

#### MANONMANIAM SUNDARANAR UNIVERISTY, TIRUNELVELI-12

### SYLLABUS

**UG - COURSES – AFFILIATED COLLEGES** 



Course Structure for B. Sc. Computer Science (Choice Based Credit System)

(with effect from the academic year 2021-2022 onwards )

Semester-IV									
Part	Subject Status	Subject Title	Subject Code	Credi t					
III	Core	DATA STRUCTURES	CMCS41	4					
III	Core	COMPUTER ARCHITECTURE	CMCS42	4					
III	Major Practical - IV	DATA STRUCTURE LAB	CMCSP4	2					
III	Allied -IV	MACHINE LEARNING TEQUNIQUES	CACS41	3					
III	Allied Practicals	PYTHON	CACSP4	2					
III	Skill Based – Core II	GREEN FOOT LAB	CSCS41	4					
IV	Non-Major Elective	FUNDAMENTALS OF STATISTICS – II/ ARIMUGA TAMIL	CNMA42/ CNTL41	2					
IV	Common	COMPUTERS FOR DIGITAL ERA	CCDE41	2					
V	Extension Activity	NCC, NSS, YRC, YWF	C5EA41	1					





#### Total Marks: 100 Internal Exam: 25 marks + External Exam: 75 marks

#### A. Scheme for internal Assessment:

Maximum marks for written test: 20 marks3 internal tests, each of I hour duration shall be conducted every semester.To the average of the best two written examinations must be added the marks scored in. The assignment for 5 marks.

The break up for internal assessment shall be: Written test- 20 marks; Assignment -5 marks Total - 25 marks

#### **B.** Scheme of External Examination

**3 hrs.** examination at the end of the semester

- A Part : 1 mark question two from each unit
- B-Part: 5 marks question one from each unit
- C Part: 8 marks question one from each unit

#### > Conversion of Marks into Grade Points and Letter Grades

S.No	Marks	Letter Grade	Grade point (GP)	Performance
1	90-100	0	10	Outstanding
2	80-89	A+	9	Excellent
3	70-79	А	8	Very Good
4	60-69	B+	7	Good
5	50-59	В	6	Above Average
6	40-49	С	5	Pass
7	0-39	RA	-	Reappear
8	0	AA	-	Absent

#### <u>Cumulative Grade Point Average (CGPA)</u>

$$\mathsf{CGPA} = \frac{\Sigma \left(\mathsf{GP} \times \mathsf{C}\right)}{\Sigma \mathsf{C}}$$

- **GP** = Grade point, **C** = Credit
- CGPA is calculated only for Part-III courses
- CGPA for a semester is awarded on cumulative basis

#### > Classification

a)	First Class with Distinction	: CGPA $\geq 7.5^*$	
b)	First Class	: CGPA $\geq 6.0$	
c)	Second Class	: CGPA $\geq$ 5.0 and <	6.0

d) Third Class : CGPA< 5.0



# **DATA STRUCTURES**

#### **COURSE OUTCOMES**

On Successful completion of the course, the student will be able to

- CO1: To understand the concepts of basic data structures.
- CO2: To acquire the knowledge about stack, Queues and Linked list.
- **CO3**: To have general understanding of the network structures through trees and graph.
- **CO4**: To make the students to understand the basic algorithms for sorting.
- **CO5**: Define data structure Algorithms

#### Unit I

**Basic Concepts:-** Algorithm specification – Data Abstraction – Performance Analysis. Arrays and Structures:- Arrays: Abstract data type – Polynomials – Sparse Matrices – Representation of Multidimensional Arrays.

#### Unit II

**Stacks and Queues:**- Stacks – Queues – Evaluation of Expressions. Linked Lists:-Singly Linked Lists and Chains – Linked Stacks and Queues – Polynomials: Polynomial Representation – Adding Polynomials. Sparse Matrices: Sparse Matrix Representation. – Doubly Linked Lists.

#### Unit III

**Trees:**- Introduction – Binary Trees – Binary Tree Traversals: Inorder Traversal – Preorder Traversal – Postorder Traversal. Heaps – Binary Search Trees Forests: Transforming a Forest into a Binary Tree.

#### Unit IV

**Graphs:** - The Graph Abstract Data Type-Elementary Graph Operations – Minimum Cost Spanning Trees: Kruskal's Algorithm – Prim's Algorithm. – Sollin's algorithm Shortest Paths and Transitive Closure: Single Source/ All Destination: Nonnegative Edge Costs - All Pairs Shortest Paths.

#### Unit V

**Sorting:**- Motivation – Insertion Sort – Quick Sort – Merge Sort: Recursive Merge Sort. – Heap Sort – External Sorting: Introduction – k-way Merging. Hashing:- Static Hashing: Hash Tables, Hash functions.

Nesamony Memorial Christian College, Marthandam



#### **Text Book:**

1. Fundamentals of Data Structures in C by Ellis Horowitz, Sartaj Sahni, Susan Anderson- Freed – Second Edition – Universities Press (India) Private Limited(2019).

#### **Reference Books:**

- 1. Data Structures Using C, Second Edition by Reema Thareja Oxford University Press
- 2. Data Structures by Dr N Jeya Prakash Anuradha Publications

### LOCF MAPPING

C	Course code and title : DATA STRUCTURES										
CO/PO			PO				PSO				
	1	2	3	4	5	1	2	3	4	5	% of co's
CO1	3	2	3	2	2	2	3	3	2	2	2.4
CO2	3	3	3	2	2	3	3	3	2	2	2.6
CO3	2	3	3	2	2	2	3	3	2	2	2.4
CO4	2	2	2	3	3	2	2	2	3	3	2.4
CO5	2	2	3	3	3	2	2	3	3	2	2.5
								Ave	rage of	CO's =	= 2.46(high)

Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0

# **COMPUTER ARCHITECTURE**

#### **COURSE OUTCOMES**

On Successful completion of the course, the student will be able to

CO1: Understand the basics of Computers and its Organization

CO2: Know the various Technologies behind the Computer Architecture

CO3: An ability to apply knowledge about hardware implementation and algorithms

CO4: To evaluate various input output organisations

**CO5**: To develop the architecture using various memories

#### UNIT I

**Basic Computer Organization And Design :** Instruction codes – Computer Registers - Computer Instructions - Timing and Control - Instruction Cycle - Control Memory-Address Sequencing



### UNIT II

**Central Processing Unit :** General Register Organization – Stack Organization – Instruction Formats – Addressing Modes – Data transfer and manipulation – Program Control.

### UNIT III

**Computer Arithmetic** : Hardware Implementation and Algorithm for Addition, Subtraction, Multiplication, Division-Booth Multiplication Algorithm-Floating Point Arithmetic.

#### UNIT IV

**Input Output Organization** : Input – Output Interface – Asynchronous data transfer – Modes of transfer – Priority Interrupt – Direct Memory Access (DMA).

#### Unit V

**Memory Organisation:** Memory Hierarchy - Main memory - Auxillary memory - Associative memory - Cache memory - Virtual memory.

#### **Text Book:**

1. Computer system Architecture - by Morris Mano, Third Edition. P.H.I Private Limited.

#### **Reference Books:**

- 1. "Computer System Architecture", John. P. Hayes.
- 2. "Computer Organization, C. Hamacher, Z. Vranesic, S.Zaky.
- 3. "Computer Architecture and parallel Processing ", Hwang K. Briggs.
- 4. "Computer Organization and Architecture, William Stallings, Sixth Edition, Pearson Education, 2003.

#### LOCF MAPPING

Course	Course code and title : COMPUTER ARCHITECTURE										
CO/PO			PO				PSO				
	1	2	3	4	5	1	2	3	4	5	% of co's
CO1	3	2	3	2	2	2	3	3	3	2	2.5
CO2	3	3	3	2	2	3	3	3	2	2	2.6
CO3	2	3	3	2	2	2	3	3	2	2	2.4
CO4	2	2	2	3	3	2	2	3	3	3	2.5
CO5	2	2	3	3	3	2	2	3	3	2	2.5
	•	•	•	•				Ave	rage of	CO's =	2.5(high)

# MACHINE LEARNING TEQUNIQUES

#### **COURSE OUTCOMES**

On Successful completion of the course, the student will be able to

CO1:To introduce students to the basic concepts of Machine Learning.

CO2: To acquire various techniques in Machine learning.

**CO3**:To have a thorough understanding of the Supervised and Unsupervised learning techniques

**CO4**: To study the probability based learning techniques

CO5: To understand graphical models of machine learning algorithms

UNIT I

**INTRODUCTION** : Introduction to analytics an Machine Learning – Why Machine Learning – Framework for Developing Machine Learning Models – Why Python - Python Stack for Data Science. **DESCRIPTIVE ANALYTICS**: Working with Data Frames in Python – Handling Missing vales – Exploration of Data using Visualization-Exercises.

#### UNIT II

**LINEAR REGREION**: Simple Linear Regression – Steps in Building a Regression Model - Building Simple Linear Regression Model – Model Diagnostics – Multiple Linear Regression - Exercises. **CLASSIFICATION PROBLEM**: Classification – Binary Logistic Regression – Credit Classification - Decision Tree – Exercises

#### UNIT III

**ADVANCED MACHINE LEARNING**: Overview – Gradient r Algorithm – Scikit-Learn Library for Machine Learning – Advanced Regression Model – Advanced Machined Machine Learning Algorithm – Exercises.

#### UNIT IV

**CLUSTERING**: Overview – How does Clustering works – K-Means clustering -Creating Product Segments Using Clustering – Hierarchical Clustering. **RECOMENDER SYSTEMS**: Datasets – Association Rules – Collaborative Filtering – Matrix Factorization – Exercises.

#### UNIT V

**TEXT ANALYTICS**: Overview - Sentiment Classification – Naïve-Bayes Model for Sentiment Classification - Using Tf-IDF Vectorizer – Challenges – Exercises.

#### **TEXT BOOK**

1. Machine Learning using Python by Manaranjan Pradhan and U.Dinesh Kumar Wiley publications.

Nesamony Memorial Christian College, Marthandam



#### **REFERENCES:**

1. Tom M. Mitchell, -Machine Learning, McGraw-Hill Education (India) Private Limited, 2013.

#### LOCF MAPPING

Cours	Course code and title : MACHINE LEARNING TEQUNIQUES										
CO/PO			PO	)			PSO				
	1	2	3	4	5	1	2	3	4	5	% of co's
CO1	3	2	3	2	2	2	3	3	3	2	2.5
CO2	3	3	3	2	2	3	3	3	2	2	2.6
CO3	2	3	3	2	2	2	3	3	2	2	2.4
CO4	2	2	2	3	3	2	2	2	3	3	2.4
CO5	2	2	3	3	3	2	2	3	3	2	2.5
	Average of CO's $= 2.48$ (high)										





# DATA STRUCTURE LAB

#### **COURSE OUTCOMES**

On Successful completion of the course, the student will be able to

- CO1: To develop skills in implementing sort and search data structure algorithms
- CO2: To implement queue and stack techniques
- CO3: To design tree traversals
- CO4: To implement binary search tree
- **CO5**: To Compile sorting algorithms

#### **List of Practicals**

- 1. Search an element in a list using Binary Search.
- 2. Implementation of Stack- Push and Pop.
- 3. Implementation of Queue Enqueue and Dequeue
- 4. Implementation of Binary Tree Traversals using recursion.
  - a) Pre-order b) In-order c) Post-Order
- 5. Implementation of Breadth First Search algorithm.
- 6. Implementation of Depth First Search algorithm.
- 7. Implementation of Merge Sort
- 8. Implementation of Quick Sort

#### LOCF MAPPING

Cours	Course code and title : DATA STRUCTURES LAB										
CO/PO			PO				PSO				
	1	2	3	4	5	1	2	3	4	5	% of co's
CO1	3	2	2	3	3	2	3	2	2	3	2.5
CO2	2	3	2	3	3	2	3	2	3	3	2.6
CO3	2	2	3	3	3	2	2	3	3	3	2.6
CO4	2	3	2	3	2	2	2	3	3	3	2.5
CO5	2	3	3	3	3	2	2	2	3	3	2.6
								Aver	age of (	CO's =	2.5(high)



# **PYTHON**

#### **COURSE OUTCOMES**

On Successful completion of the course, the student will be able to

**CO1**: To understand the basic concepts in python

- CO2: To understand the concepts and develop python programs
- **CO3**: To acquire the knowledge about menu driven programs
- CO4: To improve the knowledge in CSV files
- **CO5**: To understand the functions of python
  - 1. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user"s choice.
  - 2. Write a menu-driven program, using user-defined functions to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
  - 3. Write a program (WAP) to display the first n terms of Fibonacci series.
  - 4. WAP to find factorial of the given number.
  - 5. WAP to find sum of the following series for n terms: 1 2/2! + 3/3! n/n!
  - 6. WAP to calculate the sum and product of two compatible matrices.
  - 7. WAP to explore String functions.
  - 8. WAP to create and read a CSV file and display the file contents.
  - 9. WAP to write the text —hello python lin an existing file.
  - 10. WAP to set background color and draw a circle using turtle module

Cours	Course code and title : PYTHON LAB											
CO/PO			PO				PSO					
	1	2	3	4	5	1	2	3	4	5	% of	
											co's	
CO1	2	2	3	2	3	2	2	3	3	3	2.4	
CO2	2	3	3	2	2	2	3	3	3	2	2.5	
CO3	2	2	3	2	3	2	3	3	2	2	2.4	
CO4	2	2	2	3	3	2	2	3	3	3	2.5	
CO5	2	2	3	3	3	2	2	3	3	2	2.5	
								Ave	rage of	CO's =	= 2.52(high)	

### LOCF MAPPING



# **GREEN FOOT LAB**

#### **COURSE OUTCOMES**

On Successful completion of the course, the student will be able to

- CO1: To know about the various Applications of Multimedia.
- **CO2**: To develop two- dimensional graphical applications
- CO3: To design multimedia animations
- CO4: To know the knowledge about video works in multimedia applications
- CO5: To implement interactive games.

#### Write the following program using Greenfoot :

- 1. To change the behaviour of an object.
- 2. For changing images
- 3. To make your own scenarios.
- 4. To create a new world subclass and compile the scenario
- 5. To add an Actor subclass instance to the scenario
- 6. To set up the scenario for gameplay
- 7. Program keyboard interaction
- 8. Using the playSound() method
- 9. To record sounds in Greenfoot
- 10. To changing the image of an instance summarized
- 11. To viewing the images stored in the scenario
- 12. To set an image using the image file name

### LOCF MAPPING

Cours	Course code and title : GREEN FOOT LAB										
CO/PO			PO		-		PSO				
	1	2	3	4	5	1	2	3	4	5	% of co's
CO1	3	2	2	2	2	2	3	2	2	2	2.2
CO2	2	3	2	3	3	2	3	2	3	3	2.6
CO3	2	2	3	3	3	2	2	3	3	3	2.6
CO4	2	3	2	3	2	2	2	3	3	3	2.5
CO5	2	3	3	3	3	2	2	2	3	3	2.6
								Avera	age of (	:0's =	2.5(high)



# FUNDAMENTALS OF STATISTICS-II

#### **Objective:**

• To know the concept of attributes and to study the index numbers and simple problems.

#### **Course Content:**

**UNIT–I** Theory of attributes–two attributes.

#### UNIT –II

Index number –weighted index number.

#### UNIT – III

Consumer Price index number -conversion of index number.

#### UNIT –IV

Time series -measurement of trends.

#### UNIT-V

Curve fitting–Straight line –Parabola –Exponential curve.

#### **Text Book:**

1. Dr. S. Arumugam, A.ThangapandiIssac- Statistics, New Gamma Publishing House, Palayamkottai (2016).

#### **Books for Reference:**

- 1. S.P.Gupta-Elementary Statistical Methods, Sultan Chand & Sons, 2017).
- 2. T. Veerarajan Fundamentals of mathematical Statistics, YesDee Publishing Pvt.Ltd.Edition .(2017)

#### **Course Outcomes:**

On successful completion of the course, the students should be able to

CO	Course Outcome	Knowledge Level
No.		_
CO1	Explain the theory of Attributes	K3
CO2	Illustrate about index numbers and to	K1,K5
	determine the weighted index numbers.	
CO3	Analyse and predict consumer price index	K6
	numbers	
CO4	Evaluate Time series	K4
CO5		K2
	Apply curve fitting for straight line ,parabola	
	and exponential curve	

K1-Remember, K2-Understand, K3-Apply, K4-Analyze, K5-Evaluate, K6-Create



			,		
PSOs PSOs	PSO1	PSO2	PSO3	PSO4	PSO5
Cos					
CO1	2	3	3	3	3
CO2	2	2	3	3	3
CO3	3	3	2	2	2
CO4	3	2	1	2	3
CO5	2	3	1	3	3
Total contribution of	12	13	11	13	14
COs to PSOs					
Weighted Percentage	80	86.67	73.33	86.67	93.33
of COs contribution					
to PSOs					

#### **CO-PSO** mapping (Course Articulation Method)

# அறிமுகத்தமிழ்

#### அலகு- 1 : செய்யுள் பகுதி

- 1. கடவுள் வாழ்த்து
- 2. **கல்வி**:
- 3. அறம்
- 4. ஆத்திதூடி
- 5.ஓடி விளையாடு பாப்பா
- 6. பசுவும் கன்றும் பாடல்

### குறிப்பு:- மனப்பாடப்பகுதி

- 1. கடவுள் வாழ்த்து
- 2. கல்வி
- 3. அறம்
- 4. ஆத்திச்சூடி

#### அலகு-2: கதை வாசித்து கதை சொல்லல்

- 1. பணிமிருந்தும் பட்டினி
- 2. அறிவால் வெல்லுவேன்

#### அலகு-3 : பொதுக்கட்டுரை

- 1. ஒன்றுபட்டால் உண்டு வாழ்வு
- 2. வாய்மையே வெல்லும்
- அலகு -4 : சொற்பொருள் அறிதல்

#### அலகு- 5: மொழித்திறன் பயிற்சி



# **COMPUTERS FOR DIGITAL ERA**

#### **Objectives:**

1. To create the awareness about the digital India among the student community.

2. To make the student to understand the role of computer in the day to day living.

3. To create the awareness about the e-learning and security issues.

#### Unit I

#### FUNDAMENTALS OF COMPUTERS

The role of computers in the modern society – Types of Computers and their specifications – Server – Desk Top Computers - Lap Top – Tablet – Smart Phones - Block diagram of Digital Computer –Working Principle of Computer, I/O Devices – Central Processing Unit – Types of Memory - Display – Port – UPS – Setting up and Maintenance of Computer.

#### Unit II

#### **TYPES OF SOFTWARE AND OFFICE AUTOMATION**

Types of Software with examples – System Software – Application Software – Utility Software - Operating System – Basics on Windows – Introduction to Android –Application Software - Free Open source software – Database and its applications – Office Automation Software – applications of Microsoft Word – Microsoft Power Point – Microsoft Excel.

#### Unit III

#### INTERNET AND MOBILE APPLICATIONS

Introduction to computer networks – LAN – WAN – MAN – Wired and wireless network – Wi Fi Networks - Network Devices – Modem – Switch – Router – Broad Band – Leased Lines- Internet – WWW – URL- Browser – e-mail – SMS – MMS - Client Server Computing - Cloud – Public and Private cloud – Mobile Applications.

#### Unit IV

#### **E – GOVERNANCE IN INDIA**

E-Governance initiative by the Government – Digital India Platform – Agencies enabling Digital India - Electronic Payment and Receipt – Digital Locker – e-district service – electronic signature service – Digital AIIMS – India BPO Scheme – Integrated Nutrient Managment – GIS – Mobile Seva App Store- GARV- Grameen Vidyutikaran



#### Unit V

#### **E – LEARNING AND MOOC**

E – Learning – Digital Library – E- Journals – Introduction to MOOC – Edex – Course era etc - SWAYAM – NPTEL – Cyber Security – Virus – Malware – Network Security - Hacking – Big Data – Data Analytics – Social Networks – Social Media Analytics- Introduction to IT Act.

### > 10 Hours Practical Sessions are to be allotted for Computer & Mobile Applications

#### Suggested List of Exercises:

- 1. Setting up of computers Connecting I/O device, UPS, CPU, Printers, Mouse, Key Boards, Pen Drives, etc. (Mandatory)
- 2. Minor fault findings.
- 3. Preparing a word Document and saving, copying files, deleting files, renaming files, etc. (Mandatory)
- 4. Preparing slides Animation Slide Transition Back Ground Changing Word Art, etc. (Mandatory)
- 5. Preparing Mark Sheet with Excel Calculating First Class, second class, etc. (Mandatory)
- Browsing Searching for documents e-mail id creation Useful mobile apps – downloading. (Mandatory)
- 7. Data/Wi-Fi Connectivity and Exchanging of Data.
- 8. Electronic Payment Online Application Processing
- 9. Browsing for NPTEL/ SWAYAM Courses
- 10. Browsing the useful e-learning sites

#### **Learning Outcomes:**

At the end of the course the students will be able to:

- 1. apply the computing technology in their day to day life
- 2. create awareness regarding digital India initiatives to their surroundings

3. identify the areas where he can extend the digital computing for their benefits.

#### **Text Book:**

1. E- Materials of Manonmaniam Sundaranar University on "Computer for Digital Era", <u>http://msuniv.ac.in</u>



#### **References:**

- 1. Andrew S. Tanenbaum, Computer Networks, 4th Edition, Eastern Economy Edition, PHI Private Ltd, New Delhi, 2003.
- 2. Gautam Shroff, Enterprise Cloud Computing, Technology, Architecture, Applications, Cambridge University Press, First Edition, 2010.
- 3. Reza B'Far, Mobile Computing Principles, Cambridge University Press, First Edition, 2005.
- 4. Charles P Pfleeger, Shari Lawrence Pfleeger, Security in Computing, I Edition, Pearson Education, 2003.
- 5. <u>https://swayam.gov.in</u>
- 6. <u>http://www.digitalindia.gov.in/content/social-media-analytics</u>

Scheme of Examination								
Internal – 25 Marks External – 75 Marks								
Internal Break Up - 15 for Continuous Assessment Test (CAT) + 5 for Assignment + 5 for								
Seminar. 3 CATs (Two tests on Theory and on	e on Practical )are to be conducted							



