# **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**

a	<i>a a</i> 1			Ins.	a 11	Marks			
Sem	Course Code	Part	Course Category	Course Title		Credit	CIA	ESE	Total
	23U1LT1/LA1/LF1 /LH1/LU1	Ι	Language - I		6	3	25	75	100
	23UCN1LE1	II	English - I	English for Communication - I	6	3	25	75	100
т	24UAI1CC1		Core - I	5	5	25	75	100	
1	24UAI1CC2P	ш	Core - II	Core - II Programming in C Lab - Practical				80	100
	24UMA1AC1:4	JMA1AC1:4 Allied - I Calculus					25	75	100
	24UMA1AC2:4		Allied - II	Linear Algebra	4	3	25	75	100
	23UCN1AE1	IV	AECC - I	Value Education	2	2	-	100	100
			1	Total	30	22			700
	23U2L12/LA2/LF2 /LH2/LU2	Ι	Language - II		6	3	25	75	100
	23UCN2LE2	II	English - II	English for Communication - II	6	3	25	75	100
	24UAI2CC3		Core - III	Programming in Python	5	5	25	75	100
	24UAI2CC4P	ш	Core - IV	Programming in Python Lab - Practical	4	3	20	80	100
п	24UMA2AC3:4	- 111	Allied - III	Discrete Mathematics	4	4	25	75	100
	24UMA2AC4:4		Allied - IV	Statistics and Numerical Methods	3	3	25	75	100
	23UCN2SS	IV	Soft Skills Development	Soft Skills Development	2	2	-	100	100
	23UCN2CO	V	Community Outreach	JAMCROP	-	@	-	-	@
	23U2BT1 /		Basic Tamil - 1/	எழுத்தும் இலக்கியமும் அறிமுகம் - I	-	-	-	100 #	-
	@ Only grades will be	agiyon	Advanced Tanni - I	தமழ இலக்கியமும் வரலாறும் - 1 Total	30	23			700
		e given		10121	30	23			700
	/LH3/LU3	I	Language - III		6	3	25	75	100
	23UCN3LE3	II	English - III	English for Communication - III	6	3	25	75	100
	24UAI3CC5		Core - V	RDBMS and NoSQL	4	4	25	75	100
III	24UAI3CC6P	ш	Core - VI	RDBMS and NoSQL Lab - Practical	3	3	20	80	100
	24UPH3AC5	- 111	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
	23UCN3AE2		AECC - II	Environmental Studies	2	2	-	100	100
				1 otal	30	23			800
	23U4L14/LA4/LF4 /LH4/LU4	Ι	Language - IV		6	3	25	75	100
	23UCN4LE4	II	English - IV	English for Communication - IV	6	3	25	75	100
	24UAI4CC7		Core - VII	Artificial Intelligence	5	5	25	75	100
	24UAI4CC8P	ш	Core - VIII	Artificial Intelligence Lab - Practical	3	3	20	80	100
IV	24UPH4AC7	PH4AC7 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	V	Experiential Learning	Internship	-	2	-	100	100
	23UUN4EA 23U//BT2 /	v	Basic Tamil - II /		-	1	-	-	-
	23U4AT2		Advanced Tamil - II	தமிழ் இலக்கியமும் வரலாறும் - II	-	-	-	100 #	-
				Total	30	25			800
	24UAI5CC9T		Core - IX (a)	Robotics	4	4	10	40	50
	24UAI5CC9P		Core - IX (b)	Robotics Lab - Practical	2	2	10	40	50
	24UAI5CC10	ш	Core - X	Open Source Software	5	5	25	75	100
	24UAI5CC11	ш	Core - XI	Embedded Systems and IoT	5	5	25	75	100
v	24UAI5CC12		Core - XII	Cloud Computing	5	5	25	75	100
	24UAI5DE1A/B		Discipline Specific Elective - I		5	4	25	75	100
	24UAI5SE1		Skill Enhancement Course - I	Mobile Application Development	2	1	-	100	100
	24UAI5SE2P	IV	Skill Enhancement Course - II	Mobile Application Development Lab - Practical	2	1	-	100	100
	24UAI5EC1		Extra Credit Course - I*	Online Course	-	*	-	-	-
	0.000.0000			Total	30	27			700
	24UAI6CC13		Core - XIII	Human Computer Interaction	5	5	25	75	100
	24UAI6CC14		Core - XIV	Machine Learning	5	5	25	75	100
	24UAI6CC15	III	Core - XV	Machine Learning Lab - Practical	4	4	20	80	100
	24UAI6PW		Project Work	Project Work	5	5	-	100	100
VI			Discipline Specific Elective - II	1	5	4	25	75	100
	24UAIODESA/B 23UCN64F3	IV	AFCC - III	Gender Studies	5 1	4	- 23	100	100
	24UAI6EC1	1 V	Extra Credit Course - II*	Online Course	-	*	-	-	
	24UAIECA		Extra Credit Course for all**	Online Course	-	**	-	-	-
	23UCN6ECA1		Extra Credit Course for all <sup>+</sup>	Entrepreneurship Development	-	+	-	-	-
	* Programme Specif	ic Onlin	e Course for Advanced Learners					•	
	** Any Online Cours	se for Er	hancing Additional Skills	Total	30	28			700
	Course for Enhance	ing Enti	repreneurial Skills	~		140			
1				Gra	uu 1 otal	14ð			4400

#### GENERIC ELECTIVE COURSES

Semester	Course Code	Course Title
III	24UAI3GE1	Business Process Outsourcing
IV	24UAI4GE2	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		
п	23U2BT1	Basic Tamil – I (எழுத்தும் இலக்கியமும் அறிமுகம் - I)		
11	23U2AT1	Advanced Tamil – I (தமிழ் இலக்கியமும் வரலாறும் - I)		
IV.	23U4BT2	Basic Tamil – II (எழுத்தும் இலக்கியமும் அறிமுகம் - II)		
1 V	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.

Semester	Course Code	Course Title
V	24UAI5DE1A	Virtual Reality and Augmented Reality
v	24UAI5DE1B	Fuzzy Logic and Neural Networks
	24UAI6DE2A	Deep Learning
VI	24UAI6DE2B	Natural Language Processing
V1	24UAI6DE3A	Big Data Analytics
	24UAI6DE3B	Data Mining & Warehousing

#### DISCIPLINE SPECIFIC ELECTIVES

Comoston	C	ourse Code	Course Cotogony	Hours/	Credita	Marks for Evaluation			
Semester	Ŭ	ourse Coue	Course Category	Week	Creuits	CIA	ESE	Total	
Ι	24	4UAI1CC1 Core – I		5	5	25	75	100	
Course Title		Programmin	g in C and Data Structures						

Hours

15

15

15

#### **SYLLABUS** Unit **Contents** 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, Ι Evaluating of Arithmetic Expressions – \*Type Conversion\*- Decision Statements: if, if-else, and nested if statements. Loops Structures: For Loop, While, Do-while loop – Arrays: - One Dimensional Π Array, Two-dimensional Arrays, Character Arrays and Strings - Functions: Function with arrays-Function with decision and looping statements - \*Recursion\*. Pointers: Introduction - Pointer Expressions - Chain of Pointers - Pointers and Arrays – Array of Pointers – Pointers as function arguments – Functions returning III Pointers - Pointers to Functions - Function pointer - Structures - declaration, initialization, Array of Structures - Pointer to structures, Structures and functions -\*Types of Enumerated data types\*, Unions. Strings Processing, Standard string library functions – Files: introduction and files functions – Writing and reading in Text mode – Simple application:

 IV
 and thes functions – writing and reading in Text mode – Simple application.
 15

 Display the contents of a file. Write data to a file. Append data to an existing file –
 15

 File IO – \*Reading and writing structures\*.
 15

 V
 Stack: LIFO concept, Stack operations, Array implementation of stack – Queue:
 15

 FIFO concept, Queue operations, Array implementation of queue – Singly Linked
 15

 List: concepts, operations – Doubly Linked List: concepts, operations – Trees:
 15

 VI
 Current Trends (For CIA only): Developing C coding for simple real world application problems
 15

\*.....\* Self Study

# Text Book(s):

- 1. E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, New Delhi, Seventh Edition, 2016.
- 2. E. Horowitz, S. Sahni and Susan Anderson Freed, "Fundamental Data Structures in C", 2ed, Orient Black Swan Publisher, 2009.

# **Reference Book(s):**

- 1. E. Karthikeyan, "A Textbook on C Fundamentals, Data Structures and Problem Solving", Prentice-Hall of India Private Limited, New Delhi, 2008.
- 2. Yashavant Kanetkar, "Let us C", BPB Publications, Tenth Edition, New Delhi, 2010.

# Web Resource(s):

- 1. <u>https://www.tutorialspoint.com/cprogramming/index.htm</u>
- 2. <u>https://www.w3schools.in/data-structures/intro</u>

	Course Outcomes								
Upon suc	Upon successful completion of this course, the student will be able to:								
CO No.	CO Statement	Cognitive Level (K-Level)							
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							

Course	1	Program	ne Outco	mes (POs)	)	Pro	Mean Score of				
(COs)	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	COs
CO1	3	3	2	2	3	3	2	2	2	3	2.5
CO2	3	3	2	3	2	3	2	3	2	2	2.5
CO3	3	2	3	3	3	2	3	2	3	2	2.6
CO4	2	3	2	3	3	3	3	3	2	2	2.6
CO5	3	2	2	3	2	3	2	2	3	3	2.5
								Mea	an Overa	all Score	2.54
									Cor	relation	High

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

Mean Overall Score	Correlation
< 1.5	Low
$\geq$ 1.5 and < 2.5	Medium
≥ 2.5	High

# Course Coordinator: Dr. M. Mohamed Surputheen

Someston	Course Code		Course Cotogomy	Hours/	Credita	Marks for Evaluation			
Semester			Course Category	Week	Creatis	CIA	ESE	Total	
Ι	24UAI1CC2P		CORE – II	3	3	20	80	100	
Course Title 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.

	Course Outcomes								
Upon suc	Upon successful completion of this course, the student will be able to:								
CO No.	CO Statement	Cognitive Level (K-Level)							
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							

Course	P	rogramn	ne Outco	mes (PO	s)	Progra	Mean Score of				
(COs)	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	COs
CO1	3	3	2	3	2	3	2	2	2	2	2.4
CO2	3	3	3	2	2	3	3	3	2	2	2.6
CO3	3	2	3	2	3	2	3	3	3	0	2.4
CO4	2	3	2	2	3	3	3	2	2	2	2.4
CO5	3	3	3	3	3	3	2	3	3	3	2.9
Mean Overall Score									2.54		
Correlation									High		

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

Mean Overall Score	Correlation
< 1.5	Low
$\geq$ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinator: Dr. S. Mohamed Iliyas

Somostor	Course Code		Course Category	Hours/	Credite	Marks for Evaluation			
Semester				Week	Creans	CIA	ESE	Total	
Ι	24U	MA1AC1:4	Allied - I	4	3	25	75	100	
Course Ti	tle	CALCULU	S						

SYLLABUS								
Unit	Contents	Hours						
Ι	*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						
ш	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

## **Text Book(s):**

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

## **Reference Book(s):**

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

Web Resource(s):

1. <u>https://onlinecourses.nptel.ac.in/noc24\_ma12/preview</u>

2. https://onlinecourses.nptel.ac.in/noc24\_ma33/preview

Course Outcomes									
Upon suc	Upon successful completion of this course, the student will be able to:								
CO No.	CO Statement	Cognitive Level (K-Level)							
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	К3							
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							

Course	]	Program	ne Outco	mes (POs)	)	Pro	Mean Score				
(COs)	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	of COs
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
Mean Overall Score										2.8	
Correlation										High	

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

Mean Overall Score	Correlation
< 1.5	Low
$\geq$ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinator: Dr. M.A. Rifayathali

Somester	Course Code		Course Cotogony	Hours/	Credita	Marks for Evaluation			
Semester			Course Category	Week	Creans	CIA	ESE	Total	
Ι	240	UMA1AC2:4	Allied - II	4	3	25	75	100	
Course Title		Linear Algeb	ra						

SYLLA	BUS	
Unit	Contents	Hours
Ι	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-line in real life.	ear model

\*.....\* Self Study

#### **Text Book:**

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.

### **Reference Book:**

Charu C. Aggarwal, Linear Algebra and Optimization for Machine Learning, Springer Nature Switzerland, 2020.

### Web Resources:

- 1. <u>https://youtu.be/nG\_zOJCvmzw?si=v\_Li8DLmovXzEF13</u>
- 2. https://youtu.be/kZwSqZuBMGg?si=lhe9ZYhy6\_06\_x0z
- 3. <u>https://youtu.be/JO9jNe6BemE?si=3ZhcSZcnhStmsqtK</u>

	Course Outcomes									
	Upon successful completion of this course, the student will be able to:									
CO No.	CO Statement	Cognitive Level (K-Level)								
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.	К3								
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								

Course	Pr	ogramn	ne Outco	omes (PC	Os)	Prog	Mean Score of				
(COs)	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	COs
C01	3	3	2	2	3	3	3	3	3	2	2.7
CO2	3	2	2	3	3	3	3	3	3	2	2.7
CO3	3	2	2	2	2	3	3	3	3	3	2.6
CO4	3	2	2	3	2	3	3	3	2	2	2.5
CO5	3	3	3	2	2	3	3	3	2	2	2.6
Mean Overall Score										2.62	
									Со	rrelation	High

Course Coordinator: Dr. N. Mohamed Thoiyab

Somostor	C	aurea Cada	Course Cotogory	Hours/	Cradita	Marks for Evaluation				
Semester	Course Coue		Course Category	Week	Creans	CIA	ESE	Total		
II	24	4UAI2CC3	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				
ш	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 P Study on Jumla – an high level language approach.	ython -				

\*.....\* Self Study

## **Text Book(s):**

Jeeva Jose and P. Sojan Lal, "Introduction to Computing and Problem Solving with PYTHON", Khanna Book Publishing Co, 2016

### **Reference Book(s):**

- 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.

# Web Resource(s):

- 1. https://www.python.org
- 2. <u>https://www.programiz.com/python-programming</u>
- 3. <u>https://www.w3schools.com/python/python\_intro.asp</u>

Course Outcomes								
Upon suc	Upon successful completion of this course, the student will be able to:							
CO No.	CO Statement	Cognitive Level (K-Level)						
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						

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

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

Mean Overall Score	Correlation
< 1.5	Low
$\geq$ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinator: Dr. M. Mohamed Surputheen

Someston	C	ourse Code	Course Cotogomy	Hours/	Credita	Marks for Evaluation			
Semester	U	ourse Coue	Course Category	Week	Creuits	CIA	ESE	Total	
II	24	UAI2CC4P	CORE – IV		3	20	80	100	
<b>Course Title</b> Pr		Programmin	g 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.

	Course Outcomes							
Upon suc	Upon successful completion of this course, the student will be able to:							
CO No.	CO Statement	Cognitive Level (K-Level)						
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						

Course	P	rogramn	ne Outco	mes (PO	s)	Programme Specific Outcomes (PSOs)					Mean Score of
(COs)	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	COs
CO1	3	3	2	2	3	3	1	1	1	1	2.0
CO2	3	3	2	3	2	1	1	2	2	2	2.0
CO3	3	2	3	2	2	2	1	1	3	1	2.0
CO4	2	3	2	3	3	3	3	3	2	2	2.6
CO5	3	2	2	1	2	3	1	2	2	2	2.0
Mean Overall Score										2.12	
Correlation N									Medium		

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

Mean Overall Score	Correlation
< 1.5	Low
$\geq$ 1.5 and < 2.5	Medium
≥ 2.5	High

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

Semester	C	ourse Code	Course Cotogory	Hours/	Cradita	Marks for Evaluation			
		ourse Code	Course Category	Week	Creatis	CIA	ESE	Total	
II	240	UMA2AC3:4	Allied - III	4	4	25	75	100	
Course Title		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
Π	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
Ш	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	Current Trends (For CIA only): Developing C coding for simple real world application p	roblems

## **Text Book:**

Tremblay J.P and Manohar. R, "Discrete Mathematical Structures with Applications to Computer Science", Tata Magraw Hill bub. Co. Ltd, 1997

#### **Reference Book(s):**

- Liu C.L and Mohapatra "Elements of Discrete Mathematics" Tata Magraw Hill bub. 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.

#### Web Resource(s):

- 1. <u>https://www.youtube.com/@4GSilverAcademy</u>
- 2. https://www.youtube.com/@mathematicskala
- 3. https://www.youtube.com/@mathematicskala

	Course Outcomes							
	Upon successful completion of this course, the student will be able to:							
CO No.	CO Statement	Cognitive Level (K-Level)						
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						

Course	P	rogramn	ne Outco	mes (PO	s)	Prog	Mean Score of				
s (COs)	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	COs
CO1	3	3	2	2	2	2	2	2	2	1	2.1
CO2	3	3	1	1	2	2	3	2	1	1	1.9
CO3	1	3	2	1	1	2	2	2	2	1	1.7
CO4	2	2	2	2	1	3	2	2	2	1	1.9
CO5	3	2	2	2	1	2	3	3	2	1	2.1
Mean Overall Score									1.94		
	Correlation									Medium	

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

Mean Overall Score	Correlation
< 1.5	Low
$\geq$ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinator: Dr. U. Abuthahir

Somostor	Course Code		Course Cotogony	Hours/	Credita	Marks for Evaluation			
Semester	U	ourse Code	Course Category	Week	Creatis	CIA	ESE	Total	
II	240	UMA2AC4:4 Allied - IV 3 3		25	75	100			
Course Title Statistics an			d Numerical Methods						

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 w application problems.	vorld				

\*.....\* Self Study

#### **Text Book(s):**

1. N. Subramaniam, Probability and Statistics, first edition, SCM Publisher, Erode (2005)					
IL. A L	Charten 4: Section 4.1. 4.2 (Dece No. 2011, 224)				
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, 1	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)				

### **Reference Book(s):**

- 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.

## Web Resource(s):

Testing of Hypothesis:

https://www.youtube.com/watch?v=zJ8e\_wAWUzE&pp=ygUac3RhdGlzdGljcyB0ZXN0IGh5cG90aGVzaXM %3D

Design of Experiments:

 $\label{eq:https://www.youtube.com/watch?v=k3lUo0XYG3E&pp=ygUgc3RhdGlzdGljcyBkZXNpZ24gb2YgZXhwZXJpbWVudHM%3D$ 

Numerical Methods:

 $\underline{https://www.youtube.com/watch?v=jw4\_1XLwBCQ\&list=PLFw9SEeylu1Ve4Cym98bc\_i4fuyQoTruJ}$ 

Course Outcomes								
	Upon successful completion of this course, the student will be able to:							
CO No.	CO Statement	Cognitive Level (K-Level)						
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	К3						
CO4	Solve the algebraic and transcendental equations with iteration methods	K4						
CO5	Appreciate the numerical techniques in various intervals.	K5						

Course	Р	rogramn	ne Outco	mes (PO	s)	Prog	Mean Searc of				
s (COs)	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	COs
CO1	2	2	3	3	3	2	3	3	3	3	2.7
CO2	2	2	2	3	2	3	2	3	2	3	2.4
CO3	2	2	3	3	3	2	3	3	3	3	2.7
CO4	2	2	2	3	2	2	3	3	2	3	2.4
CO5	2	2	2	3	2	2	3	2	3	3	2.4
Mean Overall Score										2.52	
Correlation										High	
	Mean Overall Score – Sum of Mean Score of COs / Total Number of COs										

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

Mean Overall Score	Correlation
< 1.5	Low
$\geq$ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinator: Dr. M. Mohamed Althaf

Somester	Course Code		Course Cotogony	Hours/	Cradita	Marks for Evaluation			
Semester			Course Category	Week	Creatis	CIA	ESE	Total	
III	24	4UAI3CC5	Core – V	4	4	25	75	100	
Course Title		RDBMS and	l NoSQL						

	SYLLABUS	
Unit	Contents	Hours
I	<b>Introduction to Databases:</b> Databases and Database Users - Introduction - Example - Characteristics of the Database Approach - Actors on the Scene - Workers behind the Scene - Advantages of Using the DBMS Approach - *A Brief History of Database Applications*	12
II	<b>Database System Concepts and Architecture:</b> Data Models, Schemas, and Instances - Three-Schema Architecture and Data Independence - Database Languages and Interfaces - The Database System Environment - Centralized and Client/Server Architectures for DBMSs - Classification of Database Management Systems - The Relational Data Model and SQL: The Relational Data Model and Relational - Database Constraints - Relational Model Concepts - Relational Model Constraints and Relational Database Schemas - Update Operations, Transactions, and *Dealing with Constraint Violations*	12
ш	<b>Basic SQL:</b> SQL Data Definition and Data Types - Specifying Constraints in SQL - Basic Retrieval Queries in SQL - INSERT, DELETE, and UPDATE Statements in SQL - Additional Features of SQL - More SQL: Complex Queries, Triggers, Views, and Schema Modification - More Complex SQL Retrieval Queries – Specifying Constraints as Assertions and Actions as Triggers - Views (Virtual Tables) in SQL - *Schema Change Statements in SQL*	12
IV	<b>NoSQL:</b> The Value of Relational Databases - Impedance Mismatch - Application and Integration Databases - Attack of the Clusters - The Emergence of NoSQL - Aggregate Data Models: Aggregates - Key-Value and Document Data Models - Column-Family Stores - *Summarizing Aggregate-Oriented Databases*.	12
V	<b>Details on Data Models:</b> Relationships - Graph Databases - Schemaless Databases - Materialized Views - Modeling for Data Access - Distribution Models: Single Server - Sharding Master-Slave Replication - Peer-to-Peer Replication - *Combining Sharding and Replication*.	12
VI	Current Trends (For CIA only):	

\*.....\* Self Study

#### Text Book(s):

1. "Fundamentals of Database System" Elmasari & Navathe- Pearson Education, 7th Edition, 2017

2. "NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence", Sadalage, P. & Fowler, Wiley Publications, 1st Edition ,2019.

### **Reference Book(s):**

S.K. Singh Database System: concept, Design & Application, Pearson Education, 2011

Course Outcomes							
Upon suc	Upon successful completion of this course, the student will be able to:						
CO No.	CO Statement	Cognitive Level (K-Level)					
CO1	Know about databases and about database users.	K1					
CO2	Understand the concept of Database system structure and the concept of Relational model.	K2					
CO3	Illustrate various programming mechanism used in SQL.	K3					
CO4	Examine the Emergence of NoSQL.	K4					
CO5	Understand about data models in NoSQL.	K5					

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

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

Mean Overall Score	Correlation
< 1.5	Low
$\geq$ 1.5 and $<$ 2.5	Medium
≥ 2.5	High

Course Coordinator: S. Syed Ibrahim

Somester	Course Code		Course Cotogomy	Hours/	Credita	Marks for Evaluation			
Semester			Course Category	Week	Creans	CIA	ESE	Total	
III	24UAI3CC6P		UAI3CC6P CORE – VI		3	20	80	100	
<b>Course Title</b>		RDBMS and	d NoSQL Lab – Practical						

Demonstrate the following SQL commands

1. Write a SQL query for creating Table, and SQL queries for inserting, deleting, updating the records in Table.

- 2. Write SQL Queries for AND/OR/NOT operation, Union- Intersection and Minus
- 3. Write SQL queries for various Join Operations.
- 4. Write SQL query for Sorting and Grouping the records.
- 5. Write Nested queries, Sub queries using SQL.
- 6. Write an SQL program using Built-in functions.
- 7. Create a view and access the view using query.
- 8. Creation of unstructured table contents using Nosql commands
- 9. Write NoSQL query for sorting data using ORDER BY clause
- 10. Write NoSQL query using aggregate functions using COUNT, SUM, AVG, MIN and MAX.

Course Outcomes							
Upon suc	Upon successful completion of this course, the student will be able to:						
CO No. CO Statement							
CO1	Recall and work on database queries	K2					
CO2	Relate the entity relationship and join dependencies with software programs	K3					
CO3	Write queries on aggregate functions, subqueires.	K4					
CO4	Create structured and unstructured database using SQL and NoSQL	K4					
CO5	Able to implement various functions of NoSQL.	K5					

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

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

Mean Overall Score	Correlation
< 1.5	Low
$\geq$ 1.5 and $<$ 2.5	Medium
≥ 2.5	High

Course Coordinator: S. Syed Ibrahim

Someston	Course Code	Course Cotogony	Hours/	Credita	Marks for Evaluation			
Semester	Course Coue	Course Category	Week	Creatis	CIA	ESE	Total	
III	24UPH3AC5	ALLIED - V	4	4	25	75	100	

**Course Title** 

# ELECTRONIC CIRCUITS AND DEVICES

SYLLABUS							
Unit	Contents	Hours					
I	Semiconductor Physics Intrinsic & Extrinsic Semiconductors – n-Type and p-Type semiconductors- Formation of PN Junction Diode -V-I characteristics –*Zener diode* –V-I characteristics – Zener diode voltage regulator -Rectifiers – Half wave & Full wave bridge rectifier	12					
п	$\begin{array}{c} \textbf{Transistors} \\ Transistor action: npn & pnp-Transistor characteristics CE and CB configuration - \\ \alpha \ and \ \beta \ relationship-Amplifier - Single \ Stage \ RC \ Coupled \ Amplifier - Principle \ of \\ feedback \ -Types \ of \ feedback \ -Barkhausen \ criterion \ - \ Oscillator \ - \ Hartley \\ oscillator. \end{array}$	12					
ш	<b>Special Devices</b> FET – Construction – n channel and p channel – FET Characteristics – FET parameters – FET amplifier (CS configuration) –Photo diode –Construction- Characteristics - LED – Construction- Characteristics- *LCD*- Construction - Seven segment display.	12					
IV	Optical Fiber & Optoelectronic devices Types of fibers- Semiconductor laser source for optical communication-Block diagram of fiber optic communication system -Construction and Characteristics of Optoelectronic devices: Photoconductive Sensors – Photoconductive Cell, Applications, Photodiode, Phototransistor –Solar Cell	12					
V	<b>Operational Amplifier:</b> Ideal Op-amp – Parameters – Inverting and Non-Inverting Operational Amplifiers – Adder – Subtractor – Sign changer – Scale changer – Op-amp Differentiator - Op- amp Integrator.	12					
Text B	ook(s):						
1. 2. 3.	<ul> <li>V.K. Mehta &amp; Rohit Metha, Principle of Electronics, PH Printers &amp; Publishers Private Ltd 2008.</li> <li>P.K.Palanisamy, Semiconductor Physics And Opto-Electronics, Scitech Publications (India 2011</li> <li>S Salivahanan, N Suresh Kumar, Electronic Devices and Circuits, McGraw Hill Education Electronic Limited, Chennai, Fourth Edition, 2019.</li> </ul>	d, Reprint a).Pvt.Ltd, Pvt					
Refere	nce Book(s):						
1. Mur 2. Appl 3. D. Ro Fourt	agesan, Kiruththiga SivaPrasath ,Modern Physics,S. Chand & Co Thirteenth Edition, 2 ed Physics – Dr. M. Arumugam – Anuradha Agencies, 2011 by Choudhury and Shail B. Jain, Linear Integrated Circuits, New Age International Publishers h Edition, 2015	2016 ,					
Web R	esource(s):						
1. 1	. https://swayam.gov.in/nd1_noc19_ee36/preview						

	Course Outcomes							
Upon suc	Upon successful completion of this course, the student will be able to:							
CO No.	CO Statement	Cognitive Level (K-Level)						
CO1	Remembering some basic semiconductor devices, means of identifying them from their coding schemes and finding out their terminals	K1						
CO2	understanding a knowledge of the principles and functioning of these semiconductor devices and their individual or standalone characteristic features using mathematical and graphical analysis so that they may be helpful in predicting their behavior and functioning when incorporated in circuitry	К2						
CO3	Applying the essential techniques of circuit design employing these devices, the analysis of the circuits so constructed and the means of evaluating their parameters and performance using mathematical and graphical tools	К3						
CO4	Analyzing a sound knowledge of the essential theoretical features and concepts such as modulation and demodulation, regulated power supplies, amplification, switching operations so that they may be useful not only for higher studies but also in providing theoretical framework for possible applications beneficial to the society	K4						
CO5	Evaluating technical skills to wire the circuits and to trouble shoot them as well as to construct of new circuits for specific tasks thereby helping them to become entrepreneurs	К5						

Course	Course Programme Outcomes (POs)				Programme Specific Outcomes (PSOs)					Mean Score	
(COs)	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	of COs
CO1	2	3	3	2	2	3	2	3	2	3	2.5
CO2	3	3	2	2	2	3	2	3	2	2	2.4
CO3	3	2	3	2	3	3	2	3	2	3	2.6
CO4	2	3	2	3	2	3	2	3	3	3	2.6
CO5	2	3	2	2	2	2	3	3	3	3	2.5
Mean Overall Score										2.52	
Correlation									High		

Mean Overall Score	Correlation
< 1.5	Low
$\geq$ 1.5 and < 2.5	Medium
≥ 2.5	High

# **Course Coordinators:**

Dr. A. Mohamed Saleem Dr. S. Abbas Manthiri

Somestor	C	ourse Code	Course Cotogory	Hours/	Credite	Marks for Evaluation			
Semester	U	ourse Code	Course Category	Week	Creatis	CIA	ESE	Total	
III	24	UPH3AC6P	ALLIED - VI		2	20	80	100	
Course Ti	tle		ELECTRONI	CS – PRA	ACTICAL	4			

S.No.	List of Experiments
1	Junction diode characteristics
2	Wave shaping Circuits (Positive & Negative Clippers & Clampers)
3	Op-Amp – Adder and Subtractor
4	Basic Logic gates – Discrete Components
5	Zener controlled rectifier
6	Zener diode characteristics
7	Op-Amp – Differentiator and Integrator
8	NAND as universal gates

## Text Book(s):

1. M.N. Srinivasan, S.Balasubramaniyan, R. Ranganathan, A text book of Practical Physics, S.Chand&Sons , Reprint 2010.

## **Reference Book(s):**

1. C.C. Ouseph, U.J. Rao& V. Vijayendran, Practical physics and electronics, S. Viswanathan, Pvt,Ltd, First edition,2007.

## Web Resource(s):

- 1. www.physicstutoruials.org
- 2. www.sciencelearn.org.nz

Course Outcomes								
Upon suc	Upon successful completion of this course, the student will be able to:							
CO No.	CO Statement	Cognitive Level (K-Level)						
CO1	Understand the basic principles of Electricity and Magnetism	K1						
CO2	Acquire the experimental skills.	K1						
CO3	Understand the characteristics of the semiconductor diodes and operational amplifiers.	K2						
CO4	Analyzing the practical applications of Electricity ,Magnetism and Electronics in their day to day life.	K4						
CO5	Evaluating the basic requirements for their higher studies.	K5						

Course		Program	ne Outco	mes (POs	)	Programme Specific Outcomes (PSOs)					Mean Score of
(COs)	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	COs
CO1	3	2	1	2	3	2	2	2	3	1	2.1
CO2	3	2	3	2	2	2	2	2	3	2	2.3
CO3	3	2	2	2	2	2	2	2	3	2	2.2
CO4	3	2	3	2	1	2	2	2	3	3	2.3
CO5	3	2	3	3	2	2	2	2	3	2	2.4
								Me	an Overa	ll Score	2.26
									Cor	relation	Medium

Mean Overall Score	Correlation
< 1.5	Low
$\geq$ 1.5 and < 2.5	Medium
≥ 2.5	High

# **Course Coordinators:**

Dr. S. Abbas Manthiri

Dr. C. Hariharan

Semester	C	ourse Code	Course Cotogory	Hours/	Cradita	Marks for Evaluation			
	Course Coue		Course Category	Week	Creuits	CIA	ESE	Total	
III	24	4UAI3GE1	Generic Elective – I	2	2	-	100	100	
<b>Course Title</b> Busin		Business Pro	ocess Outsourcing						

SYLLABUS							
Unit	Contents	Hours					
Ι	<b>Introduction to BPO:</b> Basics of Business Process Outsourcing – History of BPO – Evolution of BPO – Global trends of BPO – *Future of BPO*	6					
II	<b>BPO Industry:</b> Employment opportunities in BPO industry – Employee structure – Skill set required for BPO – Compensation levels – Future of BPO employee.	6					
ш	<b>Models of BPO:</b> BPO Model and Types of Vendors – Transaction Processing BPO – Elements of back-office services – Contact Centre BPO – Types of Call Centres – Components and working of a call centre – * Offshoring – Offshore BPO* – BPO Companies in India.	6					
IV	<b>Processes in BPO:</b> Financial Services – Insurance – Human Resource BPO – Activities involved in HR BPO – *Career in HR BPO*	6					
V	<b>BPO Domains:</b> Media and Entertainment BPO – Publishing BPO – social media and BPO – *Changing dynamics in Indian BPO Industry*.	6					
*	* Self Study						

#### Text Book(s):

Business Process Outsourcing Handbook

**Reference Book(s):** 

Sarika Kulkarni, Business Process Outsourcing, Jaico Publishing House, 2005

## Web Resource(s):

1. <u>https://www.techtarget.com/searchcio/definition/business-process-outsourcing</u>

2. <u>https://unity-connect.com/our-resources/bpo-learning-center/what-is-business-process-outsourcing/</u>

Course Outcomes								
Upon suc	Upon successful completion of this course, the student will be able to:							
CO No.	CO Statement	Cognitive Level (K-Level)						
CO1	Recall the basics of business process outsourcing	K1						
CO2	Illustrate the fundamentals of BPO industry	K2						
CO3	Examine the models of BPO and its vendor	K3						
CO4	Analyze the importance of various processes of BPO	K4						
CO5	Explain the appropriate domains of BPO	K5						

Course	-	Programi	ne Outco	mes (POs	)	Programme Specific Outcomes (PSOs)					Mean
(COs)	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Score of COs
CO1	3	3	1	2	3	3	3	2	2	2	2.4
CO2	3	3	3	2	1	3	3	3	2	0	2.3
CO3	3	2	3	2	3	2	3	3	3	0	2.4
CO4	2	3	2	2	3	3	3	2	2	2	2.4
CO5	3	3	3	3	3	3	2	3	3	3	2.9
Mean Overall Score										2.48	
Correlation										Medium	
Mean Ov	Mean Overall Score = Sum of Mean Score of COs / Total Number of COs										

Mean Overall Score	Correlation
< 1.5	Low
$\geq$ 1.5 and $<$ 2.5	Medium
≥ 2.5	High

Course Coordinator: Dr. S. Mohamed Iliyas

Semester	Course Code		Course Cotogory	Hours/	Cradita	Marks for Evaluation			
			Course Category	Week	Creatis	CIA	ESE	Total	
IV	24	4UAI4CC7	Core – VII	5	5	25	75	100	
Course Ti	tle	Artificial Int	elligence				·	·	

SYLLABUS					
Unit	Contents	Hours			
I	Artificial Intelligence: AI Problems – Underlying Assumption – AI Technique – Level of the Model – Criteria of Success – Some General References. Problems, Problem Spaces, and Search: Defining the Problem as a State Space Search – Production Systems – Problem Characteristics – Production System Characteristics – *Issues in the Design of Search Programs*.	15			
п	<b>Heuristic Search Techniques:</b> Generate and Test – Hill Climbing – Best-First Search – Problem Reduction – Constraint Satisfaction – Means-ends Analysis. Knowledge Representation Issues: Representations and Mappings – Approaches to Knowledge Representation – *Issues in Knowledge Representation* – The Frame Problem.	15			
ш	Using Predicate Logic: Representing Simple Facts in Logic – Representing Instance and ISA Relationships – Computable Functions and Predicates – Resolution – Natural Deduction - Representing Knowledge Using Rules: Procedural Versus Declarative Knowledge – Logic Programming – Forward Versus Backward Reasoning – Matching – *Control Knowledge*.	15			
IV	Symbolic Reasoning Under Uncertainty: Introduction to Non-monotonic Reasoning – Logics for Non-monotonic Reasoning – Implementation Issues – Augmenting a Problem-solver – Implementation Depth First Search – Implementation Breadth First Search. Statistical Reasoning: Probability and Baye's Theorem – Certainty Factors and Rule- based Systems – Bayesian Networks – *Dempster-Shafer Theory* – Fuzzy Logic	15			
V	Semantic Nets: Frames- Conceptual Dependency – Scripts – CYC Syntactic- Semantic Spectrum of Representation – Logic and Slot-and-Filler Structures – *Other Representational Techniques*.	15			
VI	Current Trends (For CIA only):				

\*.....\* Self Study

## **Text Book(s):**

Elaine Rich, Kevin Knight, Shivashankar B Nair, "Artificial Intelligence", Third Edition, Tata McGraw Hill, 2019.

## **Reference Book(s):**

1. Gerhard Welss, - Multi Agents Systems, Second Edition, 2013

2. David L. Poole and Alan K. Mackworth, - Artificial Intelligence: Foundations of Computational Agents, Cambridge University Press, 2010.

# Web Resource(s):

1. <u>https://www.udemy.com/course/learn-basics-of-artificial-intelligence/</u>

2. https://onlinecourses.swayam2.ac.in/cec21 cs08/preview

	Course Outcomes								
Upon successful completion of this course, the student will be able to:									
CO No.	CO Statement	Cognitive Level (K-Level)							
CO1	Understand the basic idea of artificial intelligence and its application areas.	K1							
CO2	Apply basic principles of AI in solutions that requires problem solving, inference, perception, knowledge representation, and learning.	K2							
CO3	Demonstrate awareness and a fundamental understanding of various applications of AI techniques.	K3							
CO4	Understand about Logic programming and about Reasoning related to AI.	K4							
CO5	Know about the different representational techniques in AI.	K5							

Course		Programi	ne Outco	mes (POs)	)	Programme Specific Outcomes (PSOs)					Mean Score of
(COs)	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	COs
CO1	3	3	2	2	3	3	2	2	3	2	2.5
CO2	3	3	2	3	2	3	2	3	2	2	2.5
CO3	3	2	3	2	2	2	3	3	3	3	2.6
CO4	2	3	2	3	3	3	3	3	3	3	2.8
CO5	3	2	2	3	2	3	3	2	2	2	2.4
Mean Overall Score										2.56	
Correlation										High	

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

Mean Overall Score	Correlation
< 1.5	Low
$\geq$ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinator: Dr. S.A. Jameel

Someston	Course Code		Course Cotogony	Hours/	Credita	Marks for Evaluation			
Semester	U	ourse Code	Course Category	Week	Creatis	CIA	ESE	Total	
IV	24UAI4CC8P		UAI4CC8P CORE – VIII		3	20	80	100	
Course Ti	tle	Artificial Int	telligence Lab – Practical						

- 1. Write a C++ program to implement the Hill Climbing problem
- 2. Write a C++ program to implement the Towers of Hanoi problem
- 3. Write a C++ program to implement the Missionaries and Cannibals problem
- 4. Write a C++ program to implement the 8 queens problem
- 5. Write a C++ program to implement the A\* Algorithm
- 6. Write a C++ program to Implement the Breadth first algorithm
- 7. Write a C++ program to implement the Depth first algorithm
- 8. Write a C++ program to implement the predicate logic

	Course Outcomes								
Upon suc	Upon successful completion of this course, the student will be able to:								
CO No. CO Statement									
CO1	Solve various kinds of problems using AI techniques.	K2							
CO2	Solve basic AI based problems using any programming language.	K3							
CO3	Understand to implement the various kinds of AI based algorithms.	K4							
CO4	Apply AI techniques to real-world problems to develop intelligent systems.	K4							
CO5	Understand problems related to AI.	K5							

Course	P	rogramn	ne Outco	mes (PO	s)	Progra	Mean				
Outcomes (COs)	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Score of COs
CO1	3	3	2	2	3	3	2	2	3	2	2.5
CO2	3	3	2	3	2	3	2	3	2	2	2.5
CO3	3	2	3	2	2	2	3	3	2	2	2.4
CO4	2	3	2	3	3	3	2	2	3	3	2.6
CO5	3	2	2	3	2	3	3	2	2	2	2.4
Mean Overall Score									2.48		
Correlation										Medium	

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

Mean Overall Score	Correlation
< 1.5	Low
$\geq$ 1.5 and < 2.5	Medium
≥ 2.5	High

Someston	Course Code	Course Cotogory	Hours/	Credita	Marks for Evaluation			
Semester	Course Coue	Course Category	Week	Creans	CIA	ESE	Total	
IV	24UPH4AC7	ALLIED - VII	5	4	25	75	100	

**Course Title** 

#### DIGITAL ELECTRONICS AND MICROPROCESSOR

	SYLLABUS	
Unit	Contents	Hours
I	Number Systems: Introduction to decimal, binary, octal & hexadecimal number systems – Interconversions –binary arithmetic operations – Addition, Subtraction, Multiplication and Division – 1's & 2's complements - signed binary numbers - BCD code - *Gray code – ASCII code*	15
II	Logic gates and Boolean expressions: *Logic gates* –AND, OR, NOT, NAND, NOR, EX-OR, and EX-NOR – Universality of NAND and NOR gates- Sum of Products (SOP) - Product of Sum (POS) Laws of Boolean algebra — simplification of Boolean expressions using Boolean laws - De-Morgan's theorems-Karnaugh map:Minterms – 2, 3 & 4 variables – Don't care conditions.	15
III	Arithmetic, Combinational and Sequential circuits: *Half adder and full adder* – half subtractor and full subtractor–multiplexer – demultiplexer- Flip flops – RS, Clocked RS, J-K, J-K master slave and D flip flop	15
IV	Microprocessor Architecture: Intel 8085 architecture – Pin configuration – *Opcode – Operands – Instruction Word size* – Instruction Cycle – Fetch Operation – Execution Operation – Machine Cycle and State – Timing diagram – opcode fetch cycle– memory read – I/O read – memory write –I/O write	15
V	Intel 8085 Assembly language: Addressing modes – Intel 8085 instructions – data transfer, arithmetic, branch, stack, I/O and machine control group – stack – addition, subtraction, multiplication and division of 8-bit numbers – sum of the series of 8-bit numbers – sorting of numbers in ascending and descending order – block data transfer	15

\*.....\* Self Study

#### **Text Book(s):**

V.Vijayendran, S.Viswanathan, Introduction to Integrated electronics( Digital & Analog) PH Printers & 1. Publishers Private Ltd, Reprint 2008. Unit-II: 5.1 – 6.23.

Unit-I : 1.1 – 4.20.

Unit-III: 7.1 – 8.18, 9.1 – 10.19, 16.1 – 16.13.

P.S.Manoharan, Microprocessors & Microcontrollers –P.S.Manoharan, Charulatha Publications, 2011 2. Unit-IV: 1.68 – 1.82.

B.Ram, Fundamentals of Microprocessors and Microcontrollers, 3. B.Ram. Dhanpat Rai Publications, Reprint 2011.

# Unit-V: 1.6-1.86, 6.22 – 6.38.

## **Reference Book(s):**

- V.Vijayendran, Fundamentals of Microprocessor 8085, S.Viswanathan, Printers & Publishers Private 1. Ltd.
- 2. P.S.Manoharan, Microprocessors & Microcontrollers -P.S.Manoharan, Charulatha Publications, 2011

## Web Resource(s):

1. https://pages.uoregon.edu/rayfrey/DigitalNotes.pdf 2.

2.https://www.tutorialspoint.com/microprocessor/microprocessor\_tutorial.pdf

3.http://ce.sharif.edu/courses/86-87/1/ce126/resources/root/8085%20Microprocessor.pdf

	Course Outcomes								
Upon suc	Upon successful completion of this course, the student will be able to:								
CO No.	CO Statement	Cognitive Level (K-Level)							
CO1	Remember the principles and operations of analog and digital instruments	K1							
CO2	understand the digital principles and its applications	К2							
CO3	Apply the principle of combinational and Flip-flops	К3							
CO4	Analyze about the architecture of Intel 8085 Microprocessor	K4							
CO5	Evaluate the assembly language programs of 8085 microprocessor using trainer kit	К5							

Course	Course Programme Outcomes (POs)				Programme Specific Outcomes (PSOs)					Mean Score	
(COs)	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	of COs
CO1	2	3	3	2	2	3	2	3	2	3	2.5
CO2	3	3	2	2	2	3	2	3	2	2	2.4
CO3	3	2	3	2	3	3	2	3	2	3	2.6
CO4	2	3	2	3	2	3	2	3	2	3	2.5
CO5	2	3	2	2	2	2	3	3	2	2	2.3
								Me	an Overa	II Score	2.46
									Cor	relation	Medium

Mean Overall Score	Correlation
< 1.5	Low
$\geq$ 1.5 and < 2.5	Medium
≥ 2.5	High

# **Course Coordinators:**

Dr. A. Mohamed Saleem

Dr. S. Abbas Manthiri

Somostor	Course Code		Course Cotogory	Hours/	Cradita	Marks for Evaluation			
Semester	U	ourse Code	Course Category	Week	Creats	CIA	ESE	Total	
IV	24	UPH4AC8P	ALLIED - VIII	3	2	20	80	100	
Course Title			DIGITAL AND MICRO	PROCESS	OR – PRAC	CTICAL			

S.No.	List of Experiments
1	Logic Gates AND, OR, NOT, NAND, NOR EX-OR and EX-NOR using ICs
2	Half adder and Full adder using AND, OR and EXOR gates
3	Half subtractor and Full subtractor using AND, OR, NOT and EX-OR gates
4	RS and J-K flip flops
5	8-bit addition, Subtraction, Multiplication and Division
6	Sum of the series of 8-bit numbers
7	Sorting of numbers in ascending and descending order
8	Block data transfer using microprocessor 8085.

## Text Book(s):

1. M.N. Srinivasan, S.Balasubramaniyan, R. Ranganathan, A text book of Practical Physics, S.Chand&Sons , Reprint 2010.

## **Reference Book(s):**

1. C.C. Ouseph, U.J. Rao& V. Vijayendran, Practical physics and electronics, S. Viswanathan, Pvt,Ltd, First edition,2007.

#### Web Resource(s):

- 1. www.physicstutoruials.org
- 2. www.sciencelearn.org.nz

	Course Outcomes								
Upon successful completion of this course, the student will be able to:									
CO No.	CO Statement	Cognitive Level (K-Level)							
CO1	Remember the basic principles of Electricity, Heat and Electronics.	K1							
CO2	Understand the experimental skills.	K2							
CO3	Understand the characteristics of the semiconductor diodes, transistors and operational amplifiers.	K2							
CO4	Analyze the Electricity and Electronics circuit construction.	K4							
CO5	Evaluate the basic requirements for their higher studies.	K5							

Course		Program	ne Outco	mes (POs	Programme Specific Outcomes (PSOs)					Mean Score	
(COs)	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	of COs
CO1	3	2	1	2	3	2	2	2	3	2	2.2
CO2	3	2	3	2	2	2	2	2	3	2	2.3
CO3	3	3	2	2	2	2	2	2	3	2	2.4
CO4	3	2	3	2	1	2	2	2	2	3	2.2
CO5	3	2	3	3	2	2	2	2	3	2	2.4
								Me	an Overa	II Score	2.3
									Cor	relation	Medium

Mean Overall Score	Correlation
< 1.5	Low
$\geq$ 1.5 and < 2.5	Medium
$\geq 2.5$	High

# **Course Coordinators:**

Dr. A. Mohamed Saleem

Dr. S. Abbas Manthiri

Somestor	C	ourse Code	Course Cotogomy	Hours/	Credite	Marks for Evaluation			
Semester	U	ourse Code	Course Category	Week	Creatis	CIA	ESE	Total	
IV	24	4UAI4GE2	Generic Elective – II	2	2	-	100	100	
		1							
<b>Course Title</b>		Web Design							

SYLLABUS					
Unit	Contents				
I	Introduction to the Internet – Computers in Business – Networking – Internet – Email – Resource Sharing – Gopher – World Wide Web – Usenet – Telnet – Bulletin Board Service – *Wide Area Information Service*				
п	Introduction to HTML – History of HTML – HTML Documents – Anchor Tag – Hyperlinks – Head and Body Sections – Header Section – Title – Prologue – Links – Colourful Web Page –*Comment Lines*.				
III	<ul> <li>Designing the Body Section – Heading Printing – Aligning the Headings –</li> <li>Horizontal Rule – Paragraph – *Tab Settings* – Ordered and Unordered Lists –</li> <li>Lists – Unordered Lists – Ordered Lists.</li> </ul>				
IV	Table Handling – Tables – Table Creation in HTML – HTML Forms – Attributes– Elements – HTML Input types – Attributes – *Forms*				
V	<b>Cascading Style Sheets</b> – Advantages – Coding CSS – Properties of Tags – Property Values – In-line Style Sheets – *Embedded Style Sheets* – External Style Sheets – Positioning.	6			

\*.....\* Self Study

## **Text Book(s):**

- 1. C. Xavier, "World Wide Web Design with HTML", Tata McGraw Hill Company Limited, New Delhi, 19th Reprint 2008.
- 2. N.P. Gopalan, J. Akilandeswari, "Web Technology A Developer's Perspective", Prentice Hall of India Pvt Ltd, 2008

### **Reference Book(s):**

Thomas A. Powell, HTML & XHTML, TMH, Fourth Edition, Thirteenth Reprint, 2007

#### Web Resource(s):

1. <u>https://www.geeksforgeeks.org/the-internet-and-the-web/</u>

2. <u>https://www.w3schools.com/html/default.asp</u>

Course Outcomes						
Upon successful completion of this course, the student will be able to:						
CO No.	CO Statement	Cognitive Level (K-Level)				
CO1	Recall the basics of the Internet	K1				
CO2	Summarize the different Internet devices and their functions	K2				
CO3	Identify the functions of HTML	K3				
CO4	List the concepts of HTML for developing web page	K4				
CO5	Choose Web Pages for real-world problems	K5				

Course	1	Program	ne Outco	mes (POs)	)	Programme Specific Outcomes (PSOs)					Mean Score of
(COs)	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	COs
CO1	3	3	1	2	3	3	3	2	2	2	2.4
CO2	3	3	3	2	1	3	3	3	2	0	2.3
CO3	3	2	3	2	3	2	3	3	3	0	2.4
CO4	2	3	2	2	3	3	3	2	2	2	2.4
CO5	3	3	3	3	3	3	2	3	3	3	2.9
Mean Overall Score									all Score	2.48	
Correlation								relation	Medium		

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

Mean Overall Score	Correlation
< 1.5	Low
$\geq$ 1.5 and $<$ 2.5	Medium
≥ 2.5	High

Course Coordinator: M. Abdullah