

# DEPARTMENT OF COMPUTER SCIENCE

## COURSE STRUCTURE & SYLLABI (For the students admitted from year 2024-2025 onwards)

**Programme : B.Sc. Artificial Intelligence and Machine Learning**

**Eligibility:** A Pass in Higher Secondary Examination with Mathematics as one of the subjects conducted by the Government of Tamilnadu or any other examination accepted as equivalent thereto by the Syndicate



**JAMAL MOHAMED COLLEGE (AUTONOMOUS)**  
Accredited with A++ Grade by NAAC (4<sup>th</sup> Cycle) with CGPA 3.69 out of 4.0  
(Affiliated to Bharathidasan University)  
**TIRUCHIRAPPALLI – 620 020**

## B.SC. ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

Sem	Course Code	Part	Course Category	Course Title	Ins. Hrs/Week	Credit	Marks		Total
							CIA	ESE	
<b>I</b>	24U1LT1/LA1/LF1 /LH1/LU1	I	Language - I		6	3	25	75	100
	24UCN1LE1	II	English - I	English for Communication - I	6	3	25	75	100
	24UAI1CC1	III	Core - I	Programming in C and Data Structures	5	5	25	75	100
	24UAI1CC2P		Core - II	Programming in C Lab - Practical	3	3	20	80	100
	24UMA1AC1:4		Allied - I	Calculus	4	3	25	75	100
	24UMA1AC2:4		Allied - II	Linear Algebra	4	3	25	75	100
	24UCN1AE1	IV	AECC - I	Value Education	2	2	-	100	100
<b>Total</b>					<b>30</b>	<b>22</b>			<b>700</b>
<b>II</b>	24U2LT2/LA2/LF2 /LH2/LU2	I	Language - II		6	3	25	75	100
	24UCN2LE2	II	English - II	English for Communication - II	6	3	25	75	100
	24UAI2CC3	III	Core - III	Programming in Python	5	5	25	75	100
	24UAI2CC3P		Core - IV	Programming in Python Lab - Practical	4	3	20	80	100
	24UMA2AC3:4		Allied - III	Discrete Mathematics	4	4	25	75	100
	24UMA2AC4:4		Allied - IV	Statistics and Numerical Methods	3	3	25	75	100
	24UCN2SS	IV	Soft Skills Development	Soft Skills Development	2	2	-	100	100
	23UCN2CO	V	Community Outreach	JAMCROP	-	@	-	-	@
24U2BT1 / 24U2AT1		Basic Tamil - I / Advanced Tamil - I	எழுத்தும் இலக்கியமும் அறிமுகம் - I தமிழ் இலக்கியமும் வரலாறும் - I	-	-	-	100 <sup>#</sup>	-	
<b>Total</b>					<b>30</b>	<b>23</b>			<b>700</b>
<b>@ Only grades will be given</b>									
<b>III</b>	24U3LT3/LA3/LF3 /LH3/LU3	I	Language - III		6	3	25	75	100
	24UCN3LE3	II	English - III	English for Communication - III	6	3	25	75	100
	24UAI3CC5	III	Core - V	RDBMS and NoSQL	4	4	25	75	100
	24UAI3CC6P		Core - VI	RDBMS and NoSQL Lab - Practical	3	3	20	80	100
	24UPH3AC5		Allied - V	Electronic Circuits and Devices	4	4	25	75	100
	24UPH3AC6P		Allied - VI	Electronics – Practical	3	2	20	80	100
	24UAI3GE1	IV	Generic Elective - I		2	2	-	100	100
	24UCN3AE2		AECC - II	Environmental Studies	2	2	-	100	100
<b>Total</b>					<b>30</b>	<b>23</b>			<b>800</b>
<b>IV</b>	24U4LT4/LA4/LF4 /LH4/LU4	I	Language - IV		6	3	25	75	100
	24UCN4LE4	II	English - IV	English for Communication - IV	6	3	25	75	100
	24UAI4CC7	III	Core - VII	Artificial Intelligence	5	5	25	75	100
	24UAI4CC8P		Core - VIII	Artificial Intelligence Lab - Practical	3	3	20	80	100
	24UPH4AC7		Allied - VII	Digital Electronics and Microprocessor	5	4	25	75	100
	24UPH4AC8P		Allied - VIII	Digital and Microprocessor – Practical	3	2	20	80	100
	24UAI4GE2	IV	Generic Elective - II		2	2	-	100	100
	24UCN4EL		Experiential Learning	Internship	-	2	-	100	100
	24UCN4EA	V	Extension Activities	NCC, NSS, etc.	-	1	-	-	-
24U4BT2 / 24U4AT2		Basic Tamil - II / Advanced Tamil - II	எழுத்தும் இலக்கியமும் அறிமுகம் - II தமிழ் இலக்கியமும் வரலாறும் - II	-	-	-	100 <sup>#</sup>	-	
<b>Total</b>					<b>30</b>	<b>25</b>			<b>800</b>
<b>V</b>	24UAI5CC9T	III	Core - IX (a)	Robotics	4	4	10	40	50
	24UAI5CC9P		Core - IX (b)	Robotics Lab - Practical	2	2	10	40	50
	24UAI5CC10		Core - X	Open Source Software	5	5	25	75	100
	24UAI5CC11		Core - XI	Embedded Systems and IoT	5	5	25	75	100
	24UAI5CC12		Core - XII	Cloud Computing	5	5	25	75	100
	24UAI5DE1A/B		Discipline Specific Elective - I		5	4	25	75	100
	24UAI5SE1	IV	Skill Enhancement Course - I	Mobile Application Development	2	1	-	100	100
	24UAI5SE2P		Skill Enhancement Course - II	Mobile Application Development Lab - Practical	2	1	-	100	100
	24UAI5EC1		Extra Credit Course - I <sup>†</sup>	Online Course	-	*	-	-	-
<b>Total</b>					<b>30</b>	<b>27</b>			<b>700</b>
<b>VI</b>	24UAI6CC13	III	Core - XIII	Human Computer Interaction	5	5	25	75	100
	24UAI6CC14		Core - XIV	Machine Learning	5	5	25	75	100
	24UAI6CC15		Core - XV	Machine Learning Lab - Practical	4	4	20	80	100
	24UAI6PW		Project Work	Project Work	5	5	-	100	100
	24UAI6DE2A/B	IV	Discipline Specific Elective - II		5	4	25	75	100
	24UAI6DE3A/B		Discipline Specific Elective - III		5	4	25	75	100
	24UCN6AE3		AECC - III	Gender Studies	1	1	-	100	100
	24UAI6EC1		Extra Credit Course - II*	Online Course	-	*	-	-	-
24UAI6ECA		Extra Credit Course for all**	Online Course	-	**	-	-	-	
<b>Total</b>					<b>30</b>	<b>28</b>			<b>700</b>
<b>* Programme Specific Online Course for Advanced Learners</b>									
<b>** Any Online Course for Enhancing Additional Skills</b>									
<b>Grand Total</b>						<b>148</b>			<b>4400</b>

### GENERIC ELECTIVE COURSES

Semester	Course Code	Course Title
III	23UAI3GE1	Business Process Outsourcing
IV	23UAI4GE2	Web Design

#### # Self-Study Course – Basic and Advanced Tamil

(Applicable to the candidates admitted from the academic year 2023 -2024 onwards)

Semester	Course Code	Course Title
II	23U2BT1	Basic Tamil – I (எழுத்தும் இலக்கியமும் அறிமுகம் - I)
	23U2AT1	Advanced Tamil – I (தமிழ் இலக்கியமும் வரலாறும் - I)
IV	23U4BT2	Basic Tamil – II (எழுத்தும் இலக்கியமும் அறிமுகம் - II)
	23U4AT2	Advanced Tamil – II (தமிழ் இலக்கியமும் வரலாறும் - II)

#### Mandatory

Basic Tamil Course - I and II are offered for the students who have not studied Tamil Language in their schools and college.

Advanced Tamil Course - I and II are offered for those who have studied Tamil Language in their schools but have opted for other languages under Part - I.

### DISCIPLINE SPECIFIC ELECTIVES

Semester	Course Code	Course Title
V	24UAI5DE1A	Virtual Reality and Augmented Reality
	24UAI5DE1B	Fuzzy Logic and Neural Networks
VI	24UAI6DE2A	Deep Learning
	24UAI6DE2B	Natural Language Processing
	24UAI6DE3A	Big Data Analytics
	24UAI6DE3B	Data Mining & Warehousing

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	24UAI1CC1	Core – I	5	5	25	75	100
<b>Course Title</b>		Programming in C and Data Structures					

SYLLABUS		
Unit	Contents	Hours
I	Basic of C: History of C and its importance – Structure of a C program – Data Types – Constants and Variables – Operators and Expressions – Order of Precedence, Evaluating of Arithmetic Expressions – *Type Conversion*- Decision Statements: if, if-else, and nested if statements.	15
II	Loops Structures: For Loop, While, Do-while loop – Arrays: - One Dimensional Array, Two-dimensional Arrays, Character Arrays and Strings – Functions: Function with arrays- Function with decision and looping statements - *Recursion*.	15
III	Pointers: Introduction – Pointer Expressions – Chain of Pointers – Pointers and Arrays – Array of Pointers – Pointers as function arguments – Functions returning Pointers – Pointers to Functions – Function pointer – Structures - declaration, initialization, Array of Structures – Pointer to structures, Structures and functions – *Types of Enumerated data types*, Unions.	15
IV	Strings Processing, Standard string library functions – Files: introduction and files functions – Writing and reading in Text mode – Simple application: Display the contents of a file. Write data to a file. Append data to an existing file – File IO – *Reading and writing structures*.	15
V	Stack: LIFO concept, Stack operations, Array implementation of stack – Queue: FIFO concept, Queue operations, Array implementation of queue – Singly Linked List: concepts, operations – Doubly Linked List: concepts, operations – Trees: General trees, *Binary trees*.	15
VI	<b>Current Trends (For CIA only):</b> Developing C coding for simple real world application problems	

\*.....\* Self Study

<b>Text Book(s):</b>
<ol style="list-style-type: none"> <li>1. E. Balagurusamy, “Programming in ANSI C”, Tata McGraw Hill, New Delhi, Seventh Edition, 2016.</li> <li>2. E. Horowitz, S. Sahni and Susan Anderson Freed, “Fundamental Data Structures in C”, 2ed, Orient Black Swan Publisher, 2009.</li> </ol>
<b>Reference Book(s):</b>
<ol style="list-style-type: none"> <li>1. E. Karthikeyan, “A Textbook on C Fundamentals, Data Structures and Problem Solving”, Prentice-Hall of India Private Limited, New Delhi, 2008.</li> <li>2. Yashavant Kanetkar, “Let us C”, BPB Publications, Tenth Edition, New Delhi, 2010.</li> </ol>
<b>Web Resource(s):</b>
<ol style="list-style-type: none"> <li>1. <a href="https://www.tutorialspoint.com/cprogramming/index.htm">https://www.tutorialspoint.com/cprogramming/index.htm</a></li> <li>2. <a href="https://www.w3schools.in/data-structures/intro">https://www.w3schools.in/data-structures/intro</a></li> </ol>

<b>Course Outcomes</b>		
Upon successful completion of this course, the student will be able to:		
<b>CO No.</b>	<b>CO Statement</b>	<b>Cognitive Level (K-Level)</b>
CO1	Summarize the basic knowledge to develop C programs	K1
CO2	Manipulate Looping, arrays and functions	K2
CO3	Apply and write programs for solving real world problems	K3
CO4	Create open, read, manipulate, write and close files.	K4
CO5	Understand the basic concepts in data structures.	K5

**Relationship Matrix:**

<b>Course Outcomes (COs)</b>	<b>Programme Outcomes (POs)</b>					<b>Programme Specific Outcomes (PSOs)</b>					<b>Mean Score of COs</b>
	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>	
<b>CO1</b>	3	3	2	2	3	3	2	2	2	3	2.5
<b>CO2</b>	3	3	2	3	2	3	2	3	2	2	2.5
<b>CO3</b>	3	2	3	3	3	2	3	2	3	2	2.6
<b>CO4</b>	2	3	2	3	3	3	3	3	2	2	2.6
<b>CO5</b>	3	2	2	3	2	3	2	2	3	3	2.5
<b>Mean Overall Score</b>											<b>2.54</b>
<b>Correlation</b>											<b>High</b>

**Mean Overall Score = Sum of Mean Score of COs / Total Number of COs**

<b>Mean Overall Score</b>	<b>Correlation</b>
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

**Course Coordinator: Dr. M. Mohamed Surputheen**

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	24UA11CC2P	CORE – II	3	3	20	80	100
<b>Course Title</b>		Programming in C Lab – Practical					

1. Write a C program
  - a. To convert temperature from degree Centigrade to Fahrenheit.
  - b. To find whether the given number is Even or Odd.
  - c. To find the greatest of three numbers.
2. Write a C program to use the switch statement to display Monday to Sunday.
3. Write a C program to display first Ten Natural Numbers and their sum.
4. Write a C program to find Multiplication of Two Matrices.
5. Write a C program
  - a. To find the maximum number in Array using pointer.
  - b. To reverse a number using pointer.
  - c. To add two numbers using pointer.
6. Write a C program to solve Quadratic Equation using functions.
7. Write a C program to find factorial of a number using Recursion.
8. Write a C program to show Call by Value and Call by Reference.
9. Write a C program to create a file containing Student Details.
10. Write a C program to implement a stack using singly linked list, Implement Queue using Linked List.

<b>Course Outcomes</b>		
Upon successful completion of this course, the student will be able to:		
<b>CO No.</b>	<b>CO Statement</b>	<b>Cognitive Level (K-Level)</b>
CO1	To relate the ways to solve simple programs	K2
CO2	To understand and trace the execution of programs using arrays	K3
CO3	To develop programs with functions and pointers	K4
CO4	To solve data handling problems using files	K4
CO5	To implement stack and queue operations.	K5

**Relationship Matrix:**

<b>Course Outcomes (COs)</b>	<b>Programme Outcomes (POs)</b>					<b>Programme Specific Outcomes (PSOs)</b>					<b>Mean Score of COs</b>
	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>	
<b>CO1</b>	3	3	2	3	2	3	2	2	2	2	2.4
<b>CO2</b>	3	3	3	2	2	3	3	3	2	2	2.6
<b>CO3</b>	3	2	3	2	3	2	3	3	3	0	2.4
<b>CO4</b>	2	3	2	2	3	3	3	2	2	2	2.4
<b>CO5</b>	3	3	3	3	3	3	2	3	3	3	2.9
<b>Mean Overall Score</b>											<b>2.54</b>
<b>Correlation</b>											<b>High</b>

**Mean Overall Score = Sum of Mean Score of COs / Total Number of COs**

<b>Mean Overall Score</b>	<b>Correlation</b>
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

**Course Coordinator: Dr. S. Mohamed Iliyas**

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	24UMA1AC1:4	Allied - I	4	3	25	75	100
<b>Course Title</b>		CALCULUS					

SYLLABUS		
Unit	Contents	Hours
I	*Functions and their Graphs*-An Intuitive Introduction to Limits-Techniques for Finding Limits-A Precise Definition of a Limit-Continuous Functions-Tangent Lines and Rates of Change	12
II	The Derivative-Basic Rules of Differentiation-The Product and Quotient Rules-*The Role of the Derivative in the Real World*-Derivatives of Trigonometric Functions-The Chain Rule-Implicit Differentiation-Related Rates-Differentials and Linear Approximations	12
III	Indefinite Integrals-Integration by Substitution-Area-The Definite Integral-The Fundamental Theorem of Calculus- Areas Between Curves-Volumes: Disks, Washers, and Cross Sections-Volumes Using Cylindrical Shells-Arc Length and Areas of Surfaces of Revolution	12
IV	Functions of Two or More Variables-Limits and Continuity-Partial Derivatives-Differentials-The Chain Rule- Tangent Planes and Normal Lines-Extrema of Functions of Two Variables-Lagrange Multipliers	12
V	Double Integrals-Iterated Integrals-Double Integrals in Polar Coordinates-Applications of Double Integrals-Surface Area-Triple Integrals	12
VI	<b>Current Trends</b> *Extrema of Functions-The Mean Value Theorem-Increasing and Decreasing Functions and the First Derivative Test*	

\*.....\* Self Study

<b>Text Book(s):</b>
Soo T. Tan, Calculus, Brooks/Cole, Cengage Learning, USA, 2010 Chapter I : 0.2, 1.1-1.5 Chapter II: 2.1-2.9 Chapter III: 4.1-4.5, 5.1-5.4 Chapter IV: 13.1-13.5, 13.7-13.9 Chapter V: 14.1-14.6 Chapter VI: 3.1-3.3
<b>Reference Book(s):</b>
1. Thomas and Finney, Calculus and Analytic Geometry, Narosa Publishing House, New Delhi, 1998 2. Thomas. G. B., Hass. J, and Weir. MD., Thomas Calculus, 14 <sup>th</sup> Edition, Pearson India, 2018
<b>Web Resource(s):</b>
1. <a href="https://onlinecourses.nptel.ac.in/noc24_ma12/preview">https://onlinecourses.nptel.ac.in/noc24_ma12/preview</a> 2. <a href="https://onlinecourses.nptel.ac.in/noc24_ma33/preview">https://onlinecourses.nptel.ac.in/noc24_ma33/preview</a>



<b>Course Outcomes</b>		
Upon successful completion of this course, the student will be able to:		
<b>CO No.</b>	<b>CO Statement</b>	<b>Cognitive Level (K-Level)</b>
CO1	Recall the basic concept of functions and their graphs	K1
CO2	Calculate the limits and derivatives of a function	K2
CO3	Determine the areas between curves and surface area	K3
CO4	Explain the different methods of integration in solving practical problems	K4
CO5	Evaluate the areas, volumes and other practical problems using multiple integral ideas	K5

**Relationship Matrix:**

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	1	3	3	3	3	3	3	3	3	2.8
CO2	3	1	3	3	3	3	3	3	3	3	2.8
CO3	3	1	3	3	3	3	3	3	3	3	2.8
CO4	3	1	3	3	3	3	3	3	3	3	2.8
CO5	3	1	3	3	3	3	3	3	3	3	2.8
<b>Mean Overall Score</b>											<b>2.8</b>
<b>Correlation</b>											<b>High</b>

**Mean Overall Score = Sum of Mean Score of COs / Total Number of COs**

<b>Mean Overall Score</b>	<b>Correlation</b>
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinator: Dr. M.A. Rifayathali

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	24UMA1AC2:4	Allied - II	4	3	25	75	100
<b>Course Title</b>		Linear Algebra					

SYLLABUS		
Unit	Contents	Hours
I	Systems of Linear Equations-Row Reduction and Echelon Forms- * Solution Sets of Linear Systems*- Applications of Linear Systems-Introduction to Linear Transformations- *Matrix Operations-The Inverse of a Matrix*	12
II	Partitioned Matrices- Matrix Factorizations-Applications to Computer Graphics- Cramer's Rule-Volume, and Linear Transformations-Vector Spaces and Subspaces- Null Spaces, Column Spaces, and Linear Transformations	12
III	Linearly Independent Sets; Bases - Coordinate Systems- The Dimension of a Vector Space- Rank-Change of Basis- Eigenvectors and Eigenvalues - The Characteristic Equation.	12
IV	Diagonalization- Eigenvectors and Linear Transformations-Inner Product, Length, and Orthogonality-Orthogonal Sets-Orthogonal Projections-The Gram-Schmidt Process	12
V	Inner Product Spaces- Applications of Inner Product Spaces- Diagonalization of Symmetric Matrices- Quadratic Forms -The Singular Value Decomposition- Applications to Image Processing and Statistics.	12
VI	<b>Current Trends (For CIA only):</b> An introduction to the applications of linear and non-linear model in real life.	

\*.....\* Self Study

<b>Text Book:</b>
David C. Lay, Steven R. Lay, Judi J. McDonald, Linear Algebra and its Applications, Fifth Edition, Pearson Education, U.S.A, 2016.
UNIT I Chapter 1: Sections 1.1, 1.2, 1.5, 1.6, 1.8. Chapter 2: Sections 2.1, 2.2.
UNIT II Chapter 2: Sections 2.4, 2.5,2.7. Chapter 3: Section 3.3. Chapter 4: Sections 4.1, 4.2.
UNIT III Chapter 4: Sections 4.3-4.7. Chapter 5: Sections 5.1, 5.2.
UNIT IV Chapter 5: Sections 5.3, 5.4 Chapter 6: Sections 6.1-6.4.
UNIT V Chapter 6: Sections 6.7, 6.8. Chapter 7: Sections 7.1, 7.2,7.4,7.5.
<b>Reference Book:</b>
Charu C. Aggarwal, Linear Algebra and Optimization for Machine Learning, Springer Nature Switzerland, 2020.
<b>Web Resources:</b>
1. <a href="https://youtu.be/nG_zOJCvmzw?si=v_Li8DLmovXzEF13">https://youtu.be/nG_zOJCvmzw?si=v_Li8DLmovXzEF13</a>
2. <a href="https://youtu.be/kZwSqZuBMGg?si=lhe9ZYhy6_06_x0z">https://youtu.be/kZwSqZuBMGg?si=lhe9ZYhy6_06_x0z</a>
3. <a href="https://youtu.be/JO9jNe6BemE?si=3ZhcSZcnhStmsqtK">https://youtu.be/JO9jNe6BemE?si=3ZhcSZcnhStmsqtK</a>

<b>Course Outcomes</b>		
Upon successful completion of this course, the student will be able to:		
<b>CO No.</b>	<b>CO Statement</b>	<b>Cognitive Level (K-Level)</b>
CO1	Remember the concept of matrices and operations on it.	K1
CO2	Understand the fundamental concepts of linear algebra relevant to AI and Machine Learning (ML)	K2
CO3	Apply linear algebra techniques to solve problems in AI and ML, such as solving linear systems and performing dimensionality reduction.	K3
CO4	Analyse data as vectors and matrices and find its singular value decomposition.	K4
CO5	Evaluate the matrix of a linear transformation and computing its eigenvalues and eigenvectors.	K5

**Relationship Matrix:**

<b>Course Outcomes (COs)</b>	<b>Programme Outcomes (POs)</b>					<b>Programme Specific Outcomes (PSOs)</b>					<b>Mean Score of COs</b>
	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>	
<b>CO1</b>	3	3	2	2	3	3	3	3	3	2	<b>2.7</b>
<b>CO2</b>	3	2	2	3	3	3	3	3	3	2	<b>2.7</b>
<b>CO3</b>	3	2	2	2	2	3	3	3	3	3	<b>2.6</b>
<b>CO4</b>	3	2	2	3	2	3	3	3	2	2	<b>2.5</b>
<b>CO5</b>	3	3	3	2	2	3	3	3	2	2	<b>2.6</b>
<b>Mean Overall Score</b>											<b>2.62</b>
<b>Correlation</b>											<b>High</b>

**Course Coordinator:** Dr. N. Mohamed Thoiyab

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	24UCN1AE1	Ability Enhancement Compulsory Course-I	2	2	-	100	100
<b>Course Title</b>		<b>Value Education</b>					

SYLLABUS		
Unit	Contents	Hours
I	<b>VALUES IN LIFE:</b> Purpose and philosophy of life – Need for values –five fold moral culture. Values: truth, loyalty, integrity, humility, trustworthy, considerate, not being greedy, clean habits, <b>punctuality, kindness, gratitude, patience, respect</b> and character building.	6
II	<b>PERSONAL WELLBEING:</b> Social responsibility - taming a healthy mind and body – personal hygiene - Balanced diet – meditation – yoga - positive thinking – introspection - a passion for Nature- Win-win strategy.	6
III	<b>ROLE OF MEN IN FAMILY:</b> As a responsible student – committed employee - loyal husband - dedicated father – fatherhood- sacrificing human – considerate true friend.	6
IV	<b>MAN A SOCIAL BEING:</b> A friendly neighbour - living a life with definite motives – emotions and moral desire- uncompromising will power- puberty-secondary sexual characters- marriage: Purpose – marital life- Harmony with spouse- fidelity towards spouse.	6
V	<b>PROFESSIONAL VALUES:</b> More of a giver than a taker - being compassionate – patriotism - respecting culture - dependence on God – avoiding worry-professional ethics.	6

**Hours of Teaching: 5 Hours and Hours of Activity: 25 Hours**

<b>Textbook(s):</b>
1. Value Education for health, Happiness and harmony, the world community service centre, Vethathri Publications
2. N. Venkataiah, Value Education, APH Publishing Corporation, New Delhi, 1998
3. K.R. Lakshminarayanan and M. Umamageshwari, Value Education, Nalnilam Publication, Chennai.
<b>Web References:</b>
1. <a href="https://www.slideshare.net/humandakakayilongranger/values-education-35866000">https://www.slideshare.net/humandakakayilongranger/values-education-35866000</a>
2. <a href="https://www.ananda.org/blog/5-secrets-to-a-harmonious-marriage/">https://www.ananda.org/blog/5-secrets-to-a-harmonious-marriage/</a>
3. <a href="https://www.un.org/esa/socdev/family/docs/men-in-families.">https://www.un.org/esa/socdev/family/docs/men-in-families.</a>

**Activity:**

- Assignment on Values ( not less than 20 Pages)
- Multiple Choice Questions and Quiz
- Elocution - (Manners and good Habits for 3 to 5 minutes)
- Field Visit
- Debating - Current issues
- Essay writing : Proper use of e-gadgets, Ethics, Cyber ethics, Social media, etc.,
- Case Study / Album Making / Poster Presentation / Documentary- Celebrating National Days, Drug abuse & illicit trafficking, Independence Day, Secularism, Teachers Day, National Youth Awakening Day, Father's Day / Mother's Day and etc.,

**EVALUATION COMPONENT: TOTAL: 100 MARKS****Component I :**

Documentary (or) Poster Presentation (or) Elocution - 25 marks

**Component II:**

Quiz (or) Multiple choice questions Test - 25 marks

**Component III:**

Album Making (or) Case Study on a topic (or) Field visit - 25 marks

**Component IV:**

Assignment (or) Essay Writing (or) Debating - 25 marks

**Course Coordinator: Dr. M. Purushothaman**

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	24UAI2CC3	Core – III	5	5	25	75	100
<b>Course Title</b>		Programming in Python					

SYLLABUS		
Unit	Contents	Hours
I	Introduction to Python: Features of Python - How to Run Python - Identifiers - Reserved Keywords - Variables - Comments in Python - Indentation in Python - Multi-Line Statements - Multiple Statement Group (Suite) - Quotes in Python - Input, Output and Import Functions - Operators. Data Types and Operations: Numbers – Strings – List – Tuple – Set – Dictionary – *Data type conversion*.	15
II	Flow Control: Decision Making – Loops – Nested Loops – Types of Loops. Functions: Function Definition – Function Calling - Function Arguments - Recursive Functions - *Function with more than one return value*.	15
III	Modules and Packages: Built-in Modules - Creating Modules – import Statement - Locating Modules - Namespaces and Scope - The dir() function - The reload() function - Packages in Python - Date and Time Modules. File Handling- *Directories in Python*.	15
IV	Object-Oriented Programming: Class Definition - Creating Objects - Built-in Attribute Methods - Built-in Class Attributes- Destructors in Python – Encapsulation - Data Hiding – Inheritance – *Method Overriding*- Polymorphism.	15
V	Exception Handling: Built-in Exceptions-Handling Exceptions-Exception with Arguments - Raising Exception - User-defined Exception - Assertions in Python. Regular Expressions: The match() function - The search() function - Search and Replace – Regular Expression Modifiers: Option Flags-Regular Expression Patterns- Character Classes-Special Character Classes - *Repetition Cases* - findall() method - compile() method.	15
VI	<b>Current Trends (For CIA only):</b> An Introduction to Interactive Programming in Python - Study on Jumla – an high level language approach.	

\*.....\* Self Study

<b>Text Book(s):</b>
Jeeva Jose and P. Sojan Lal, “Introduction to Computing and Problem Solving with PYTHON”, Khanna Book Publishing Co, 2016
<b>Reference Book(s):</b>
1. Mark Summerfield. — Programming in Python 3: A Complete introduction to the Python Language, Addison-Wesley Professional, 2009.
2. Jake Vander Plas, “Python Data Science Handbook: Essential Tools for Working with Data”, O'Reilly Media, 2016.
<b>Web Resource(s):</b>
1. <a href="https://www.python.org">https://www.python.org</a>
2. <a href="https://www.programiz.com/python-programming">https://www.programiz.com/python-programming</a>
3. <a href="https://www.w3schools.com/python/python_intro.asp">https://www.w3schools.com/python/python_intro.asp</a>

<b>Course Outcomes</b>		
Upon successful completion of this course, the student will be able to:		
<b>CO No.</b>	<b>CO Statement</b>	<b>Cognitive Level (K-Level)</b>
CO1	Recall and understand the features of python programming language	K1
CO2	Illustrate various programming mechanism used in python	K2
CO3	Apply various language construct to write simple programs in python	K3
CO4	Examine the application of object oriented concept in python	K4
CO5	Distinguish the various constructs used in python.	K5

**Relationship Matrix:**

<b>Course Outcomes (COs)</b>	<b>Programme Outcomes (POs)</b>					<b>Programme Specific Outcomes (PSOs)</b>					<b>Mean Score of COs</b>
	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>	
<b>CO1</b>	3	3	2	2	3	3	1	1	1	1	2.0
<b>CO2</b>	3	3	2	3	2	3	2	3	2	2	2.5
<b>CO3</b>	3	2	3	2	2	2	1	1	3	1	2.0
<b>CO4</b>	2	3	2	3	3	3	3	3	2	2	2.6
<b>CO5</b>	3	2	2	1	2	3	1	2	2	2	2.0
<b>Mean Overall Score</b>											<b>2.22</b>
<b>Correlation</b>											<b>Medium</b>

**Mean Overall Score = Sum of Mean Score of COs / Total Number of COs**

<b>Mean Overall Score</b>	<b>Correlation</b>
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

**Course Coordinator: Dr. M. Mohamed Surputheen**

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	24UAI2CC4P	CORE – IV	4	3	20	80	100
<b>Course Title</b>		Programming in Python Lab – Practical					

1. Write a python program that displays the following information:  
Your name, Full address Mobile number, College name, Course subjects.
2. Write a python program to find the largest three integers using if-else and conditional operator.
3. Write a python program that asks the user to enter a series of positive numbers (The user should enter a negative number to signal the end of the series) and the program should display the numbers in order and their sum.
4. Write a python program to find the product of two matrices [A]mxp and [B]pxr
5. Write recursive functions for GCD of two integers.
6. Write recursive functions for the factorial of positive integer.
7. Write recursive functions for Fibonacci Sequence up to given number n.
8. Write recursive functions to display prime number from 2 to n
9. Write a python program that writes a series of random numbers to a file from 1 to n and display.
10. Write a python program to sort a given sequence: String, List and Tuple.
11. Write a python program to make a simple calculator.
12. Write a python program for Linear Search and Binary Search.



<b>Course Outcomes</b>		
Upon successful completion of this course, the student will be able to:		
<b>CO No.</b>	<b>CO Statement</b>	<b>Cognitive Level (K-Level)</b>
CO1	Recall and relate the features of python programming language	K2
CO2	Compare various programming mechanism used in python	K3
CO3	Construct simple programs in python using various language features	K4
CO4	Distinguish the various constructs used in python	K4
CO5	Apprise the application of object oriented concept in python	K5

**Relationship Matrix:**

<b>Course Outcomes (COs)</b>	<b>Programme Outcomes (POs)</b>					<b>Programme Specific Outcomes (PSOs)</b>					<b>Mean Score of COs</b>
	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>	
<b>CO1</b>	3	3	2	2	3	3	1	1	1	1	2.0
<b>CO2</b>	3	3	2	3	2	1	1	2	2	2	2.0
<b>CO3</b>	3	2	3	2	2	2	1	1	3	1	2.0
<b>CO4</b>	2	3	2	3	3	3	3	3	2	2	2.6
<b>CO5</b>	3	2	2	1	2	3	1	2	2	2	2.0
<b>Mean Overall Score</b>											<b>2.12</b>
<b>Correlation</b>											<b>Medium</b>

**Mean Overall Score = Sum of Mean Score of COs / Total Number of COs**

<b>Mean Overall Score</b>	<b>Correlation</b>
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

**Course Coordinator: Dr. M. A. Jamal Mohamed Yaseen Zubeir**

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	24UMA2AC3:4	Allied - III	4	4	25	75	100
<b>Course Title</b>		DISCRETE MATHEMATICS					

SYLLABUS		
Unit	Contents	Hours
I	Mathematical Logic: Statements and notation – connectives – Negation – Conjunction – Disjunction – Statement formulas and truth tables – Conditional and Biconditional – well-formed formulas - Tautologies – Rules of inference.	12
II	Set theory: Basic concept of set theory – Notation – Inclusion and equality of sets – the power set – Some operations on sets – Venn diagrams – Cartesian products.	12
III	Algebraic Structures : Algebraic systems: Examples and general properties – Definition and examples – Some simple Algebraic systems and general properties – Semigroups and Monoids – Groups – definition and examples – subgroups and Homomorphism – Cosets and Lagrange’s theorem – Normal subgroups.	12
IV	Lattices and Boolean Algebra: Lattices as partially ordered sets – Some properties of Lattices – Lattices as algebraic systems – Sub lattices – Direct product and Homomorphism – Some special Lattices – Boolean algebra – Sub algebra – Boolean Homomorphism.	12
V	Graph Theory : Basic concept of Graph theory – Basic definitions – Paths – Reachability and Connectedness – Matrix representation of Graphs – Trees.	12
VI	<b>Current Trends (For CIA only):</b> Developing C coding for simple real world application problems	

<b>Text Book:</b>
Tremblay J.P and Manohar. R, “Discrete Mathematical Structures with Applications to Computer Science”, Tata Magraw Hill pub. Co. Ltd, 1997
<b>Reference Book(s):</b>
1. Liu C.L and Mohapatra “Elements of Discrete Mathematics” Tata Magraw Hill pub. Co. Ltd, reprint 2015
2. Grimaldi. R.P. “Discrete and Combinatorial Mathematics: An applied introduction”, 5 <sup>th</sup> Edition, Pearson Eductaion Asia, Delhi 2013.
<b>Web Resource(s):</b>
1. <a href="https://www.youtube.com/@4GSilverAcademy">https://www.youtube.com/@4GSilverAcademy</a>
2. <a href="https://www.youtube.com/@mathematicskala">https://www.youtube.com/@mathematicskala</a>
3. <a href="https://www.youtube.com/@mathematicskala">https://www.youtube.com/@mathematicskala</a>

<b>Course Outcomes</b>		
Upon successful completion of this course, the student will be able to:		
<b>CO No.</b>	<b>CO Statement</b>	<b>Cognitive Level (K-Level)</b>
CO1	Remembering the concepts needed to test the logic of a program	K1
CO2	Have an understanding the concept of set theory	K2
CO3	Be aware of counting principles.	K3
CO4	Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.	K4
CO5	Be aware of a class of functions which transform a finite set into another set which relates to input and output functions in computer science	K5

**Relationship Matrix:**

<b>Course Outcomes (COs)</b>	<b>Programme Outcomes (POs)</b>					<b>Programme Specific Outcomes (PSOs)</b>					<b>Mean Score of COs</b>
	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>	
<b>CO1</b>	3	3	2	2	2	2	2	2	2	1	2.1
<b>CO2</b>	3	3	1	1	2	2	3	2	1	1	1.9
<b>CO3</b>	1	3	2	1	1	2	2	2	2	1	1.7
<b>CO4</b>	2	2	2	2	1	3	2	2	2	1	1.9
<b>CO5</b>	3	2	2	2	1	2	3	3	2	1	2.1
<b>Mean Overall Score</b>											<b>1.94</b>
<b>Correlation</b>											<b>Medium</b>

**Mean Overall Score = Sum of Mean Score of COs / Total Number of COs**

<b>Mean Overall Score</b>	<b>Correlation</b>
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

**Course Coordinator:** Dr. U. Abuthahir

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	24UMA2AC4:4	Allied - IV	3	3	25	75	100
<b>Course Title</b>		<b>Statistics and Numerical Methods</b>					

SYLLABUS		
Unit	Contents	Hours
I	Testing of Hypothesis: Basic Definitions – Test of Hypothesis (Large Sample Tests) – Test of significance of single mean - Test of significance of difference of two means – Test of significance of single proportion.	9
II	Test of Hypothesis (Small Sample Tests) – Test of significance of single mean - Test of significance of difference of two means – Chi-Square Test.	9
III	Design of Experiments: one way and two way classification – completely Randomized Design (CRD) – Randomized Block Design (RBD).	9
IV	Solution of algebraic and transcendental equation: Bisection Method – Method of false position – Iteration Method - Newton-Raphson Method.	9
V	Interpolation: finite differences – forward differences – backward differences – central differences. (Problems only)	9
VI	<b>Current Trends (For CIA only):</b> Formulate the system of linear equation of simple real world application problems.	

\*.....\* Self Study

<b>Text Book(s):</b>
1. N. Subramaniam, Probability and Statistics, first edition, SCM Publisher, Erode (2005) Unit – I: Chapter 4: Section 4.1 – 4.2 (Page No.: 291 – 324). Unit – II: Chapter 4: Section 4.3 (Page No.: 344 – 369), 4.5 (Page No.: 384 – 395). Unit – III: Chapter 5: Section 5.1 – 5.2 (Page No.: 408 – 444) 2. S. S. Sastry, Introductory Methods of Numerical Analysis, fourth edition, prentice Hall of india, New Delhi (2006) Unit – IV: Chapter 2: Section 2.2 – 2.5 (Page No.: 21 – 38) Unit – V: Chapter 3: Section 3.3.1 - 3.3.3 (Page No.: 65 – 78)
<b>Reference Book(s):</b>
1. Grewal, B.S., and Grewal, J.S., “Numerical Methods in Engineering and Science”, Khanna Publishers, 10 <sup>th</sup> Edition, New Delhi, 2015. 2. Johnson, R.A., Miller, I and Freund J., “Miller and Freund’s Probability and Statistics for Engineers”, Pearson Education, Asia, 8 <sup>th</sup> Edition, 2015.
<b>Web Resource(s):</b>
Testing of Hypothesis: <a href="https://www.youtube.com/watch?v=zJ8e_wAWUzE&amp;pp=ygUac3RhdGlzdGljcyB0ZXN0IGh5cG90aGVzaXM%3D">https://www.youtube.com/watch?v=zJ8e_wAWUzE&amp;pp=ygUac3RhdGlzdGljcyB0ZXN0IGh5cG90aGVzaXM%3D</a> Design of Experiments: <a href="https://www.youtube.com/watch?v=k3lUo0XYG3E&amp;pp=ygUgc3RhdGlzdGljcyBkZXNpZ24gb2YgZXhwZXJpbWVudHM%3D">https://www.youtube.com/watch?v=k3lUo0XYG3E&amp;pp=ygUgc3RhdGlzdGljcyBkZXNpZ24gb2YgZXhwZXJpbWVudHM%3D</a> Numerical Methods: <a href="https://www.youtube.com/watch?v=jw4_1XLwBCQ&amp;list=PLFw9SEeylu1Ve4Cym98bc_i4fuyQoTruJ">https://www.youtube.com/watch?v=jw4_1XLwBCQ&amp;list=PLFw9SEeylu1Ve4Cym98bc_i4fuyQoTruJ</a>

<b>Course Outcomes</b>		
Upon successful completion of this course, the student will be able to:		
<b>CO No.</b>	<b>CO Statement</b>	<b>Cognitive Level (K-Level)</b>
CO1	Apply the concept of testing of hypothesis for small and large samples in real life problems	K1
CO2	Understand the logic and framework of the inference of hypothesis testing	K2
CO3	Apply the basic concepts of classification of design of experiments in the field of agriculture	K3
CO4	Solve the algebraic and transcendental equations with iteration methods	K4
CO5	Appreciate the numerical techniques in various intervals.	K5

**Relationship Matrix:**

<b>Course Outcomes (COs)</b>	<b>Programme Outcomes (POs)</b>					<b>Programme Specific Outcomes (PSOs)</b>					<b>Mean Score of COs</b>
	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>	
<b>CO1</b>	2	2	3	3	3	2	3	3	3	3	2.7
<b>CO2</b>	2	2	2	3	2	3	2	3	2	3	2.4
<b>CO3</b>	2	2	3	3	3	2	3	3	3	3	2.7
<b>CO4</b>	2	2	2	3	2	2	3	3	2	3	2.4
<b>CO5</b>	2	2	2	3	2	2	3	2	3	3	2.4
<b>Mean Overall Score</b>											<b>2.52</b>
<b>Correlation</b>											<b>High</b>

**Mean Overall Score = Sum of Mean Score of COs / Total Number of COs**

<b>Mean Overall Score</b>	<b>Correlation</b>
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

**Course Coordinator:** Dr. M. Mohamed Althaf

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	24UCN2SS	Soft Skills Development	2	2	-	100	100
<b>Course Title</b>		<b>Soft Skills Development</b>					

SYLLABUS		
Unit	Contents	Hours
I	<b>Communication Skills:</b> Verbal and Non - Verbal communication - The active vocabulary - Conversational Etiquette - KOPPACT syndrome	6
II	<b>Emotional Skills:</b> Emotional Intelligence - The five steps to Emotional Quotient - Self Awareness and Regulation - Empathy - Social Intelligence - stress management - coping with failures	6
III	<b>Functional Skills:</b> Using the tools of communicatory and emotional skills - Resume writing - Preparation of Curriculum Vitae - interview skills - Acing the interview - Group dynamics - Mock interviews and Group discussions	6
IV	<b>Interpersonal Skills:</b> Synergising relationships - SWOT analysis - SOAR analysis - The social skills - Time Management - Decision making - problem solving - prioritising and Implementation	6
V	<b>Personality Skills:</b> Leadership skills - Attributes and Attitudes - Social leader Vs The Boss - critical and creative thinking	6

**Hours of Teaching : 5 hours and Hours of Activity: 25 hours**

<b>Textbook(s):</b>
<ol style="list-style-type: none"> <li>1. Social intelligence: The new science of human relationships - Daniel Goleman; 2006.</li> <li>2. Body Language in the workplace - Allan and Barbara Pease; 2011.</li> <li>3. Student's Hand Book: Skill Genie - Higher education department, Government of Andhra Pradesh.</li> </ol>
<b>Web References:</b>
<ol style="list-style-type: none"> <li>1. <a href="https://nptel.ac.in/courses/109105110">https://nptel.ac.in/courses/109105110</a></li> </ol>

### EVALUATION CRITERIA

<b>Work Book (Each unit carries 10 marks)</b>	-	<b>50 Marks</b>
<b>Examination</b>	-	<b>50 Marks</b>

1. Teacher who handles the subject will award 50 marks for work book based on the performance of the student.
2. On the day of examination the examiners (Internal & External) will jointly award the marks for the following categories:

- Self-Introduction - 20 Marks
- Resume - 10 Marks
- Mock Interview - 20 Marks

To assess the self-introduction, Examiners are advised to watch the video presentation submitted by the students. If they failed to submit the video presentation, the Examiners may direct the student to introduce himself orally and a maximum 10 marks only will be awarded.

#### **Mock Interview Marks Distribution**

**(20-Marks)**

Attitude (self interest, confidence etc.) (4 Marks)	Physical appearance including dress code (4 Marks)	Communication Skills (6 Marks)	Answering questions asked from the resume and work book (6 Marks)
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**Course Coordinator: Dr. M. Syed Ali Padusha**