 2   | 1   | 3   | 2   | 1    |
| CO4     | 3   | 3   | 3   | 3   | 2   | 2   | 2   | 3   | 2   | 1    |
| CO5     | 2   | 3   | 3   | 2   | 3   | 2   | 2   | 3   | 2   | 2    |

3 – Strong, 2 – Medium, 1 – Low

### Mapping with Programme Specific Outcomes

| CO / PSO                                           | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | PSO6 |
|----------------------------------------------------|------|------|------|------|------|------|
| CO1                                                | 3    | 2    | 2    | 1    | 2    | 2    |
| CO2                                                | 3    | 3    | 3    | 2    | 2    | 2    |
| CO3                                                | 3    | 3    | 3    | 2    | 2    | 3    |
| CO4                                                | 3    | 3    | 3    | 2    | 2    | 3    |
| CO5                                                | 2    | 3    | 3    | 3    | 2    | 3    |
| Weightage                                          | 14   | 14   | 14   | 10   | 10   | 13   |
| Weighted percentage of Course Contribution to PSOs | 2.8  | 2.8  | 2.8  | 2    | 2    | 2.6  |

Mapping Scale: 3 – Strong Correlation, 2 – Moderate Correlation, 1 – Low Correlation

## FIRST YEAR - SEMESTER I

### ME 1– MATHEMATICAL FOUNDATION FOR COMPUTER APPLICATIONS (ELECTIVE)

| Subject Code | Category | L | T | P | S | Credits | Inst. Hours | Marks |          |       |
|--------------|----------|---|---|---|---|---------|-------------|-------|----------|-------|
|              |          |   |   |   |   |         |             | CIA   | External | Total |
| AECA11       | Core     | Y | Y | - | - | 4       | 4           | 25    | 75       | 100   |

### Learning Objectives

The course aims to:

1. To provide a strong foundation in discrete mathematical concepts required for computer applications.
2. To develop problem-solving skills using sets, relations, functions, and mathematical logic.
3. To apply matrix algebra and graph theory in solving computing and real-world problems.
4. To enhance analytical and logical reasoning abilities through mathematical modelling and representation.
5. To prepare students for advanced studies in computer science by strengthening their mathematical and computational thinking.

### Course Outcomes

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

| CO No. | Course Outcomes                                                             | BT Level |
|--------|-----------------------------------------------------------------------------|----------|
| CO1    | To recall basic concepts for clear understanding of mathematical principles | K2       |
| CO2    | To explain practical problems.                                              | K5       |
| CO3    | To construct matrices using discrete mathematics                            | K2       |
| CO4    | To analyze techniques to draw graph using mathematics                       | K4       |
| CO5    | To design graphs using the representations                                  | K2       |

### Bloom's Taxonomy Levels

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

### Course Content

| Unit | Contents                                                                                                                                                                                                                                                                          | No. of Hours |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| I    | <b>Set Theory</b><br>Introduction – Sets – Notation and Description of Sets – Subsets – Venn-Euler Diagram – Operations on Sets – Properties of Set Operations                                                                                                                    | 15           |
| II   | <b>Relations:</b> Cartesian Product of Two sets – Relations – Representation of a Relation - Operations on Relations - Compositions of Relations – Equivalence Relation<br><b>Function:</b> Function and Operators – One to one Functions - Onto Functions – Many to one function | 15           |
| III  | <b>Mathematical Logic</b><br>Statements and Notation – Connectives-Statements Formulas and Truth Tables – Conditional Statement – Biconditional Statement – Tautologies – Normal Forms                                                                                            | 15           |
| IV   | <b>Matrix Algebra</b><br>Introduction – Matrix Operations – Inverse of a Square Matrix – Elementary Operations and Rank of Matrix                                                                                                                                                 | 15           |
| V    | <b>Graph Theory</b><br>Introduction – Graph and Basic Terminologies – Types of Graphs – Sub Graph and Isomorphic Graph – Operations on Graphs – Representation of Graph.                                                                                                          | 15           |
|      | <b>Total</b>                                                                                                                                                                                                                                                                      | 75           |

| S. No. | Text Books                                                                                                              |
|--------|-------------------------------------------------------------------------------------------------------------------------|
| 1      | Discrete Mathematics by Dr. M. K. Venkataraman, Dr. N. Sridharan, N. Chandrasekaran                                     |
| 2      | Discrete Mathematical Structures with Applications to Computer Science by J.P.Tremblay, R.Manohar TMH edition           |
| 3      | Discrete Mathematics, Swapan Kumar Chakraborty and Bikash Kanti Sarkar, OXFORD University Press.                        |
| S. No. | Reference Works                                                                                                         |
| 1      | Discrete Mathematics, Seymour Lipschutz and Marc Lars Lipson, Third Edition Tata McGraw Hill Education Private Limited. |
| 2      | Discrete Mathematical Structures with Applications to Computer Sciece, J.P. Tremblay, R. Manohar, TMH Edition.          |
| S. No. | Web Sources (URL)                                                                                                       |
| 1      | <a href="https://www.tutorialspoint.com/discrete_mathematics">https://www.tutorialspoint.com › discrete mathematics</a> |

### Mapping with Programme Outcomes

| CO / PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| CO1     | 3   | 2   | 2   | 2   | 2   | 2   | 1   | 1   | 1   | 1    |
| CO2     | 2   | 3   | 3   | 3   | 2   | 2   | 1   | 2   | 1   | 1    |
| CO3     | 3   | 3   | 2   | 3   | 2   | 2   | 1   | 2   | 1   | 1    |
| CO4     | 2   | 3   | 3   | 3   | 3   | 2   | 1   | 2   | 1   | 1    |
| CO5     | 2   | 3   | 3   | 3   | 2   | 2   | 2   | 2   | 1   | 1    |

3 – Strong, 2 – Medium, 1 - Low

### Mapping with Programme Specific Outcomes

| CO / PSO                                           | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | PSO6 |
|----------------------------------------------------|------|------|------|------|------|------|
| CO1                                                | 3    | 2    | 2    | 1    | 1    | 1    |
| CO2                                                | 2    | 3    | 3    | 2    | 1    | 1    |
| CO3                                                | 3    | 2    | 3    | 2    | 1    | 1    |
| CO4                                                | 2    | 3    | 3    | 3    | 2    | 2    |
| CO5                                                | 2    | 3    | 2    | 2    | 2    | 2    |
| Weightage                                          | 12   | 13   | 13   | 10   | 7    | 7    |
| Weighted percentage of Course Contribution to PSOs | 2.4  | 2.6  | 2.6  | 2    | 1.4  | 1.4  |

Mapping Scale: 3 – Strong Correlation, 2 – Moderate Correlation, 1 – Low Correlation

**SEMESTER I**  
**NON MAJOR ELECTIVE I (NME)**  
**MS OFFICE LAB**

| Subject Code | Category | L | T | P | S | Credits | Inst. Hours | Marks |          |       |
|--------------|----------|---|---|---|---|---------|-------------|-------|----------|-------|
|              |          |   |   |   |   |         |             | CIA   | External | Total |
| ASCA11       | Core     | Y | Y | - | - | 2       | 2           | 25    | 75       | 100   |

### Learning Objectives

The course aims to:

1. Understand the basics of computer systems and its components.
2. Understand and apply the basic concepts of a word processing package.
3. Understand and apply the basic concepts of electronic spreadsheet software.
4. Understand and create a presentation using Power Point tool.
5. Understand and apply the basic concepts of database management system.

### Course Outcomes

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

| CO No. | Course Outcomes                                                                   | BT Level |
|--------|-----------------------------------------------------------------------------------|----------|
| CO1    | Understand basic functions and new formatting features in MS Word.                | K2       |
| CO2    | Apply the concept of Header and Footer content and update page numbers and dates. | K3       |
| CO3    | Apply the data manipulation techniques in Excel.                                  | K3       |
| CO4    | Analyze data using Excel.                                                         | K4       |
| CO5    | Construct the power point presentation                                            | K3       |

### Bloom's Taxonomy Levels

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

### Course Content

| S No | Exercise                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | No. of Hours |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
|      | <b>MS – Word</b> <ol style="list-style-type: none"> <li>1. Prepare a word document</li> <li>2. Insert Header with College Name, Footer with Page No., and Footnote in a document.</li> <li>3. Insert mathematical symbols</li> <li>4. Creating a Simple Table</li> <li>5. Preparing Newspaper format (Apply Alignment, Font, Property, Line spacing, Picture Format).</li> <li>6. Inserting Shapes &amp; Images</li> <li>7. Page Borders &amp; Page Color</li> <li>8. Prepare a Bio-Data and insert the contents of qualification within the table.</li> </ol> | 6            |

|  |                                                                                                                                                                                                                                                                 |           |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
|  | <b>MS – Excel</b> <ol style="list-style-type: none"> <li>1. Apply formulas and functions.</li> <li>2. Prepare a chart for population growth.</li> <li>3. Apply ascending and descending order.</li> <li>4. Apply auto format.</li> </ol>                        | <b>10</b> |
|  | <b>MS – PowerPoint</b> <ol style="list-style-type: none"> <li>1. Create a power point presentation with 3 slides.</li> <li>2. Create a design template with 3 slides.</li> <li>3. Create a presentation with animation.</li> </ol>                              | <b>6</b>  |
|  | <b>MS – Access</b> <ol style="list-style-type: none"> <li>1. Create an employee database.</li> <li>2. Create a mark statement for a class of 20 students. Find total, average and rank the marks. Give proper headings.</li> <li>3. Create a report.</li> </ol> | <b>8</b>  |
|  | <b>Total</b>                                                                                                                                                                                                                                                    | <b>30</b> |

| <b>S. No.</b> | <b>Text Book</b>                                                               |
|---------------|--------------------------------------------------------------------------------|
| 1             | Tom Bunzel, “Easy Microsoft Office 2010”, Que Publishing, First Edition, 2010. |

| <b>S. No.</b> | <b>Reference Books</b>                                                                                          |
|---------------|-----------------------------------------------------------------------------------------------------------------|
| 1             | Gary B. Shelly, Misty E. Vermaat, “Microsoft Office 2010: Introductory”, Cengage Learning, First Edition, 2012. |
| 2             | Katherine Murray, “Microsoft Office 2010 Plain & Simple”, Microsoft Press, First Edition, 2010.                 |

| <b>S. No.</b> | <b>Web Resources</b>                                                                      |
|---------------|-------------------------------------------------------------------------------------------|
| 1             | <a href="https://www.udemy.com/course/office">https://www.udemy.com/course/office</a>     |
| 2             | <a href="https://www.javatpoint.com/automation">https://www.javatpoint.com/automation</a> |

#### **MAPPING OF COURSE OUTCOMES WITH PROGRAMME OUTCOMES (POs)**

| <b>CO / PO</b> | <b>PO1</b> | <b>PO2</b> | <b>PO3</b> | <b>PO4</b> | <b>PO5</b> | <b>PO6</b> | <b>PO7</b> | <b>PO8</b> | <b>PO9</b> | <b>PO10</b> |
|----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|
| <b>CO1</b>     | 2          | 2          | 1          | 1          | 1          | 2          | 1          | 2          | 2          | 1           |
| <b>CO2</b>     | 2          | 2          | 2          | 2          | 1          | 2          | 1          | 2          | 3          | 1           |
| <b>CO3</b>     | 2          | 3          | 3          | 2          | 2          | 2          | 1          | 2          | 2          | 1           |
| <b>CO4</b>     | 2          | 3          | 3          | 3          | 2          | 2          | 2          | 3          | 2          | 1           |
| <b>CO5</b>     | 2          | 2          | 3          | 2          | 1          | 2          | 2          | 3          | 3          | 2           |

3 – Strong Correlation, 2 – Moderate Correlation, 1 – Low Correlation.

**MAPPING OF COURSE OUTCOMES WITH PROGRAMME SPECIFIC OUTCOMES (POs)**

| <b>CO / PSO</b>                                           | <b>PSO1</b> | <b>PSO2</b> | <b>PSO3</b> | <b>PSO4</b> | <b>PSO5</b> | <b>PSO6</b> |
|-----------------------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>CO1</b>                                                | 2           | 1           | 1           | 1           | 2           | 1           |
| <b>CO2</b>                                                | 2           | 2           | 2           | 1           | 2           | 1           |
| <b>CO3</b>                                                | 2           | 3           | 2           | 1           | 3           | 2           |
| <b>CO4</b>                                                | 2           | 3           | 3           | 2           | 3           | 2           |
| <b>CO5</b>                                                | 2           | 2           | 3           | 2           | 3           | 3           |
| <b>Weightage</b>                                          | 10          | 11          | 11          | 7           | 13          | 9           |
| <b>Weighted Percentage of Course Contribution to PSOs</b> | <b>2</b>    | <b>2.2</b>  | <b>2.2</b>  | <b>1.4</b>  | <b>2.6</b>  | <b>1.8</b>  |

**Mapping Scale: 3 – Strong Correlation, 2 – Moderate Correlation, 1 – Low Correlation**

**FIRST YEAR – SEMESTER I**

**FOUNDATION COURSE-FUNDAMENTALS OF INFORMATION TECHNOLOGY**

| Subject Code | Category          | L | T | P | S | Credits | Inst. Hours | CIA | External | Total |
|--------------|-------------------|---|---|---|---|---------|-------------|-----|----------|-------|
| AFCA11       | Foundation Course | Y | Y | - | - | 2       | 2           | 25  | 75       | 100   |

**Learning Objectives**

The course aims to:

1. Understand the basic concepts and terminology of information technology.
2. Have a basic understanding of personal computers and their operation.
3. Be able to identify data storage and its usage.
4. Get great knowledge of software and its functionalities.
5. Understand about operating systems and their uses.

**Course Outcomes**

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

| CO No. | Course Outcomes                                                                                                                         | BT Level |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------|----------|
| CO1    | Learn the basics of computer, Construct the structure of the required things in computer, learn how to use it.                          | K1       |
| CO2    | Develop organizational structure using for the devices present currently under input or output unit.                                    | K2       |
| CO3    | Concept of storing data in computer using two headers namely RAM and ROM with different types of ROM with advancement in storage basis. | K3       |
| CO4    | Work with different software, Write program in the software and applications of software.                                               | K3       |
| CO5    | Usage of Operating system in information technology which really acts as a interpreter between software and hardware                    | K5       |

### Course Content

| Unit       | Contents                                                                                                                                                                                                                                                                                                                                                                                                      | No. of Hours |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>I</b>   | <b>Introduction to Computers</b><br>Introduction, Definition, Characteristics of computer, Evolution of Computer, Block Diagram of a computer, Generations of Computer, Classification of Computers, Applications of Computer, Capabilities and limitations of computer                                                                                                                                       | <b>6</b>     |
| <b>II</b>  | <b>Basic Computer Organization</b><br>Role of I/O devices in a computer system. Input Units: Keyboard, Terminals and its types. Pointing Devices, Scanners and its types, Voice Recognition Systems, Vision Input System, Touch Screen, Output Units: Monitors and its types. Printers: Impact Printers and its types. Non-Impact Printers and its types, Plotters, types of plotters, Sound cards, Speakers. | <b>6</b>     |
| <b>III</b> | <b>Storage Fundamentals</b><br>Primary Vs Secondary Storage, Data storage & retrieval methods. Primary Storage: RAM ROM, PROM, EPROM, EEPROM. Secondary Storage: Magnetic Tapes, Magnetic Disks. Cartridge tape, hard disks, Floppy disks Optical Disks, Compact Disks, Zip Drive, Flash Drives                                                                                                               | <b>6</b>     |
| <b>IV</b>  | <b>Software</b><br>Software and its needs, Types of S/W. System Software: Operating System, Utility Programs Programming Language: Machine Language, Assembly Language, High Level Language their advantages & disadvantages. Application S/W and its types: Word Processing, Spread Sheets Presentation, Graphics, DBMS                                                                                      | <b>6</b>     |
| <b>V</b>   | <b>Operating System</b><br>Functions, Measuring System Performance, Assemblers, Compilers and Interpreters. Batch Processing, Multiprogramming, Multi-Tasking, Multiprocessing, Time Sharing, DOS, Windows, Unix/Linux.                                                                                                                                                                                       | <b>6</b>     |
|            | <b>Total</b>                                                                                                                                                                                                                                                                                                                                                                                                  | <b>30</b>    |

| S. No. | Text Books                                                                                          |
|--------|-----------------------------------------------------------------------------------------------------|
| 1      | Anoop Mathew, S. Kavitha Murugesan (2009), “Fundamental of Information Technology”, Majestic Books. |
| 2      | Alexis Leon, Mathews Leon,” Fundamental of Information Technology”, 2nd Edition.                    |
| 3      | S. K Bansal, “Fundamental of Information Technology”.                                               |

| S. No. | Reference Books                                                                   |
|--------|-----------------------------------------------------------------------------------|
| 1      | Bhardwaj Sushil Puneet Kumar, “Fundamental of Information Technology”             |
| 2      | GG WILKINSON, “Fundamentals of Information Technology”, Wiley-Blackwell           |
| 3      | A Ravichandran , “Fundamentals of Information Technology”, Khanna Book Publishing |

| S. No. | Web Resources                                                                                                                                                     |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | <a href="https://testbook.com/learn/computer-fundamentals">https://testbook.com/learn/computer-fundamentals</a>                                                   |
| 2      | <a href="https://www.tutorialsmate.com/2020/04/computer-fundamentals-tutorial.html">https://www.tutorialsmate.com/2020/04/computer-fundamentals-tutorial.html</a> |
| 3      | <a href="https://www.javatpoint.com/computer-fundamentals-tutorial">https://www.javatpoint.com/computer-fundamentals-tutorial</a>                                 |
| 4      | <a href="https://www.tutorialspoint.com/computer_fundamentals/index.htm">https://www.tutorialspoint.com/computer_fundamentals/index.htm</a>                       |
| 5      | <a href="https://www.nios.ac.in/media/documents/sec229new/Lesson1.pdf">https://www.nios.ac.in/media/documents/sec229new/Lesson1.pdf</a>                           |

#### MAPPING OF COURSE OUTCOMES WITH PROGRAMME OUTCOMES (POs)

| CO / PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| CO1     | 3   | 2   | 2   | 1   | 1   | 2   | 1   | 2   | 2   | 1    |
| CO2     | 3   | 2   | 2   | 2   | 1   | 2   | 1   | 2   | 2   | 1    |
| CO3     | 2   | 2   | 3   | 2   | 2   | 2   | 1   | 2   | 3   | 1    |
| CO4     | 2   | 2   | 3   | 2   | 2   | 2   | 2   | 2   | 3   | 2    |
| CO5     | 2   | 3   | 3   | 2   | 2   | 2   | 2   | 3   | 3   | 2    |

#### Mapping Scale

3 – Strong Correlation, 2 – Moderate Correlation, 1 – Low Correlation

#### MAPPING OF COURSE OUTCOMES WITH PROGRAMME SPECIFIC OUTCOMES (PSOs)

| CO / PSO                                           | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | PSO6 |
|----------------------------------------------------|------|------|------|------|------|------|
| CO1                                                | 3    | 2    | 1    | 1    | 2    | 1    |
| CO2                                                | 3    | 2    | 1    | 1    | 2    | 1    |
| CO3                                                | 2    | 3    | 2    | 1    | 3    | 1    |
| CO4                                                | 2    | 3    | 3    | 2    | 3    | 2    |
| CO5                                                | 2    | 3    | 2    | 2    | 3    | 2    |
| Weightage                                          | 12   | 13   | 9    | 7    | 13   | 7    |
| Weighted Percentage of Course Contribution to PSOs | 2.4  | 2.6  | 1.8  | 1.4  | 2.6  | 1.4  |

#### Mapping Scale

3 – Strong Correlation, 2 – Moderate Correlation, 1 – Low Correlation