# Department of Computer Science with AI

## ACADEMIC YEAR 2025-2026

### I – VI Semesters

### SCHEME AND SYLLABUS

# CONTENTS

## SCHEME

## SYLLABUS

# INSTITUTION

## VISION

To impart value-based quality academia; to empower students with wisdom and to charge them with rich Indian traditions and culture; to invoke the self, to broaden the same towards nation building, harmony and Universal brotherhood.

## MISSION

To ensure sustained progress and development in imparting quality education, to pioneer new avenues of teaching and research and to emerge as an institution with potential for excellence.

# DEPARTMENT OF COMPUTER SCIENCE WITH AI

## VISION

To empower students with strong foundations in Computer Science and Artificial Intelligence, fostering innovation, ethical thinking, and develop smart, AI-based solutions for real-world problems.

## MISSION

| M1 | To cultivate a learning environment that blends core computing principles with AI-driven problem-solving. |
| M2 | To encourage creativity, teamwork, and communication in developing intelligent, human-centered technologies. |
| M3 | To equip students with hands-on experience in AI tools, programming, data analytics, and machine learning. |
| M4 | To promote industry readiness through internships, interdisciplinary projects, and exposure to AI applications in society. |

## PROGRAM EDUCATION OBJECTIVES (PEOs)

| PEO1 | To prepare graduates with a strong foundation in computing and AI principles to design and develop intelligent, efficient, and ethical solutions for real-world challenges. |
| PEO2 | To equip students with practical skills in programming, machine learning, data handling, and AI tools for successful engagement in industry, entrepreneurship, or research. |
| PEO3 | To foster adaptability, innovation, and collaborative skills necessary for continuous learning and professional development in the dynamic field of Artificial Intelligence. |

| **PEO4** | To develop responsible computing professionals with an awareness of the societal, environmental, and ethical implications of AI-driven technologies. |
|---|---|

## PEO TO MISSION STATEMENT MAPPING

| MISSION STATEMENTS | PEO1 | PEO2 | PEO3 | PEO4 |
|---|---|---|---|---|
| M1 | 3 | 3 | 2 | 2 |
| M2 | 2 | 2 | 3 | 2 |
| M3 | 3 | 3 | 2 | 2 |
| M4 | 2 | 3 | 3 | 3 |

CORRELATION: 3- STRONG, 2- MEDIUM, 1- LOW

## PROGRAM OUTCOMES (PO) IN RELATION TO GRADUATE ATTRIBUTES

| **PO1** | Apply core principles of computer science and artificial intelligence to model, analyze, and solve real-world problems using logical, algorithmic, and data-driven approaches. |
|---|---|
| **PO2** | Design and implement intelligent software systems using techniques such as machine learning, natural language processing, and computer vision. |
| **PO3** | Understand the ethical, legal, and social implications of AI technologies and practice responsible AI development that aligns with fairness, accountability, and transparency. |
| **PO4** | Integrate knowledge from computer science, statistics and domain-specific areas to build adaptive AI applications across disciplines. |
| **PO5** | Effectively communicate technical concepts and collaborate in diverse teams to design, develop, and deploy AI-enabled systems. |
| **PO6** | Demonstrate a commitment to lifelong learning by staying current with emerging technologies in AI and contributing to innovation through continuous skill development. |

## Mapping of POs TO PEOs

| PEO/PO | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| **PEO 1** | 3 | 3 | 2 | 2 | 2 | 2 |
| **PEO 2** | 3 | 3 | 2 | 3 | 2 | 3 |
| **PEO 3** | 2 | 2 | 2 | 2 | 3 | 3 |
| **PEO 4** | 2 | 1 | 3 | 2 | 2 | 2 |

3-Strong Correlation     2- Medium Correlation   1- Low Correlation

## PROGRAM SPECIFIC OUTCOMES

| PSO1 | Design and develop intelligent software solutions by applying principles of artificial intelligence, including machine learning, neural networks, and natural language processing. |
|------|---|
| PSO2 | Apply data science techniques such as data preprocessing, visualization, and statistical analysis to extract insights from real-world datasets using tools like Python and SQL. |
| PSO3 | Build and deploy AI-powered applications that demonstrate automation, decision-making, and human-like interactions across domains such as healthcare, education, and business. |
| PSO4 | Evaluate the ethical, social, and environmental impact of AI systems and apply responsible AI practices that ensure fairness, transparency, and accountability. |
| PSO5 | Integrate AI and computer science knowledge to solve interdisciplinary problems through collaborative projects, internships, and industry-oriented learning experiences. |

## DEPARTMENT OF COMPUTER SCIENCE WITH AI

**ELIGIBILITY FOR ADMISSION**

A pass in the Higher Secondary Examination (Academic Stream) conducted by the Government of Tamil Nadu with Mathematics as one of the subjects.

**DURATION OF THE COURSE**

The duration of the course for three academic years consisting of six semesters and each semester comprises 90 days.

a) Each academic year shall be divided into two semesters. The first academic year shall comprise the first and second semesters, the second academic year the third and fourth semesters and the third academic year the fifth and sixth semester respectively.

b) The odd semesters shall consist of the period from June to November of each year and the even semesters from December to April of each year. There shall be not less than 90 working days for each semester.

**ELIGIBILITY FOR THE AWARD OF DEGREE:** A candidate shall be eligible for the award of the Degree only if he /she has undergone the prescribed course of study in a College affiliated to

the University for a period of not less than three academic years, passed the examinations all the Six-Semesters prescribed earning 142 credits.

## SCHEME ON EXAMINATIONS

As per the University Regulation the following split up of marks are to be followed.

**(i) SPLIT UP FOR INTERNAL AND EXTERNAL MARKS FOR THEORY AND PRATICAL PAPER:**

| Sl. No. | Paper | Internal | External | Total |
|---------|-----------|----------|----------|-------|
| 1. | Theory | 50 | 50 | 100 |
| 2. | Practical | 50 | 50 | 100 |

**(ii) SPLIT UP FOR INTERNAL ASSESSMENT MARKS FOR THEORY**

**CIE- Continuous Internal Evaluation (50 Marks)**

| | |
|---------------|----|
| CIA | 30 |
| Generic Skill | 15 |
| Attendance | 5 |
| Total | 50 |

**ESE- End Semester Examination (100 Marks; weightage 50%)**

# SCHEME OF I SEMESTER COMPUTER SCIENCE WITH AI PROGRAM

| SEMESTER I | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Component** | **Course Category** | **Course Code** | **Name of the course** | **Over All Credits** | **Hrs Distribution** | | | | **Total contact Hours** | **Marks** | | |
| | | | | | L | T | P | S | | CIA | ESE | Total |
| **Part I** | **AECC** | | Language I | 3 | 4 | - | - | - | 4 | 50 | 50 | 100 |
| **Part II** | **AECC** | | English I | 3 | 4 | - | - | - | 4 | 50 | 50 | 100 |
| **Part III** | **Core Course I** | | Python Programming | 5 | 4 | 1 | | | 5 | 50 | 50 | 100 |
| | **Core Practical I** | | Python Programming Practical | 5 | - | 1 | 5 | - | 6 | 50 | 50 | 100 |
| | **Generic Elective I** | | Mathematics I | 3 | 4 | 1 | | | 5 | 50 | 50 | 100 |
| **PART IV** | **Skill Enhancement Course – DS I** | | Data Visualization | 2 | - | - | 2 | - | 2 | 50 | 50 | 100 |
| | **Skill Enhancement Course – NME** | | **Skill Enhancement Course – NME I (A)-** Office Automation / Those who have studied Tamil up to XII Std. shall take either Fundamentals of information Technology(or) Network Security (or) Advanced Tamil.          B) Those who have not studied Tamil up to XII Std. and taken a Non-Tamil Language under Part-I shall take Tamil comprising of two courses (level will be at 6th Standard). | 2 | 2 | - | - | - | 2 | 50 | 50 | 100 |
| | **Soft Skill I** | | Soft Skills I | 2 | 2 | - | - | - | 2 | 50 | 50 | 100 |
| **Total** | | | | **25** | **20** | 3 | **7** | **-** | **30** | 400 | 400 | 800 |

**CIA**-Continuous Internal Assessment    **ESE**-End Semester Examination

# SCHEME OF II SEMESTER COMPUTER SCIENCE WITH AI PROGRAM

| Component | Course Category | Course Code | Name of the course | Over All Credits | Hrs Distribution | | | | Total contact Hours | Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | S | | CIA | ESE | Total |
| **SEMESTER II** | | | | | | | | | | | | |
| **Part I** | **AECC** | | Language II | 3 | 4 | - | - | - | 4 | 50 | 50 | 100 |
| **Part II** | **AECC** | | English II | 3 | 4 | - | - | - | 4 | 50 | 50 | 100 |
| **Part III** | **Core Course II** | | Java Programming | 5 | 4 | 1 | | | 5 | 50 | 50 | 100 |
| | **Core Practical II** | | Java Programming Practical | 5 | - | 1 | 5 | - | 6 | 50 | 50 | 100 |
| | **Generic elective II** | | Mathematics II | 3 | 4 | 1 | | | 5 | 50 | 50 | 100 |
| **PART IV** | **Skill Enhancement Course – DS I** | | Introduction to MYSQL | 2 | - | - | 2 | - | 2 | 50 | 50 | 100 |
| | **Skill Enhancement Course – NME II** | | **Skill Enhancement Course – NME II – AI for Everyone** / Those who have studied Tamil up to XII Std. shall take either HTML &Web design or Crypto Currency (or) Advanced Tamil. Those who have not studied Tamil up to XII Std. and taken a Non-Tamil Language under Part-I shall take Tamil comprising of two courses (level will be at 6th Standard). | 2 | 2 | - | - | - | 2 | 50 | 50 | 100 |
| | **Soft Skill II** | | Soft Skills II | 2 | 2 | - | - | - | 2 | 50 | 50 | 100 |
| **Total** | | | | **25** | 20 | 3 | 7 | | **30** | 400 | 400 | 800 |

**CIA**-Continuous Internal Assessment    **ESE**-End Semester Examination

# SCHEME OF III SEMESTER COMPUTER SCIENCE WITH AI PROGRAM

| SEMESTER III | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Component | Course Category | Course Code | Name of the course | Over All Credits | Hrs Distribution | | | | Total contact Hours | Marks | | |
| | | | | | L | T | P | S | | CIA | ESE | Total |
| Part I | AECC | | Language III | 3 | 5 | - | - | - | 5 | 50 | 50 | 100 |
| Part II | AECC | | English III | 3 | 4 | - | - | - | 4 | 50 | 50 | 100 |
| Part III | Core Course III | | Data Structures | 5 | 5 | 1 | | | 6 | 50 | 50 | 100 |
| | Core Practical III | | Data Structures Practical | 5 | - | 1 | 5 | - | 6 | 50 | 50 | 100 |
| | Generic elective III | | Statistics I | 3 | 5 | 1 | | | 6 | 50 | 50 | 100 |
| PART IV | Industrial Visit | | | 1 | - | - | - | - | - | - | - | - |
| | EVS | | | | 1 | - | - | - | 1 | - | - | - |
| | Soft Skill III | | | 2 | 2 | - | - | - | 2 | 50 | 50 | 100 |
| Total | | | | 22 | 22 | 3 | 5 | - | 30 | 300 | 300 | 600 |

**CIA**-Continuous Internal Assessment    **ESE**-End Semester Examination

# SCHEME OF IV SEMESTER COMPUTER SCIENCE WITH AI PROGRAM

| | | | | | **Hrs Distribution** | | | | | **Marks** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SEMESTER IV** | | | | | | | | | | | | |
| **Component** | **Course Category** | **Course Code** | **Name of the course** | **Over All Credits** | L | T | P | S | **Total contact Hours** | CIA | ESE | Total |
| **Part I** | **AECC** | | Language IV | 3 | 5 | - | - | - | 5 | 50 | 50 | 100 |
| **Part II** | **AECC** | | English IV | 3 | 4 | - | - | - | 4 | 50 | 50 | 100 |
| **Part III** | **Core Course IV** | | Introduction to Artificial Intelligence | 5 | 5 | 1 | | | 6 | 50 | 50 | 100 |
| | **Core Practical IV** | | Prolog Practical | 5 | - | 1 | 5 | - | 6 | 50 | 50 | 100 |
| | **Generic elective IV** | | Statistics II | 3 | 4 | 1 | | | 5 | 50 | 50 | 100 |
| **PART IV** | **EVS** | | | 2 | 2 | - | - | - | 2 | 50 | 50 | 100 |
| | **Soft Skill IV** | | | 2 | 2 | - | - | - | 2 | 50 | 50 | 100 |
| **Total** | | | | **23** | 22 | 3 | 5 | | **30** | 350 | 350 | 700 |

**CIA**-Continuous Internal Assessment   **ESE**-End Semester Examination

# SCHEME OF V SEMESTER COMPUTER SCIENCE WITH AI PROGRAM

| Componen t | Course Category | Cou rse Cod e | Name of the course | Ove r All Cre dits | Hrs Distribution | | | | Total contac t Hours | Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | S | | CIA | ES E | Total |
| Part III | **Core Course V** | | Computer Vision | 4 | 4 | 1 | - | - | 5 | 50 | 50 | 100 |
| | **Core Course VI** | | Natural Language Processing | 4 | 4 | 1 | - | - | 5 | 50 | 50 | 100 |
| | **Core Practical V** | | Computer Vision Practical | 4 | - | 1 | 4 | - | 5 | 50 | 50 | 100 |
| | **Core Practical VI** | | Natural Language Processing Practical | 4 | - | 1 | 4 | - | 5 | 50 | 50 | 100 |
| | **Disciplin e Specific Elective I - Employa bility Course I** | | Computer Networks / Software Engineerin g / Computing System Fundament als | 3 | 4 | 1 | - | - | 5 | 50 | 50 | 100 |
| | **Disciplin e Specific Elective II - Employa bility Course II** | | Cloud Computing / Big Data Analytics / Expert System | 3 | 4 | 1 | - | - | 5 | 50 | 50 | 100 |
| Part IV | **Internshi p** | | | 2 | - | - | - | - | - | - | - | - |
| | **Value Educatio n** | | | 2 | - | - | - | - | - | 50 | 50 | 100 |
| **Total** | | | | **26** | 16 | 6 | 8 | | **30** | 350 | 350 | 700 |

**CIA**-Continuous Internal Assessment    **ESE**-End Semester Examination

## SCHEME OF VI SEMESTER COMPUTER SCIENCE WITH AI PROGRAM

| SEMESTER VI | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Component | Course Category | Course Code | Name of the course | Over All Credits | Hrs Distribution | | | | Total contact Hours | Marks | | |
| | | | | | L | T | P | S | | CIA | ESE | Total |
| Part III | Core Course VII | | Machine Learning | 4 | 5 | 1 | - | - | 6 | 50 | 50 | 100 |
| | Core Course VIII | | Fuzzy Logic | 4 | 5 | 1 | - | - | 6 | 50 | 50 | 100 |
| | Core Practical VII | | Machine Learning Practical | 4 | - | 1 | 5 | - | 6 | 50 | 50 | 100 |
| | Discipline Specific Elective III - Employability Course III | | Mobile Ad-hoc Network / Data Mining and Warehousing / Artificial Neural Network | 3 | 4 | 1 | - | - | 5 | 50 | 50 | 100 |
| | Discipline Specific Elective IV - Employability Course IV | | Internet of Things and its Applications / Robotics and its Applications /Information Security | 3 | 4 | 1 | - | - | 5 | 50 | 50 | 100 |
| | Core Project | | Mini Project | 2 | - | - | 2 | - | 2 | 50 | 50 | 100 |
| PART V | Extension Activity | | | 1 | - | - | - | - | - | - | - | - |
| Total | | | | 21 | 18 | 5 | 7 | - | 30 | 300 | 300 | 600 |

**CIA**-Continuous Internal Assessment    **ESE**-End Semester Examination

## OVERALL CREDIT DISTRIBUTION

| Component | Credits |
|---|---|
| Part I | 12 |
| Part II | 12 |
| Part III | 94 |
| Part IV | 23 |
| Part V | 1 |
| Total | 142 |
| Extra Credits (maximum ) | 21 |
| Overall | 163 |

| Si No | Category | Course Category | No of Courses | Credits | Total Credits |
|---|---|---|---|---|---|
| | Part I | Language | 4 | 3 | 12 |
| | Part II | English | 4 | 3 | 12 |
| | Part III | Core Theory | 4 | 5 | 20 |
| | | Core Theory | 4 | 4 | 16 |
| | | Core Practical | 4 | 5 | 20 |
| | | Core Practical | 3 | 4 | 12 |
| | | Core Project | 1 | 2 | 2 |
| | | Generic Elective | 4 | 3 | 12 |
| | | Discipline Specific Elective | 4 | 3 | 12 |

| | | | | | |
|---|---|---|---|---|---|
| 1. | Part IV | Skill Enhancement Course - NME | 2 | 2 | 4 |
| 2. | | Skill Enhancement Course - Discipline Specific | 2 | 2 | 4 |
| 3. | | Soft Skill | 4 | 2 | 8 |
| 4. | | Industrial Visit | 1 | 1 | 1 |
| 5. | | EVS | 1 | 2 | 2 |
| 6. | | Value Education | 1 | 2 | 2 |
| 7. | | Internship/Industrial Training | 1 | 2 | 2 |
| 8. | Part v | Extension Activity | | | 1 |
| 9. | Total Mandatory Credits | | | | 142 |

| 10. | **Extra Credits** |
|---|---|
| | **Note: Students can take extra credit course from their own department or from** |
| | **other department as per the Admitting Body / University norms.** |
| | **Self-Study course (2C)** – (Department specific , curriculum and Evaluation scheme  and assessment to be framed by the department |
| | **Value added course** – minimum 30hrs **(2C)** |
| | **Certificate Course/Short-Time Course** – minimum of 15 days (minimum 45 hrs) **(3C) –** preferred online |
| | **Swayam/NPTEL/MOOC courses (2C)** – maximum of 12 credits |
| | **Skilled based vocational courses (2C)** e.g. basic computing skill, tailoring, jewel making, beauty parlour course, interiors etc., through skill development cell of college. |
| | **Other languages (2C)** |
| | **International HRD program** – 30hrs **(2C)** |

## CORE – I

### Course Title: **Python Programming**

| Course Code:  XX72101 | Credits    :    05 |
|---|---|
| L:T:P:S:  4:1:0:0 | CIA Marks   :  50 |
| Exam Hours: 03 Hours | ESE Marks   : 100 |

**LEARNING OUTCOME:**

- To interpret the fundamental Python syntax and semantics.
- To infer the use of Python control flow statements.
- To express proficiency in the handling of strings and functions.
- To determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.
- To identify the commonly used operations involving file systems.

**Course Outcomes: At the end of the Course, the Student will be able to:**

| CO1 | Explain the basic concepts, features, and syntax of Python programming. Demonstrate the use of variables, data types, and operators in Python programs. |
|---|---|
| CO2 | Construct Python programs using conditional and looping control structures. |
| CO3 | Develop functions and make use of Python's Strings. |
| CO4 | Illustrate the use of Python data structures like lists, tuples, and dictionaries. |
| CO5 | Implement file handling operations. |

**Mapping of Course Outcomes to Program Outcomes and Program Specific Outcome:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 3 | 3 | 2 | 1 | 0 | 2 | 2 | 2 | 3 |
| CO2 | 2 | 2 | 3 | 2 | 3 | 3 | 0 | 2 | 2 | 2 | 3 |
| CO3 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 3 | 2 | 2 |
| CO4 | 2 | 0 | 1 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 |
| CO5 | 1 | 3 | 2 | 2 | 0 | 1 | 3 | 2 | 0 | 3 | 1 |

**CORRELATION: 3- STRONG, 2- MEDIUM, 1- LOW**

| Sl. No. | CONTENTS OF MODULE | Hrs | Cos |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 1 | **MODULE I:** Introduction: The essence of computational problem solving – Limits of computational problem solving-Computer algorithms-Computer HardwareComputer Software-The process of computational problem solving-Python programming language – Literals – Variables and Identifiers – Operators – Expressions and Data types, Input / output. | 15 | CO1 |
| 2 | **MODULE II:** Control Structures: Boolean Expressions – Selection Control – If Statement- Indentation in Python- Multi-Way Selection – Iterative Control- While Statement- Infinite loops- Definite vs. Indefinite Loops- Boolean Flag. String, List and Dictionary, Manipulations Building blocks of python programs,Understanding and using ranges. | 15 | CO2 |
| 3 | **MODULEIII:** Functions:Program Routines- Defining Functions-More on Functions: Calling Value-Returning Functions- Calling Non-Value-Returning Functions- Parameter Passing – Keyword Arguments in Python – Default Arguments in Python-Variable Scope. Recursion: Recursive Functions. | 15 | CO3 |
| 4 | **MODULE IV**: Objects and their use: Software Objects – Turtle Graphics – Turtle attributesModular Design: Modules – Top-Down Design – Python Modules – Text Files: Opening, reading and writing text files – Exception Handling. | 15 | CO4 |
| 5 | **MODULE V:** Dictionaries and Sets: Dictionary type in Python – Set Data type. Object Oriented Programming using Python: Encapsulation – Inheritance – Polymorphism. Python packages: Simple programs using the built-in functions of packages matplotlib, NumPy, pandas etc. | 15 | CO5, |

**TEXT BOOKS**:

1. Charles Dierbach, "Introduction to Computer Science using Python – A computational Problem-solving Focus", Wiley India Edition, 2015.

2. Wesley J. Chun, "Core Python Applications Programming", 3rd Edition , Pearson Education, 2016

   **REFERENCE BOOKS:**

1. Mark Lutz, "Learning Python Powerful Object Oriented Programming", O'reilly Media 2018, 5th Edition.

2. Timothy A. Budd, "Exploring Python", Tata MCGraw Hill Education Private Limited 2011, 1 st Edition.

3. John Zelle, "Python Programming: An Introduction to Computer Science", Second edition, Course Technology Cengage Learning Publications, 2013, ISBN 978-1590282410

   **E-REFERENCES:**

1. https://www.google.co.in/books/edition/Programming_with_Python

2. https://www.programiz.com/python-programming

**Core Practical I**
**Course Title: Python Programming Practical**

| | | |
|---|---|---|
| **Course Code: XX72103** | **Credits** | **:05** |
| **L:T:P:S : 0:1:3:0** | **CIA Marks** | **: 50** |
| **Exam Hours: 3 Hours** | **ESE Marks** | **: 100** |

**LEARNING OUTCOME:**
- To write, test and debug Python Programs.
- To implement Conditionals and Loops for Python Programs
- To work with functions and Strings in Python.
- To use functions and represent Compound data using Lists, Tuples and Dictionaries.
- To read and write data from & to files in Python and develop Application.

**Course Outcomes: At the end of the Course, the Student will be able to:**

| | |
|---|---|
| **CO1** | Explain the basic concepts, features, and syntax of Python programming. Demonstrate the use of variables, data types, and operators in Python programs. |
| **CO2** | Construct Python programs using conditional and looping control structures. |
| **CO3** | Develop functions and make use of Python's Strings. |
| **CO4** | Illustrate the use of Python data structures like lists, tuples, and dictionaries. |
| **CO5** | Implement file handling operations. |

**Mapping of Course Outcomes to Program Outcomes and Program Specific Outcome:**

| CO/ PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | 3 | 2 | 1 | 3 | 2 | 2 | 2 | 1 |
| CO2 | 3 | 3 | 3 | 3 | 2 | 1 | 3 | 3 | 2 | 2 | 2 |
| CO3 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 2 |
| CO4 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 |
| CO5 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 |

**LAB EXERCISES:**

1. Program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.

2. Write a Python program to construct the following pattern, using a nested loop

```
*
**
***
****
*****
****
***
**
*
```

3. Program to calculate total marks, percentage and grade of a student. Marks obtained in each of the five subjects are to be input by user. Assign grades according to the following criteria:　　　　Grade A: Percentage >=80

Grade B: Percentage >=70 and 80

Grade C: Percentage >=60 and <70

Grade D: Percentage >=40 and <60

Grade E: Percentage < 40 4. Program, to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.

5. Write a Python script that prints prime numbers less than 20.

6. Program to find factorial of the given number using recursive function.

7. Write a Python program to count the number of even and odd numbers from array of N numbers.

8. Write a Python class to reverse a string word by word.

9. Given a tuple and a list as input, write a program to count the occurrences of all items of the list in the tuple. (Input: tuple = ('a', 'a', 'c', 'b', 'd'), list = ['a', 'b'], Output: 3)

10. Create a Savings Account class that behaves just like a Bank Account, but also has an interest rate and a method that increases the balance by the appropriate amount of interest (Hint: use Inheritance).

11. Read a file content and copy only the contents at odd lines into a new file.

12. Create a Turtle graphics window with specific size.

13. Write a Python program for Towers of Hanoi using recursion

14. Create a menu driven Python program with a dictionary for words and their meanings.

15. Devise a Python program to implement the Hangman Game.

**TEXT BOOKS**:

1. Charles Dierbach, "Introduction to Computer Science using Python - A computational Problem-solving Focus", Wiley India Edition, 2015.
2. Wesley J. Chun, "Core Python Applications Programming", 3rd Edition , Pearson Education, 2016

**REFERENCE BOOKS:**

1. Mark Lutz, "Learning Python Powerful Object Oriented Programming", O'reilly Media 2018, 5th    Edition.
2. Timothy A. Budd, "Exploring Python", Tata MCGraw Hill Education Private Limited 2011, 1 st    Edition.
3. John Zelle, "Python Programming: An Introduction to Computer Science", Second edition, Course    Technology Cengage Learning Publications, 2013, ISBN 978- 1590282410
4. Michel Dawson, "Python Programming for Absolute Beginers", Third Edition, Course Technology Cengage Learning Publications, 2013, ISBN 9781435455009

**E-REFERENCES:**

1.https://www.google.co.in/books/edition/Programming_with_Python
2.https://www.programiz.com/python-programming
3.https://www.guru99.com/python-tutorials.html

**Course Title: Data Visualization**

| Course Code:  XX72104 | Credits  :02 |
|---|---|
| L:T:P:S:   0:0:2:0 | CIA Marks   : 50 |
| Exam Hours: 1.30Hours | ESE Marks   : 50 |

**LEARNING OUTCOME:**
- Understand the principles and importance of data visualization to effectively
- communicate patterns, trends, and insights from raw data.
- Develop proficiency in Python libraries such as Matplotlib, Seaborn, and Plotly to
- create static and interactive visualizations.
- Apply appropriate visualization techniques based on data types and analysis goals for
- informed decision-making.

**Course Outcomes: At the end of the Course, the Student will be able to:**

| | |
|---|---|
| **CO1** | Create basic plots such as bar charts, line graphs, and pie charts using Python&#39;s<br><br>visualization libraries. |
| **CO2** | Analyze and visualize distributions, relationships, and categorical data using advanced<br>plots like histograms, boxplots, scatter plots, and heatmaps. |
| **CO3** | Build interactive and dynamic visualizations using Plotly to enhance data exploration and<br>user engagement. |
| **CO4** | Interpret complex datasets by designing visual stories and dashboards<br>that convey clear, data-driven insights. |
| **CO5** | Choose and apply suitable visualizations for different data scenarios, supporting effective<br>analytical and presentation skills. |

**Mapping of Course Outcomes to Program Outcomes and Program Specific Outcome:**

| CO/ PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 3 |
| CO 2 | 3 | 2 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 |
| CO 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 3 |
| CO 4 | 3 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 3 |
| CO 5 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 3 |

CORRELATION: 3- STRONG, 2- MEDIUM, 1- LOW

**LAB EXERCISES:**

1. Basic Visualization (Matplotlib)
   - Create Basic Line and Bar Charts
   - Visualize monthly sales or temperature data using plt.plot() and plt.bar() in
   - Matplotlib.
   - Pie Chart for Categorical Data
   - Use a pie chart to show proportions of different product categories or election results.
   - Subplots and Custom Layouts
2. Exploratory Data Visualization (Seaborn)
   - Histogram and KDE Plot
   - Use Seaborn& histplot() and kdeplot() to visualize the distribution of
   - marks/salaries/ages.
   - Boxplot and Violin Plot
   - Show data spread and outliers for different departments, genders, or regions.
3. Scatter Plot with Hue and Size
   - Plot a scatter plot using sns.scatterplot() for 3D insights (e.g., height vs. weight colored by gender).
   - Pairplot for Multivariate Data
   - Use sns.pairplot() to analyze relationships between multiple numerical columns (e.g., Iris dataset).
   - Heatmap of Correlation Matrix
   - Create a heatmap to visualize correlation between student test scores across subjects.
4. Projects &amp; Data Insights
   - Dashboard with Multiple Charts (Plotly)
   - Combine line, bar, and pie charts in a single dashboard for visualizing sales across
   o products, regions, and months.

5. Case Study: Titanic Dataset Visualization
   - Use Matplotlib/Seaborn/Plotly to analyze age, class, survival rate, gender distribution,
   - Mini Project: Data Storytelling with Visuals
   - Choose a theme (e.g., climate, education, or health) and use multiple visualizations to tell a data-driven story.

**TEXT BOOKS:**

1. Claus O. Wilke , "Fundamentals of Data Visualization: A Primer on Making Informative and Compelling Figures", O'Reilly; First Edition (31 March 2019)

**REFERENCE BOOKS:**

1. Boozman Richard Richard, "Data Visualization with Python: Create Stunning Graphs and Visualizations with Matplotlib and Seaborn", Lincoln Publishers.

**E-REFERENCES:**

1. [https://seaborn.pydata.org/](https://seaborn.pydata.org/)
2. [https://www.geeksforgeeks.org/data-visualization/data-visualization-with-python-seaborn/](https://www.geeksforgeeks.org/data-visualization/data-visualization-with-python-seaborn/)

## Course Title: <u>Office Automation</u>

| | |
|---|---|
| **Course Code: XX72105** | **Credits :02** |
| **L:T:P:S: 2:0:0:0** | **CIA Marks : 50** |
| **Exam Hours: 1.30Hours** | **ESE Marks : 50** |

**LEARNING OUTCOME:**

- The major objective in introducing the Computer Skills course is to impart training for students in Microsoft Office which has different components like MS Word, MS Excel and Power point.
- The course is highly practice oriented rather than regular class room teaching.
- To acquire knowledge on editor, spread sheet and presentation software.

**Course Outcomes: At the end of the Course, the Student will be able to:**

| | |
|---|---|
| **CO1** | Understand the basics of computer systems and its components. |
| **CO2** | Understand and apply the basic concepts of a word processing package |
| **CO3** | Understand and apply the basic concepts of electronic spreadsheet software. |
| **CO4** | Understand and apply the basic concepts of database management system. |
| **CO5** | Understand and create a presentation using PowerPoint tool. |

**Mapping of Course Outcomes to Program Outcomes and Program Specific Outcome:**

| CO/ PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 0 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 |
| CO2 | 2 | 2 | 0 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 |
| CO3 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | 3 |
| CO4 | 1 | 2 | 2 | 2 | 1 | 3 | 1 | 2 | 3 | 3 | 3 |
| CO5 | 1 | 1 | 2 | 1 | 2 | 2 | 1 | 3 | 1 | 3 | 1 |

CORRELATION: 3- STRONG, 2- MEDIUM, 1- LOW

| Sl. No. | CONTENTS OF MODULE | Hrs | Cos |
|---|---|---|---|
| 1 | **Module I:**Introductory concepts: Hardware and Software - Memory unit – CPU-Input Devices: Key board, Mouse and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems - Introduction to Programming Languages | 2 | CO1 |
| 2 | **Module II** :Word Processing: File menu operations - Editing text – tools, formatting, bullets and numbering - Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers, printing – Preview, options, merge. | 2 | CO2 |
| 3 | **Module III:** Spreadsheets: Excel – opening, entering text and data, formatting, navigating; Formulas – entering, handling and copying | 2 | CO3 |
| 4 | **Module IV:** Charts – creating, formatting and printing, analysis tables, preparation of financial statements, introduction to data analytics. | 2 | CO4 |
| 5 | **Module V**: Power point: Introduction to Power point - Features – Understanding slide typecasting & viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition – Animation effects, audio inclusion, timers. | 2 | CO5, |

**TEXT BOOKS:**

1. Peter Norton, "Introduction to Computers" –Tata McGraw-Hill.

**REFERENCE BOOKS:**

1. Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, "Microsoft 2003", Tata McGraw- Hill

**E-REFERENCES:**

1. https://tallyeducation.com/tepl/offline-courses/office-automation/
2. https://cceindia.in/

# SECOND SEMESTER

## CORE II

## Course Title: Java Programming

| Course Code: | Credits : 05 |
|---|---|
| L:T:P:S: 4:1:0:0 | CIA Marks :50 |
| Exam Hours: 03 Hours | ESE Marks : 100 |

### LEARNING OUTCOME:

• Understand the core features of Java, its environment, and fundamental programming concepts.
• Gain knowledge of Java's object-oriented principles
• Explore the use of packages, exception handling, and error management techniques to enhance Java applications.
• Learn how to work with threads, manage synchronization, and handle file operations in Java.
• Develop interactive applets and GUI applications using AWT components.

### Course Outcomes: At the end of the Course, the Student will be able to:

| CO1 | Write basic Java programs using correct syntax, and apply concepts like data types, variables, and control flow. |
|---|---|
| CO2 | Design and implement Java programs using object-oriented principles like classes, objects, inheritance, and interfaces. |
| CO3 | Create robust Java applications using user-defined packages, exception handling, and error management. |
| CO4 | Create multithreaded programs, synchronize threads, and handle file operations using Java I/O classes. |
| CO5 | Develop interactive Java applets and GUI applications using AWT components, handling basic graphics and user input. |

### Mapping of Course Outcomes to Program Outcomes and Program Specific Outcome:

| CO/ PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 1 | 0 | 3 | 3 | 2 | 1 | 2 | 3 | 2 |
| CO | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 3 | 2 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | | | | | | | | | | | |
| CO 3 | 2 | 1 | 0 | 3 | 1 | 3 | 0 | 3 | 2 | 3 | 2 |
| CO 4 | 2 | 3 | 2 | 2 | 3 | 3 | 1 | 2 | 3 | 3 | 2 |
| CO 5 | 1 | 3 | 0 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 2 |

CORRELATION: 3- STRONG, 2- MEDIUM, 1- LOW

| Sl. No. | CONTENTS OF MODULE | Hrs | Cos |
|---|---|---|---|
| 1 | **MODULE I:** Introduction: Review of Object-Oriented concepts - Java buzzwords (Platform independence, Portability, Threads)- JVM architecture –Java Program structure - Java main method - Java Console output(System.out) - simple java program - Data types - Variables - type conversion and casting- Java Console input: Buffered input - operators - control statements - Static Data - Static Method - String and String Buffer Classes | 12 | CO1 |
| 2 | **MODULE II:** Java user defined Classes and Objects – Arrays – constructors - Inheritance: Basic concepts - Types of inheritance - Member access rules - Usage of this and Super key word - Method Overloading - Method overriding - Abstract classes - Dynamic method dispatch - Usage of final keyword -Packages: Definition - Access Protection - Importing Packages - Interfaces: Definition – Implementation – Extending Interfaces | 12 | CO2 |
| 3 | **MODULE III:** Exception Handling: try – catch - throw - throws –- finally – Built-in exceptions - Creating own Exception classes - garbage collection, finalise - Multithreaded Programming: Thread Class - Runnable interface – Synchronization – Using synchronized methods – Using synchronized statement - Interthread Communication – Deadlock. | 12 | CO3 |
| 4 | **MODULE IV**:The AWT class hierarchy - Swing: Introduction to Swing - Hierarchy of swing components. Containers - Top level containers - JFrame - JWindow - JDialog - JPanel - JButton - JToggleButton - JCheckBox - JRadioButton - JLabel,JTextField - JTextArea - JList - JComboBox – JscrollPane - Event Handling: Events - Event sources - Event Listeners - Event Delegation Model (EDM) - Handling Mouse and Keyboard Events | 12 | CO4 |

| 5 | **MODULE V:** Adapter classes - Inner classes -Java Util Package / Collections Framework:Collection & Iterator Interface- Enumeration- List and ArrayList- Vector-Comparator | 12 | CO5, |

**TEXT BOOKS:**

1.Herbert Schildt, The Complete Reference, Tata McGraw Hill, New Delhi, 7th Edition, 2010. Gary Cornell, Core Java 2 Volume I – Fundamentals, Addison Wesley, 1999.

**REFERENCE BOOKS**:

1. Herbert Schildt , Dr. Coward, Danny "Java: The Complete Reference"  2. Kathy Sierra & Bert Bates, "Head First Java", O'Reilly Media, 2nd Edition.
2. E. Balagurusamy, "Programming with Java", Tata McGraw-Hill.
3.      Joshua Bloch, "Effective Java", Pearson Education.
4.      Paul Deitel & Harvey Deitel, "Java: How to Program", Pearson Education.

**E- REFERENCES**:
1.   Java Tutorials by W3Schools: https://www.w3schools.com/java/
2.   Baeldung Java Tutorials: https://www.baeldung.com/
3.   GeeksforGeeks Java Programming: https://www.geeksforgeeks.org/java/

# Course Title: Java Programming Practical

| Course Code : | Credits |
| --- | --- |
| :5 | |
| L:T:P:S : 0:1:5:0 | CIA Marks : 50 |
| Exam Hours : 03 Hours | ESE Marks : 50 |

## LEARNING OBJECTIVES:

- Develop Java programs to perform arithmetic operations, demonstrate conditional and iterative statements, and handle command-line arguments.
- Implement constructors, method overloading, and method overriding in Java programs.
- Explore inheritance, the final keyword, and the use of String and StringBuffer classes.
- Create user-defined packages, demonstrate thread methods, and implement thread synchronization.
- Develop and test applets, including their lifecycle, user input handling, and graphical features, along with AWT controls and layout managers.

**Course Outcomes: At the end of the Course, the Student will be able to:**

| CO1 | Apply object-oriented features in Java programs. |
| --- | --- |
| CO2 | Handle exceptions, packages, and multithreading. |
| CO3 | Develop GUI applications using AWT and applets. |

**Mapping of Course Outcomes to Program Outcomes to Program Specific Outcomes:**

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CO1 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 2 |
| CO2 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 2 |

| CO3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 |
|-----|---|---|---|---|---|---|---|---|---|---|---|

**CORRELATION: 3-STRONG    2-MEDIUM    1-LOW**

**LAB EXERCISES:**

1. Write a Java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer?
2. Write a Java program to multiply two given matrices.
3. Write a Java program that displays the number of characters, lines and words in a text?
5. Generate random numbers between two given limits using Random class and print messages according to the range of the value generated.
6. Write a program to do String Manipulation using Character Array and perform the following string operations: a) String length b) Finding a character at a particular position c) Concatenating two strings
7. Write a program to perform the following string operations using String class: a) String Concatenation b) Search a substring c) To extract substring from given string
8. Write a program to perform string operations using StringBuffer class: a) Length of a string b) Reverse a string c) Delete a substring from the given string
9. Write a java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.
10. Write a threading program which uses the same method asynchronously to print the numbers 1 to 10 using Thread1 and to print 90 to 100 using Thread2. 10. Write a program to demonstrate the use of following exceptions. a) Arithmetic Exception b) Number Format Exception c) Array Index Out of Bound Exception d) Negative Array Size Exception
11. Write a Java program that reads on file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes?
12. Write a program to accept a text and change its size and font. Include bold italic options. Use frames and controls.
13. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired. (Use adapter classes).

14. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divide by zero.

15. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "stop" or "ready" or "go" should appear above the buttons in a selected color. Initially there is no message shown.

**TEXT BOOKS:**

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne "Operating System Concepts", Tenth Edition, 2018, John Wiley & Sons.

**REFERENCE BOOKS:**

1. Bhatt P. C. P., "An Introduction to Operating Systems: Concepts and Practice", Third Edition, 2010, Prentice Hall of India.
2. William Stallings, "Operating Systems: Internals and Design Principles", Pearson, 2015, Global Edition.

**E-REFERENCES:**

1. https://docs.oracle.com/javase/tutorial
2. https://www.javatpoint.com/java-tutorial
3. https://www.w3schools.com/java/

## Course Title: Introduction to My SQL

| Course Code: | Credits :02 |
|---|---|
| L:T:P:S: 0:0:2:0 | CIA Marks : 50 |
| Exam Hours: 1.30Hours | ESE Marks : 50 |

**LEARNING OUTCOME:**

- Understand and manage MySQL database users, databases, and table structures
- through command-line operations and SQL statements.
- Develop skills to perform CRUD operations using various SQL queries, constraints,
- and clauses to handle and manipulate data effectively.
- Apply relational database concepts such as joins, views, aggregate functions, and
- grouping to retrieve meaningful insights from structured data.

**Course Outcomes: At the end of the Course, the Student will be able to:**

| CO1 | Perform user management and database administration tasks such as creating users, <br><br> managing privileges, and handling databases using MySQL. |
|---|---|
| CO2 | Create, modify, and manage tables and views to structure and organize data in a relational <br> format. |
| CO3 | Construct and execute SQL queries to insert, update, delete, and retrieve data from <br> databases using appropriate clauses and constraints. |
| CO4 | Utilize aggregate functions, grouping, and filtering techniques to perform analytical <br> operations on datasets. |
| CO5 | Implement various types of joins to query and combine data from <br> multiple related tables for comprehensive data analysis. |

**Mapping of Course Outcomes to Program Outcomes and Program Specific Outcome:**

| CO/ | P | P | P | P | P | P | PS | PS | PS | PS | PS |
|---|---|---|---|---|---|---|---|---|---|---|---|

| PO | O1 | O2 | O3 | O4 | O5 | O6 | O1 | O2 | O3 | O4 | O5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 3 |
| CO 2 | 3 | 2 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 |
| CO 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 3 |
| CO 4 | 3 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 3 |
| CO 5 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 3 |

CORRELATION: 3- STRONG, 2- MEDIUM, 1- LOW

**PRACTICAL EXERCISES:**
1. User Management
a. MySQL Create User
b. MySQL Drop User
c. MySQL show Users
d. Change User Password

2. Databases
a. MySQL Create Database
b. MySQL Select Database
c. MySQL Show Database
d. MySQL Drop Database

3. Table &amp; Views
a. MySQL Create Table
b. MySQL Drop Table
c. MySQL Alter Table
d. MySQL Show Table
e. MySQL Truncate Table
f. MySQL Temporary Table
g. MySQL Copy Table
h. MySQL Views

4. MySQL Queries
a. MySQL Queries
b. MySQL Constraints

    c. MySQL insert Query

    d. MySQL Update Query

    e. MySQL Delete Query

    f. MySQL Select Query

    g. Insert On Duplicate Key Update

5. MySQL Clauses

    a. MySQL Where

    b. MySQL AND

    c. MySQL OR

    d. MySQL LIKE

    e. MySQL Limit

    f. MySQL Order By

    g. MySQL Group By

    h. MySQL Having

    i. MySQL Distinct

    j. MySQL Union

    k. MySQL Union All

**TEXT BOOKS:**

1. Manish Soni, "MySQL Text Book", Poorav Publications

**REFERENCE BOOKS:**

1. Vikram Vaswani, "MySQL(TM): The Complete Reference",  McGraw Hill Education; 1st edition
   **E-REFERENCES:**

1. **https://www.w3schools.com/MySQL/default.asp**
2. **https://www.mysqltutorial.org/**

**Course Title: AI for Everyone**

| Course Code: | Credits :02 |
|---|---|
| L:T:P:S: 2:0:0:0 | CIA Marks : 50 |
| Exam Hours: 1.30Hours | ESE Marks : 50 |

**LEARNING OUTCOME:**
- Understand the basics of artificial intelligence and its subfields.
- Explore real-world applications of AI across different industries.
- Gain insights into the ethical, social, and economic implications of AI.
- Develop an appreciation for the potential of AI to drive innovation and transformation.

**Course Outcomes: At the end of the Course, the Student will be able to:**

| CO1 | Define and explain the fundamental concepts and subfields of AI. |
|---|---|
| CO2 | Identify real-world applications of AI across various industries. |
| CO3 | Analyze the ethical, social, and economic implications of AI. |
| CO4 | Recognize the potential of AI to drive innovation and transformation in different domains. |
| CO5 | Understand the Limitations and Capabilities of AI |

**Mapping of Course Outcomes to Program Outcomes and Program Specific Outcome:**

| CO/ PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 3 | 0 | 3 | 1 | 3 | 0 | 2 | 3 | 2 | 3 |
| CO2 | 3 | 2 | 0 | 2 | 2 | 2 | 0 | 3 | 2 | 2 | 3 |
| CO3 | 2 | 1 | 3 | 1 | 2 | 1 | 0 | 2 | 2 | 3 | 3 |
| CO4 | 3 | 3 | 2 | 2 | 2 | 1 | 3 | 1 | 3 | 2 | 3 |
| CO5 | 1 | 0 | 1 | 3 | 3 | 1 | 2 | 0 | 2 | 1 | 3 |

**CORRELATION: 3- STRONG, 2- MEDIUM, 1- LOW**

| Sl. No. | CONTENTS OF MODULE | Hrs | Cos |
|---|---|---|---|
| 1 | **Module I:** Introduction to Artificial Intelligence<br>• Definition and scope of AI<br>• Historical overview and key milestones<br>• Differentiating AI from human intelligence | 2 | CO1 |
| 2 | **Module II:** AI Subfields and Technologies<br>• Machine learning: Supervised, unsupervised, and reinforcement learning<br>• Deep learning and neural networks<br>• Natural language processing (NLP) and computer vision | 2 | CO2 |
| 3 | **Module III:** Applications of AI<br>• AI in healthcare: Diagnosis, treatment, and medical imaging<br>• AI in finance: Fraud detection, algorithmic trading, and risk assessment<br>• AI in transportation: Autonomous vehicles and traffic optimization<br>• AI in customer service and chatbots<br>• AI in education: Personalized learning and intelligent tutoring systems | 2 | CO3 |
| 4 | **Module VI:** Ethical and Social Implications of AI<br>• Bias and fairness in AI systems<br>• Privacy and data protection concerns<br>• Impact of AI on employment and the workforce<br>• AI and social inequality | 2 | CO4 |
| 5 | **Module V:** Other Important Issues<br>• Ethical guidelines and responsible AI practices<br>• AI and Innovation<br>• Emerging trends and future directions in AI<br>• AI and creativity: Generative models and artistic applications | 2 | CO5, |

**TEXT BOOKS:**

1. Saptarsi Goswami, Amit Kumar Das, Amlan Chakrabarti, "AI for Everyone: A Beginner's Handbook for Artificial Intelligence (AI)",  Pearson Education

**REFERENCE BOOKS:**

1. Sridhar Seshadri & Shreeram Iyer," AI for Everyone",  Embassy Books

**E-REFERENCES:**

1. **https://ai-for-all.in/#/home**
2. **https://www.edx.org/learn/artificial-intelligence/ibm-ai-for-everyone-master-the-basics**

# APPENDIX

**OUTCOME-BASED EDUCATION (OBE)**

Outcome-Based Education (OBE) is a student-centric teaching and learning methodology in which the course delivery, assessment are planned to achieve stated objectives and outcomes. It focuses on measuring student performance i.e. outcomes at different levels.

Outcome-based education (OBE) is an educational theory that bases each part of an educational system around goals (outcomes). By the end of the educational experience each student should have achieved the goal. There is no specified style of teaching or assessment in OBE; instead classes, opportunities, and assessments should all help students achieve the specified outcomes.

There are three educational Outcomes as defined by the National Board of Accreditation.

**Program Educational Objectives (PEOs)**

The Programme Educational Objectives of a program are the statements that describe the expected achievements of graduates in their career, and also in particular, what the graduates are expected to perform and achieve during the first few years after graduation.

**Programme Outcomes (POs)**

Program outcomes are finer statements that designate what students are expected to be able to do by the time of graduation. POs are expected to be aligned closely with Graduate Attributes.
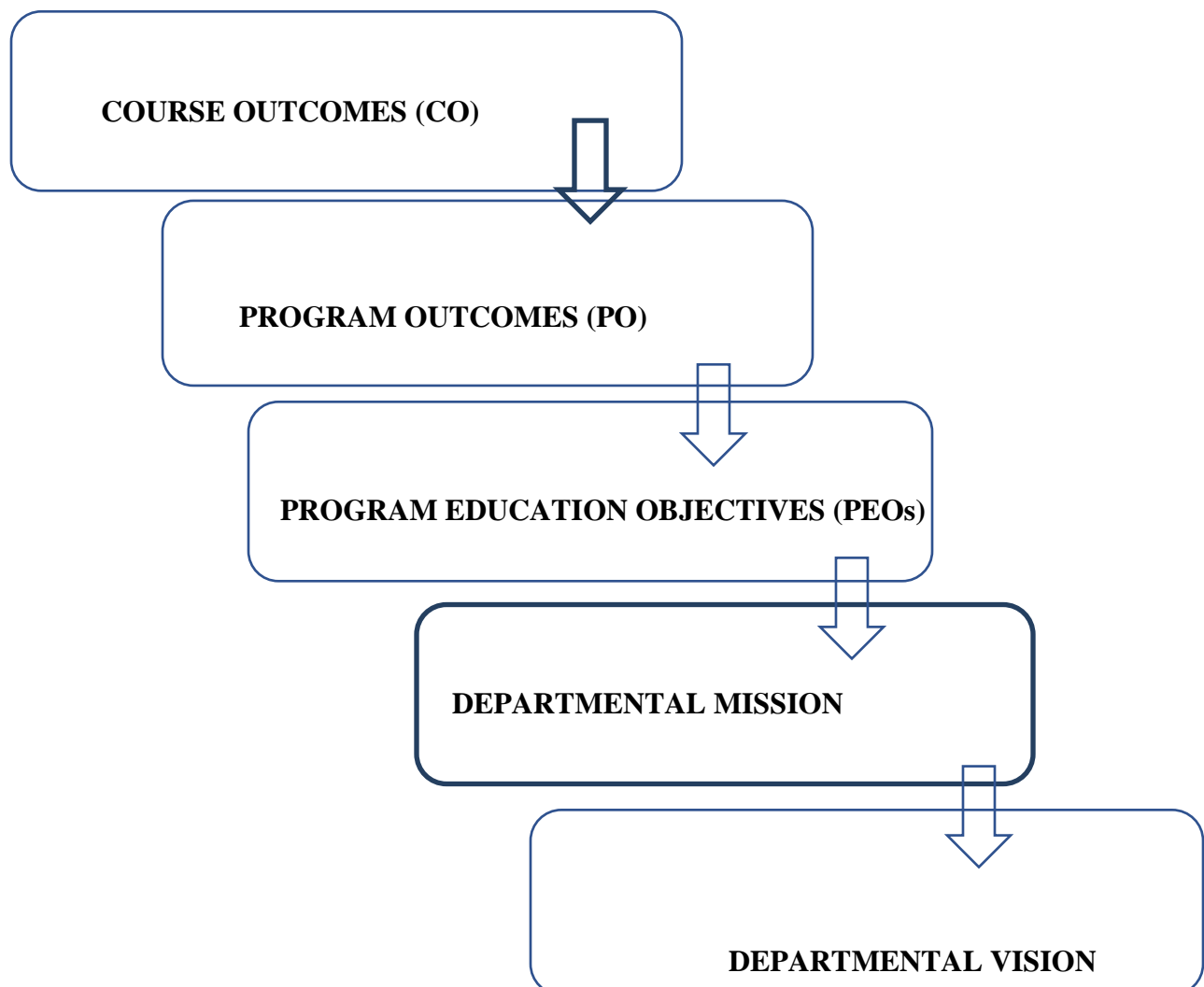
**Programme Specific Outcomes (PSO)**

Programme Specific Outcomes are what the students should be able to do at the time of graduation with reference to a specific discipline.

**Course Outcome (CO)**

Course outcomes are statements that describe significant and essential learning that learners have achieved, and can reliably demonstrate at the end of a course.

**MAPPING OF OUTCOMES**

COURSE OUTCOMES (CO)

PROGRAM OUTCOMES (PO)

PROGRAM EDUCATION OBJECTIVES (PEOs)

DEPARTMENTAL MISSION

DEPARTMENTAL VISION

# BLOOM'S TAXONOMY

**Bloom's taxonomy** is a classification system used to define and distinguish different levels of human cognition—i.e., thinking, learning, and understanding. Educators have typically used Bloom's taxonomy to inform or guide the development of assessments (tests and other evaluations of student learning), curriculum (units, lessons, projects, and other learning activities), and instructional methods such as questioning strategies. [eduglosarry.org]
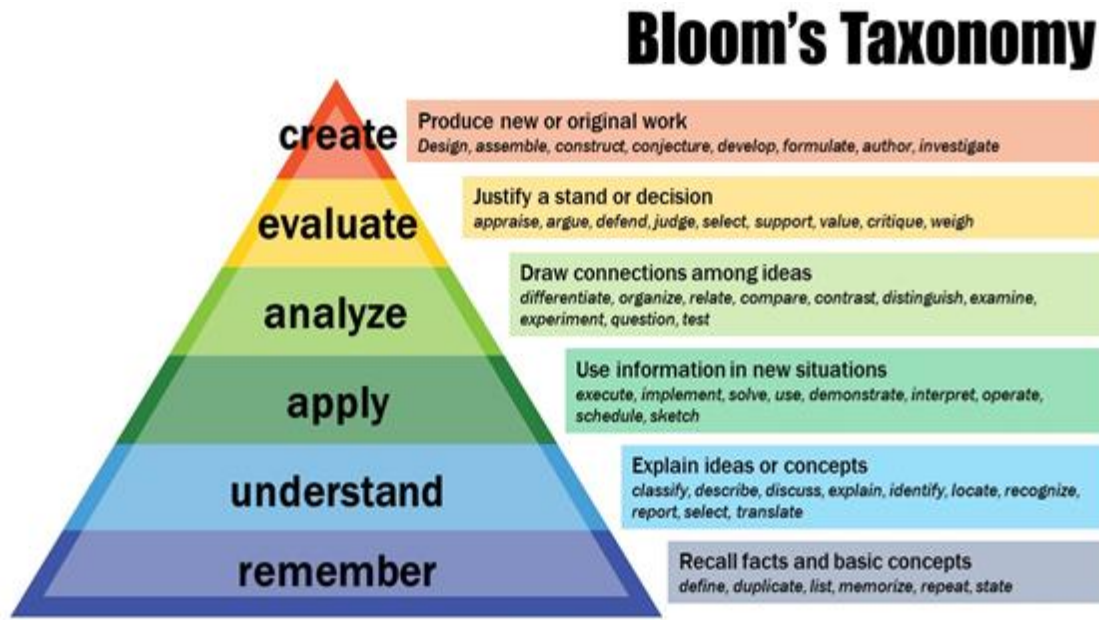


**Knowledge levels for assessment of Outcomes based on Blooms Taxonomy**

| Level | Parameter | Description |
|-------|-----------|-------------|
| K1 | Knowledge | It is the ability to remember the previously learned material/information |
| K2 | Comprehension | It is the ability to grasp the meaning of material |
| K3 | Application | It is the ability to use learned material in new and concrete situations |
| K4 | Analysis | It is the ability to break down material/concept into its component parts/subsections so that its organizational structure may be understood |
| K5 | Synthesis | It is the ability to put parts/subsections together to form a new whole material/idea/concept/information |
| K6 | Evaluation | It is the ability to judge the value of material/concept/statement/creative material /research |

| | | report) for a given purpose |
|---|---|---|