ARUL ANANDAR COLLEGE (AUTONOMOUS), KARUMATHUR, MADURAI. Department of Computer Science & Applications PG Course Structure (Those who join in 2023-24 onwards) Semester-I

Course Components	Subject Code	Name of the Course	Credits	Hours
	23PCAC11	Core: 1		
		Mathematical Foundations of Computer	5	6
		Science		
	23PCAC21	Core: 2	л	5
		Python Programming	4	J
	23PCAC31	Core: 3		
		Relational Database Management	4	5
Part III				
	23PCAE11	Elective 1:	2	Л
		Operating System	5	4
	23PCAP11	Core Lab 1:		
		Data Engineering and Management -	3	5
		Practical		
	23PCAP21	Core Lab 2 :Python Programming -	2	5
		Practical	5	5
		Total	22	30

Semester-II

Course Components	Subject Code	Name of the Course	Credits	Hours
	23PCAC42	Core 4: Data Structures and Algorithms	5	6
	23PCAC52	Core 5: Web Technologies	4	5
	23PCAC62	Core 6: Data Communication & Networking	4	5
Part III	23PCAE22	Elective 2: Data Mining & Warehousing	3	4
	23PCAP32	Core Lab 3 : Data Structures and Algorithms – Practical	3	5
	23PCAP42	Core Lab 4 : Web Technologies -Practical	3	5
		Total	22	30

Course Components	Subject Code	Name of the Course	Credits	Hours
	23PCAC73	Core 7:	Е	c
		Advanced Java Programming	5	0
	23PCAC83	Core 8:	л	5
		Mobile Application Development	4	5
	23PCAC93	Core 9:	л	5
		Big Data Analytics	4	5
	23PCAE33	Elective 3:	2	л
Part III		Cyber Security	5	-
	23PCAP53	Core Lab 5:		
		Advanced Java Programming –	4	5
		Practical		
	23PCAP63	Core Lab 6 :		
		Mobile Application Development	3	5
		– Practical		
	23PINT13	2	-	
		Total	25	30

Semester-IV

Course Components	Subject Code	Name of the Course	Credits	Hours
	23PCAD04	Core: 10		
		Industry Dynamics Technology-	4	6
		R Programming		
	23PCAD14	4	6	
	23PCAD24	Core 12:	4	6
Dart III		4	0	
raitii	23PCAD34	Core 13 : (Professional		
		Competency Skill)	1	2
		Professional Ethics		
	23PCAD44	Project	7	5
	23PCAP74	Core Lab 7 :	2	E
		5	5	
	23	30		

Total Credit: 92

Credits for each Semester

Semester	I	II	III	IV	Total	
Credits	22	22	25	23	92	

ARUL ANANDAR COLLEGE (AUTONOMOUS), KARUMATHUR

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

Class : MCA Semester :1 Subject Code : 23PCAC11 Part : Core - 1 Hours : 90 Credit : 5

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

OBJECTIVES:

The course enables the students to

- Understand the Mathematical logics and Predicate Calculus
- Analyze critically about set theory and their relations
- Interpret the fundamentals of Groups
- Understand the Graph and its Representations
- Understand the basics of language and its Grammar

UNIT I

Mathematical logic – Statements – Negation – Conjunction – Disjunction – Statement formulae and truth tables – Conditional and Bi-conditional - Well formed formulas – Tautologies - contradictions-Boolean Algebra-Basic Operations-Boolean functions-De-Morgan's Theorem-Logic Gates-sum of Product-Canonical form-simplifications-K-map.

UNIT II

Basic concepts of set theory: Notation – sub set-operations on set-algebra on set-venn diagram-collection of sets-multiset-countable and uncountable sets-orddered pairs and Cartesian product-computer representation sets-fuzzy sets.

UNIT III

Groups: Definition and examples – Sub groups – Homomorphism and Isomorphism Groupscyclic group-permutation group.

UNIT IV

Graph theory: Basic Definitions-simple graph ,multigraph and psuedograph-Degree of a vertex-Types of Graphs-operations on graphs-paths, cycles and connectivity-Eulerian and Hamiltonian Graph-Shortest path problem

UNIT V

Trees and their properties-Spanning Trees-Binary Tree-Tree Traversal-Grammars and languages: Introduction-String-Languages-Regular **Expressions-Grammars-Finite** State Machines-finite State Automata-Moore and Mealey Machine-Pushdown Automata-Turing Machine.

(18 hours)

(18 hours)

(18 hours)

Page 1829

(18 hours)

(18 hours)

BOOKS FOR STUDY

Dr.Swapan Kumar Sharma, Discrete Mathematics, S.Chand Publications, 2017.

BOOKS FOR REFERENCE

- 1. Kolman Bernard, Robert C.Busby, *Discrete Mathematical Structures for Computer Science*, Second EditionPHI, 2014.
- 2. Hopcroft, Joseph E. Ullman, Jeffery D, *Introduction to Automata Theory Languages and Computations*, Narosa Publishing House, New Delhi, 2014.
- 3. Levin Oscar, Discrete Mathematics An Open Introduction, Third Edition, 2013.

TEACHING METHODS

- > Lecturing
- Group Discussions
- PPTs
- Learning by Doing
- Video tutorials

COURSE OUTCOMES:

On the successful completion of course students will be able to

CO1: Solve the problems using truth table technique, rules of inference method.(K3)

CO2: Apply the concepts of Set theory and Relation in real life problem (K3)

CO3: Demonstrate the basics of groups and sub groups.(K2)

CO4: Apply the Graph theory concepts in Computer Network and Computer Graphics.(K3)

CO5: Understand the concepts of Grammar and languages.(K2)

K1= Remember K2 = Understand K3= Apply K4=Analysis K5= Evaluate K6= Create

MAPPING COURSE OUTCOME WITH POS AND PSOS

	PO	РО	РО	РО	РО	РО	РО	РО	PSO	PSO	PSO	PSO	PSO	Sum of
	1	2	3	4	5	6	7	8	1	2	3	4	5	COs
														with
														PSOs&
														POs
CO1	2	2	2	2	2	1	-	-	2	1	-	2	3	19
CO2	3	2	2	2	2	1	-	-	2	1	-	2	3	20
CO3	2	3	1	3	2	1	-	-	1	-	-	1	2	16
CO4	3	2	2	1	2	1	-	-	2	3	-	2	3	21
CO5	2	3	3	I	1	1	1	I	1	1	-	2	2	16
				Gr	and t	otal o	f COs	with	PSOs a	nd POs	5			106
Grand total with PSOs and POs														
Mean value of COs with PSOs and POs = = (106/ 48)											2.20			
						Num	ber of	COs re	elating	with PS	Os& PC	Ds		

Strong – 3, Medium -2, Low - 1

Mapping Scale	1	2	3							
Relation	0.01to 1.0	1.01 to 2.0	2.01 to 3.0							
Quality	Low	Medium	Strong							
Mean Value of COs			2.20							
with PSOs and POs										
Observation	COs of Mathematical Foundation of Computer Science –									
	Strongly related with PSOs and POs									

ARUL ANANDAR COLLEGE (AUTONOMOUS)-KARUMATHUR DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

Class : MCA Semester : I Part : Core-2 Hours : 75 Credit : 4

Subject Code : 23PCAC21

PYTHON PROGRAMMING

OBJECTIVES:

The course enables the students to

- Understand the basic features of Python
- Develop Python programs with conditionals and loops and data structures
- Build composite data types in Python
- Design and write efficient application using OOPs concepts
- Design and program Python applications with database.

UNIT- I: INTRODUCTION TO PYTHON

Overview – History of Python – Python features - Installing Python-Basics Syntax-VariablesAssignments-Immutable variables-Numerical types-Arithmetic Operators-Experssions -Comments in the Program-Understanding the error Messages - DATA, EXPRESSIONS, STATEMENTS: Python interpreter and interactive mode; values and types: int, float, boolean, string, and list; variables, expressions, statements, precedence of operators, comments; modules and functions, function definition and use, flow of execution, parameters and arguments

UNIT II: CONTROL FLOW, FUNCTIONS, STRINGS

Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays. Strings: A String Is a Sequence, Traversal with a for Loop, String Slices, Strings Are Immutable, Searching, Looping and Counting, String Methods, The in Operator, String Comparison, String Operations

UNIT- III: LISTS, TUPLES, DICTIONARIES, FILES

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing – list comprehension - Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions

UNIT IV: REGULAR EXPRESSIONS, OOP

Regular Expressions – Concept of regular expression, various types of regular expressions, using match function. Classes and Objects: Overview of OOP (Object Oriented Programming), Class Definition, Creating Objects, Instances as Arguments, Instances as return values, Built-in Class Attributes, Inheritance, Method Overriding, Data Encapsulation, Data Hiding

(15 Hours)

(15 Hours)

(15 Hours)

(15 Hours)

UNIT V: GUI PROGRAMMING

(15 Hours)

Widgets: Button, Canvas, Checkbutton, Entry, Frame, Label, Listbox, Menubutton, Menu, Message, Radiobutton, Scale, Scrollbar, text, Toplevel, Spinbox, PanedWindow, LabelFrame, Messagebox. Handling Standard attributes and Properties of Widgets - Connecting to a MySQL database from Python, Configuring the MySQL connection, Designing the Python GUI database, Using the INSERT command, Using the UPDATE command, Using the DELETE command, Storing and retrieving data from MySQL database.

BOOKS FOR STUDY

- 1. Downey Allen. B, *Think Python: How to Think Like a Computer Scientist*, Second Edition, O'Reilly Publishers, 2016,
- 2. Rossum Van Guido, Jr Drake Fred. L, *An Introduction to Python Revised and updated for Python 3.2*, Network Theory Ltd., 2011.
- 3. Goldwasser Michael. Letscher H, David, *Object-oriented Programming in Python*, Pearson Prentice Hall, 2008

BOOKS FOR REFERENCE

- 1. Dierbach Charles, Introduction to Computer Science using Python: A Computational Problem- Solving Focus, Wiley India Edition, 2013
- 2. Guttag John. V, Introduction to Computation and Programming Using Python, Revised and expanded Edition, MIT Press, 2013
- 3. Budd Timothy A, *Exploring Python*, Mc-Graw Hill Education (India) Private Ltd, 2015

COURSE OUTCOMES

On the successful completion of the course the students will able to

CO1: Develop simple Python programs for solving problems.(K3)

- **CO2:** Write simple Python programs and decompose a Python program into functions.(K2)
- **CO3:** Understand compound data and read and write data from/to files in Python Programs. (K3)

CO4: Develop programming using OOPs concepts in python. (K3)

CO5: Create the GUI Form and Adding Widgets and design GUI database. (K6)

K1= Remember K2 = Understand K3= Apply K4=Analysis K5= Evaluate K6= Create

	РО	PSO	PSO	PSO	PSO	PSO	Sum of							
	1	2	3	4	5	6	7	8	1	2	3	4	5	COs with
														PSOs&
														POs
CO1	3	3	2	3	2	2	-	-	3	3	-	3	3	27
CO2	3	2	2	2	2	3	-	-	3	2	-	3	3	25
CO3	3	2	3	3	2	3	-	-	3	2	-	3	3	27
CO4	3	2	3	3	2	3	-	-	3	2	-	3	3	27
CO5	3	2	3	3	2	3	-	-	3	2	-	3	3	27

MAPPING COURSE OUTCOME WITH POS AND PSOS

Grand total of COs with PSOs and POs					
Grand total with PSOs and POs					
Mean value of COs with PSO and POs = (133/50)	2.66				
Number of COs relating with PSOs& POs					

Strong – 3, Medium -2, Low – 1

Mapping Scale	1	2	3					
Relation	0.01 to 1.0	1.01 to 2.0	2.01 to 3.0					
Quality	Low	Medium	Strong					
Mean Value of COs			2.66					
with PSOs and POs								
Observation	COs of Python Programming– Strongly related with PSOs and							
	POs							

ARUL ANANDAR COLLEGE (AUTONOMOUS), KARUMATHUR DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

Class : MCA Semester :1 Subject Code : 23PCAC31 Part : Core - 3 Hours : 75 Credit : 4

RELATIONAL DATABASE MANAGEMENT SYSTEM

Objectives:

The course enables the students to

- Understand the fundamentals of data models and conceptualize database system and ER diagram.
- Recognize the SQL and relational database design.
- Understand the data storage techniques.
- Familiar with about query processing techniques
- Know about the knowledge in transaction processing, concurrency control techniques and recovery procedures.

UNIT I

Database Systems -View of Data- Data Models-Database Languages-Transaction Management-Database Systems Structure-History of Database Systems-Database Systems Applications-Entity Relationship Model

UNIT II

SQL-Basic Structure-Set Operations-Complex Queries-Joined Queries-DDL-Embedded SQL-Other SQL Functions-Query by Example-Integrity and Security of searching-Relational Database Design

UNIT III

Storage And File Structure-Disks-RAID-File Organization-Indexing And Hashing-B+ TREE-B Tree-Static Hashing-Dynamic Hashing-Multiple Key Access

UNIT IV

Query Processing- Selection Operation- Sorting-Join Operation- Evaluation of **Expressions-Query Optimization**

UNIT V

(15 Hours)

Transaction Concept-Static Implementation-Concurrency Control-Protocols-Deadlock Handling-Recovery Systems-Recovery with Concurrent Transactions

BOOK FOR STUDY

1. Silberschatz<u>Abraham</u>, Korth<u>Henry F.</u>, <u>Sudarshan</u>. S, Database System Concepts, 7th Edition, Tata McGraw Hill Publications, 2019

BOOKS FOR REFERENCE

1. RamakrishnanRaghu, GehrkeJohannes, Data Base Management Systems, Third Edition McGraw Hill International, New Delhi, 2014

(15 Hours)

(15 Hours)

(15 Hours)

(15 Hours)

- 2. Koch George, LoneyKelvin, Oracle8 The Complete Reference, Tenth Edition, Tata McGraw., New Delhi, 2000
- 3. Date C.J, An Introduction to Database Systems, Third Edition, Narosa Publishing House, 2012

TEACHING METHODS

- ➢ Lecturing
- Group Discussions
- PPTs
- Learning by Doing
- Video tutorials

COURSE OUTCOMES

On the successful completion of the course the students will able to

CO1: Understand the basic concepts of the database and data models (K2)

CO2: Apply the knowledge on the effective use of queries (K3)

CO3: Apply the storage techniques for the effective use of memory (K3)

CO4: Apply the query processing and optimization techniques (K3)

CO5: Apply the concurrency and recovery techniques (K3)

K1=Remember K2=Understand K3=Apply K4=Analysis K5=Evaluate K6=Create

MAPPING COURSE OUTCOMES WITH PO AND PSO

	РО	PO	РО	РО	РО	РО	РО	РО	PSO	PSO	PSO	PSO	PSO	Sum of
	1	2	3	4	5	6	7	8	1	2	3	4	5	COs with
														PSOs& POs
CO1	3	2	2	1	2	2	-	-	2	1	1	3	2	21
CO2	3	3	3	3	2	2	-	-	3	2	1	3	3	28
CO3	3	3	3	2	2	2	-	-	3	-	-	3	2	24
CO4	3	3	2	3	2	3	-	-	3	-	-	3	3	25
CO5	3	3	2	3	2	3	-	-	3	2	-	3	2	27
					Grand	d tota	l of CC)s wit	h PSOs	and PC)s			125
Grand total with PSOs and POs														
Mean value of COs with PSOS and POs = = (125 / 52)										2.4				
Number of COs relating with PSOs& POs														

Strong – 3, Medium -2, Low – 1

Mapping Scale	1	2	3					
Relation	0.01to 1.0	1.01 to 2.0	2.01 to 3.0					
Quality	Low	Medium	Strong					
Mean Value of COs			2.4					
with PSOs and POs								
Observation	COs of Relational Database Management Systems – Strongly							
	related with PSOs an	related with PSOs and POs						

ARUL ANANDAR COLLEGE (AUTONOMOUS), KARUMATHUR DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

Class : MCA Semester : I Subject Code : 23PCAE11 Part : Elective 1 Hours : 60 Credits: 3

OPERATING SYSTEM

OBJECTIVES:

The course enables the students to

- Understand the process concepts and its related algorithms.
- Analyze the concept of Deadlock prevention, Avoidance, Detection and Recovery
- Describe about storage management concepts like swapping, paging and Segmentation
- Review the process Management and disk performance optimization
- Understand the Securities applied in various Operating Systems

UNIT IOPERATING SYSTEMS OVERVIEW

Operating system – Types of Computer Systems - Computer-system operation – I/O structure – Hardware Protection - System components – System calls – System programs – System structure - Process concept – Process scheduling – Operations on processes – Cooperating processes – Inter-process communication – Communication in client server systems -Multithreading models – Threading issues.

UNIT II PROCESS MANAGEMENT

Scheduling criteria – Scheduling algorithms – Multiple-processor scheduling – Real time scheduling – Algorithm Evaluation – Process Scheduling Models - The critical-section problem – Synchronization hardware – Semaphores – Classic problems of synchronization – critical regions – Monitors - System model – Deadlock characterization – Methods for handling deadlocks – Recovery from deadlock

UNIT III STORAGE MANAGEMENT

Memory Management – Swapping – Contiguous memory allocation – Paging – Segmentation – Segmentation with paging. Virtual Memory: Background – Demand paging – Process creation – Page replacement – Allocation of frames – Thrashing.

UNIT IV I/O SYSTEMS

File concept – Access methods – Directory structure – Files system mounting – Protection - Directory implementation – Allocation methods – Free-space management - Disk scheduling – Disk management – Swap-space management.

UNIT V CASE STUDY

The Linux System - History – Design Principles – Kernel Modules – Process Management – Scheduling – Memory management – File systems – Input and Output – Inter-process Communication – Network Structure – Security – Windows 7 - History – Design Principles – System Components – Environmental subsystems – File system – Networking

(12 Hours)

(12 Hours)

(12 Hours)

(12 Hours)

(12 Hours)

BOOK FOR STUDY

1. Silberschatz Abraham, Galvin Peter. B, Gagne Greg, *Operating System Concepts*, Ninth Edition, John Wiley and Sons Inc, 2013.

BOOKS FOR REFERENCE

- 1. Tanenbaum Andrew. S, Bos Herbert, *Modern Operating Systems*, Fourth Edition, Pearson PLC, 2014,
- 2. Nutt Gary, Operating Systems, Third Edition, Pearson Education, 2009
- 3. Deital H M, Deital P J, Choffnes D R, *Operating Systems*, Third Edition, Pearson Education., 2009

TEACHING METHODS

- ➢ Lecturing
- Group Discussions
- PPTs
- Learning by Doing
- Video tutorials

COURSE OUTCOMES

On the successful completion of the course the students will able to:

- CO1: Describe the evolution, types, structure and functions of operating systems (K1)
- CO2: Understand the concept of Concurrent Programming (K2)
- CO3: Understand the techniques involved in Storage Management system (K2)
- CO4: Analyze processor scheduling, synchronization, deadlocks and disk allocation algorithms for a given scenario (K4)
- CO5: Describe security and protection measures used in operating systems (K2)

K1=Remember K2=Understand K3=Apply K4=Analysis K5=Evaluate K6=Create

MAPPING COURSE OUTCOME WITH PO AND PSO

	РО	РО	РО	РО	РО	РО	РО	РО	PSO	PSO	PSO	PSO	PSO	Sum of
	1	2	3	4	5	6	7	8	1	2	3	4	5	COs with
														PSOs &
														POs
CO1	3	2	2	1	1	2	-	-	з	1	-	2	2	19
CO2	3	3	2	1	1	2	-	-	3	1	-	2	2	20
CO3	3	3	3	2	1	2	-	-	3	1	-	2	2	31
CO4	3	3	2	2	1	2	-	-	3	1	-	2	2	21
CO5	3	2	2	1	1	2	-	-	3	1	-	2	2	19
					Grane	d tota	l of CC)s wit	h PSOs	and PC)s			110
Grand total with PSOs and POs														
Mean	value	of COs	s with	PSO ar	nd POs	=					— = (1	10/50)		2.2
						Num	ber of	COs re	elating v	vith PSC	Os& POs			

Strong – 3, Medium -2, Low – 1

Mapping Scale	1	2	3				
Relation	0.01 to 1.0	1.01 to 2.0	2.01 to 3.0				
Quality	Low	Medium	Strong				
Mean Value of COs	2.2						
with PSOs and POs							
Observation	COs of Operating System – Strongly related with PSOs and POs						

ARUL ANANDAR COLLEGE (AUTONOMOUS)-KARUMATHUR DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

Class

: MCA

Semester :1

Subject Code : 23PCAP11

Part : Core Lab-1 Hours : 75 Credit: 3

DATA ENGINEERING AND MANAGEMENT-PRACTICAL

COURSE OBJECTIVES:

- To acquire basic scripting knowledge in MongoDB
- To learn CRUD Operation on MongoDB database
- To comprehend MongoDB using DbVisualizer
- To be familiar with Zoho CRM features
- To customize your application using Zoho CRM
- 1. Write a script to create a MongoDB database and perform insert operation
- 2. Write a MongoDB script to perform query operations
- 3. Write a MongoDB Script to perform update operations
- 4. Write a MongoDB Script to update documents with aggregation pipeline
- 5. Write a MongoDB script to delete single and multiple documents
- 6. Write a MongoDB script to perform string aggregation operations
- 7. Design a Data Model for MongoDB using DbVisualizer
- 8. Perform CRUD operations using DbVisualizer
- 9. Create a Zoho CRM account and organize your Tasks, Meetings and Deals
- 10. Create and maintain a project using Zoho CRM features

COURSE OUTCOMES

On the successful completion	Description	Knowledge Level
CO1	Comprehend the scripting knowledge in MongoDB and perform basic operations in shell prompt	
CO2	Implement, Create, Read, Update and Delete Operations on MongoDB database	K1- K6
CO3	Analyze MongoDB using DbVisualizer	
CO4	Assess Zoho CRM features for managing the customer relationships	
CO5	Create a customized application in Zoho CRM	

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

MAPPING COURSE OUTCOME WITH POS AND PSOS

	РО	РО	PO	РО	РО	РО	РО	РО	PSO	PSO	PSO	PSO	PSO	Sum
	1	2	3	4	5	6	7	8	1	2	3	4	5	of COs
														with
														PSOs&
														POs
CO1	3	3	3	3	2	2	-	-	3	3	-	3	3	28
CO2	3	2	3	3	2	3	-	-	3	2	-	3	3	27
CO3	3	2	2	3	2	3	-	-	3	2	-	3	3	26
CO4	3	2	2	3	2	3	-	-	3	2	-	3	3	26
CO5	3	2	2	3	2	3	-	-	3	2	-	3	3	26
				(Grand	total	of COs	with	PSOs a	nd Pos				131
							Gran	d total	with PS	SOs and	POs			
Mean	value	of COs	with F	SOs a	nd POs	; =					=	(131/5	0)	2.62
						Numl	ber of	COs re	lating w	vith PSO	s & POs			

Strong – 3, Medium -2, Low - 1

Mapping Scale	1	2	3				
Relation	0.01to 1.0	1.01 to 2.0	2.01 to 3.0				
Quality	Low	Medium	Strong				
Mean Value of COs			2.62				
with PSOs and POs							
Observation	COs of Python Programming Lab – Strongly related with PSOs and						
	Pos						

ARUL ANANDAR COLLEGE (AUTONOMOUS)-KARUMATHUR DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

Class : MCA

Semester : I Subject Code : 23PCAP21 Part : Core Lab-2 Hours : 75 Credit : 3

PYTHON PROGRAMMING - PRACTICAL

OBJECTIVES:

The course enables the students to

- Understand the basic concepts in Python Data Types and Control Flow
- Develop Python programs with conditionals and loops and data structures
- Build list, tuple, dictionaries
- Develop program using OOPs concepts in Phython
- Design and program Python applications with database.

PROGRAM LIST

- 1. Write a program to demonstrate different number data types in Python.
- 2. Write a program to perform different Arithmetic Operations on numbers in Python.
- 3. Write a program to create, concatenate and print a string and accessing sub-string from a given string.
- Write a python script to print the current date in the following format Sun May 29 02:26:23 IST 2017
- 5. Write a python program to find largest of three numbers.
- Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula : c/5 = f-32/9]
- 7. Write a Python program to construct the following pattern, using a nested for loop*
 - * * * * * *
 - *
- 8. Write a program to create, append, and remove lists in python.
- 9. Write a Python program to clone or copy a list
- 10. Write a program to demonstrate working with tuples in python.
- 11. Write a program to demonstrate working with dictionaries in python.
- 12. Write a Python script to sort (ascending and descending) a dictionary by value

- 13. Write a python program to define a module and import a specific function in that module to another program.
- 14. Write a script named copyfile.py. This script should prompt the user for the names of two text files. The contents of the first file should be input and written to the second file.
- 15. Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order.
- 16. Write a Python class to implement pow(x, n)
- 17. Write a Python class to reverse a string word by word.
- 18. Design a simple database application that stores the records and retrieve the same.
- 19. Design a database application to search the specified record from the database.
- 20. Design a database application to that allows the user to add, delete and modify the records.

COURSE OUTCOMES

On the successful completion of the course the students will able to

CO1: Write simple Python programs for solving problems.(K3)

CO2:Decompose a Python program into functions.(K3)

CO3: Manipulate compound data types and files in Python Programs.(K4)

CO4: Write programming using OOPs concepts in python.(K3)

CO5: Create the Python application for real world problems.(K6)

K1= Remember K2 = Understand K3= Apply K4=Analysis K5= Evaluate K6= Create

	РО	PO	PO	РО	РО	РО	РО	РО	PSO	PSO	PSO	PSO	PSO	Sum of
	1	2	3	4	5	6	7	8	1	2	3	4	5	COs
														with
														PSOs&
														POs
CO1	3	3	3	3	2	2	-	-	3	3	-	3	3	28
CO2	3	2	3	3	2	3	-	-	3	2	-	3	3	27
CO3	3	2	2	3	2	3	-	-	3	2	-	3	3	26
CO4	3	2	2	3	2	3	-	-	3	2	-	3	3	26
CO5	3	2	2	3	2	3	-	-	3	2	-	3	3	26
				C	Grand	total	of COs	with	PSOs a	nd Pos				131
Grand total with PSOs and POs														
Mean	value	of COs	with I	PSOs a	nd POs	5 =					=	= (131/5	0)	2.62
						Nun	nber o	f COs r	elating	with PS	Os & PC	Ds		

MAPPING COURSE OUTCOME WITH POS AND PSOS

Strong – 3, Medium -2, Low – 1

Mapping Scale	1	2	3				
Relation	0.01 to 1.0	1.01 to 2.0	2.01 to 3.0				
Quality	Low	Medium	Strong				
Mean Value of COs			2.62				
with PSOs and POs							
Observation	COs of Python Programming Lab – Strongly related with PSOs and						
	Pos						

ARUL ANANDAR COLLEGE (AUTONOMOUS), KARUMATHUR DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

Class : MCA Semester : 11 Subject Code : 23PCAC42

DATA STRUCTURES AND ALGORITHMS

COURSE OBJECTIVES:

- To get a clear understanding of various ADT structures.
- To understand how to implement different ADT structures with real-time scenarios.
- To analyze the various data structures with their different implementations.
- To get an idea of applying right models based on the problem domain.
- To realize, and understand how and where to implement modern data structures with Python language.

UNIT-I

(18 Hours)

Part : Core -4

Hours: 90 Credit : 5

Abstract Data Types: Introduction-Date Abstract Data Type-Bags-Iterators. Arrays: Array Structure-Python List-Two Dimensional Arrays-Matrix Abstract Data Type. Sets, Maps: Sets-Maps- Multi-Dimensional Arrays.

UNIT-II

(18 Hours)

Algorithm Analysis: Experimental Studies-Seven Functions-Asymptotic Analysis. Recursion: Illustrative Examples-Analyzing Recursive Algorithms-Linear Recursion- Binary Recursion-Multiple Recursion.

UNIT-III

Stacks, Queues, and Deques: Stacks- Queues- Double-Ended Queues Linked. Lists: Singly Linked Lists-Circularly Linked Lists-Doubly Linked Lists. Trees: General Trees-Binary Trees-Implementing Trees-Tree Traversal Algorithms.

Unit-IV

Priority Queues: Priority Queue Abstract Data Type- Implementing a Priority Queue- Heaps-Sorting with a Priority Queue. Maps, Hash Tables, and Skip Lists: Maps and Dictionaries-Hash Tables- Sorted Maps-Skip Lists-Sets, Multisets, and Multimaps.

UNIT-V

Search Trees: Binary Search Trees-Balanced Search Trees-AVL Trees-Splay Trees. Sorting and Selection: Merge sort-Quick sort-Sorting through an Algorithmic Lens- Comparing Sorting Algorithms-Selection. Graph Algorithms: Graphs-Data Structures for Graphs-Graph Traversals-Shortest Paths-Minimum Spanning Trees.

TEXT BOOK:

1. Rance D. Necaise, "Data Structures and Algorithms Using Python", John Wiley & Sons, 2011. (Unit – 1) Chapters: 1, 2, 3.

(18 Hours)

(18 Hours)

(18 Hours)

 Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser, "Data Structures and Algorithms in Python", John Wiley & Sons, 2013. (Unit – 2, 3, 4, and 5)Chapters: 3 to 12, and 14.

REFERENCE BOOKS:

- 1. Dr. Basant Agarwal; Benjamin Baka, "Hands-On Data Structures and Algorithms with Python: Write complex and powerful code using the latest features of Python 3.7", Packt Publishing, 2018.
- 2. Magnus Lie Hetland, "Python Algorithms: Mastering Basic Algorithms in the Python Language", Apress, 2014.

COURSE OUTCOME:

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

CO1	Understand various ADT concepts	
CO2	Familiar with implementation of ADT models with Python language and understand how to develop ADT for the various real-time problems	
CO3	Apply with proper ADT models with problem understanding	K1-K6
CO4	Apply and Analyze right models based on the problem domain	
CO5	Evaluate modern data structures with Python language	

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

MAPPING COURSE OUTCOME WITH POS AND PSOS

Outcomes	PO	PO	РО	PO	РО	РО	РО	PO	PSO	PSO	PSO	PSO	PSO	Sum of
	1	2	3	4	5	6	7	8	1	2	3	4	5	Cos with
														PSOs&
														POs
CO1	3	3	2	1	1	3	-	-	3	3	-	3	3	25
CO2	3	3	2	1	2	3	-	-	3	3	-	3	3	26
CO3	3	3	3	1	2	3	-	-	3	3	-	3	3	27
CO4	3	3	3	2	2	3	-	-	3	3	-	3	3	28
CO5	3	3	3	2	2	3	-	-	3	3	-	3	3	28
			Gra	nd to	tal of	COs v	with P	SOs a	nd Pos	5				134
Grand total with PSOs and POs														
Mean value	of COs	with	PSOs a	and PC)s = —						- = (134	i / 50)		2.68
					Nur	nber o	of COs	relati	ng with	PSOs8	N POs			

Strong – 3, Medium -2, Low – 1

Mapping Scale	1	2	3				
Relation	0.01to 1.0	1.01 to 2.0	2.01 to 3.0				
Quality	Low	Medium	Strong				
Mean Value of COs			2.68				
with PSOs and Pos							
Observation	COs of Data Structures using C++ – Strongly related with PSOs and						
	Pos						

ARUL ANANDAR COLLEGE (AUTONOMOUS), KARUMATHUR DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

Class : MCA Semester : II

Subject Code : 23PCAC52

Part : Core 5 Hours : 75 Credit : 4

WEB TECHNOLOGIES

COURSE OBJECTIVES:

- Understand the fundamentals of the web and thereby develop web applications using various development languages and tools.
- Enrich knowledge about XHTML control and Cascading Style Sheets.
- Provide in- depth knowledge about Javascript.
- To enhance knowledge in XML documents with presentations using CSS.
- Deliver depth knowledge about PHP, Mysql

UNIT –I

(15 Hours)

WEB FUNDAMENTALS AND HTML: A Brief Introduction to the Internet - The World Wide Web - Web Browsers - Web Servers -URLs, MIME, HTTP, Security- Introduction to HTML- Origins and Evolution of HTML and HTML - Basic Syntax - Standard HTML Document Structure - Basic Text Markup - Images- Hypertext Links - Lists, Tables, Forms, The Audio Element, The Video Element - Organization Elements.

UNIT – II

(15 Hours)

INTRODUCTION TO XHTML AND CSS: Basic syntax, Standard structure, Basic text-markup, Images, Hypertext Links. Lists, Tables, Forms, Frames, syntactic differences between HTML and XHTML-Introduction, Levels of style sheets, Style specification formats, Selector forms, Property value forms, Font properties, List properties, Color, Alignment of text, The box model, Background images, The and <div>tags, Conflict resolution.

UNIT - III

(15 Hours)

THE BASICS OF JAVASCRIPT: Overview of JavaScript, Object orientation and JavaScript, general Syntactic characteristics, Primitives, operations, and expressions, Screen output and keyboard input, Control statements, Object creation and modification, Arrays, Functions, Constructors, Pattern matching using regular expressions, Errors in scripts.

JAVASCRIPT AND XHTML DOCUMENTS: The JavaScript Execution Environment, The Document Object Model, Elements Access in Java Script, Events and Event Handling, Handling Events from Body Elements, Handling Events from Text Box and password Elements, The DOM2 Model UNIT- IV

(15 Hours)

XML: Introduction of XML- Some current applications of XML, Features of XML, Anatomy of XML document, The XML Declaration, Element Tags- Nesting and structure, XML text and text formatting element, Table element, Mark-up Element and Attributes, Document Type Definition (DTD), types.

UNIT - V

(15 Hours)

PHP and MySQLIntroduction and basic syntax of PHP, decision and looping with examples, PHP and HTML, Arrays, Functions, Browser control and detection, string, Form processing, Files, Advance Features: Cookies and Sessions, Object Oriented Programming with PHP. Basic commands with PHP examples, Connection to server, creating database, selecting a database, listing database, listing table names, creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables, PHPMyAdmin and database bugs

TEXT BOOKS:

1. HTML5 Black Book: Covers CSS3, JavaScript, XML, XHTML, Ajax, PHP and Jquery, Kogent Learning Solutions 2016.

REFERENCE BOOKS:

- 1. M. Srinivasan: Web Programming Building Internet Applications, 3rdEdition, Wiley India, 2009.
- 2. Jeffrey C. Jackson: Web Technologies-A Computer Science Perspective, Pearson Education, 7thImpression,2012.
- 3. M.Srinivasan: Web Technology Theory and Practice, 1st Edition, Pearson Education, 2012.

4. Raj Kamal: Internet and Web Technologies, 2nd Edition, McGraw Hill Education, 2022.

COURSE OUTCOMES:

On the successful completion of the course, students will be able

CO1	Design dynamic web pages using Javascript, Jquery and	K1	LO
	Angular Java script		
CO2	Develop Web pages using HTML, CSS and XML	К2	10
CO3	Create web application using PHP and MySQL	K3 <i>,</i> K4	HO
CO4	To design dynamic web pages using Angular javascript	K2,K3	HO
CO5	Develop interactive web pages using Jquery	K4,K5	HO

ARUL ANANDAR COLLEGE (AUTONOMOUS), KARUMATHUR DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

Class : MCA

Part : Core 6

Subject Code : 23PCAC62

Hours : 75 Credit : 4

DATA COMMUNICATIONS AND NETWORKING

OBJECTIVES:

Semester

The course enables the students to

: 11

- Describe the building blocks of Computer Networks
- Analyze Analog and Digital signals and Interfaces
- Describe transmission media and error detection methods
- Understand the functions of protocol and Networking devices
- Understand the concepts of Domain Name System

UNIT I

Data communication system components – Network criteria – Protocols and Standards – Basic concepts: line configuration, topology, transmission mode, categories of networks and internetworks – the OSI Reference model – functions of each layer.

UNIT II

Signals – Analog signal – Frequency spectrum and bandwidth – Digital signals – decompositions, Bandwidths and data rate – Encoding of analog and digital signals – digital data transmission DTE – DCE interface.

UNIT III

(15 Hours)

(15 Hours)

(15 Hours)

(15 Hours)

Multiplexing - Transmission media - Types of transmission errors –Error Detection and Correction methods – Data link controls and protocols.

UNIT IV

Local Area Networks: Ethernet, Token bus, Token ring and FDDI. **MANs**: IEEE 802.6 and SMDS, Switching in network layer- The ISDN services – the X.25 layers - Repeaters, Bridges, Routers and Gateway.

UNIT V

(15 Hours)

The transport layer service – Upper OSI Layers – TCP and UDP- Domain n Name System - SMTP – WWW.

BOOK FOR STUDY

1. Foruzan Behrouz A, *Data Communications and Networking*, Fourth Edition, Tata McGraw-Hill, 2009

BOOK FOR REFERENCE

1. Tanenbaun Andrew. S, *Computers Networks*, Forth Edition, 2009, Pearson Prentice Hall. **TEACHING METHODS**

- Lecturing
- Group Discussions
- PPTs
- Learning by Doing
- Video tutorials

COURSE OUTCOMES (CO)

On successful completion of the course the students able to

CO1: Understand the building blocks of Computer Networks (K2)

CO2: Understand Analog and Digital Signals and Interfaces (K2)

CO3: Apply appropriate transmission media and error detection methods for applications (K4)

CO4: Analyze the Appropriate Protocols and Networking Devices (K4)

CO5: Execute Knowledge in Domain Name Systems (K3)

```
K1= Remember K2 = Understand K3= Apply K4=Analysis K5= Evaluate K6= Create
```

	PO	PO	PO	РО	РО	РО	РО	РО	PSO	PSO	PSO	PSO	PSO	Sum
	1	2	3	4	5	6	7	8	1	2	3	4	5	of Cos
														with
														PSOs&
														POs
CO1	2	2	1	1	1	3	-	-	3	2	-	2	3	23
CO2	2	2	2	1	-	3	-	-	3	1	-	3	2	22
CO3	3	2	2	2	1	3	-	-	3	2	-	2	3	27
CO4	2	2	2	1	-	3	-	-	3	2	-	2	3	22
CO5	2	2	2	1	1	2	-	-	3	2	-	2	2	23
Grand total of Cos with PSOs and Pos											117			
Grand total with PSOs and POs														
Mean value of Cos with PSO and POs = = (117/59)											1.98			
						Numb	er of (COs re	lating w	ith PSO	s& POs			

MAPPING COURSE OUTCOME WITH

Strong – 3, Medium -2, Low - 1

Mapping Scale	1	2	3				
Relation	0.01to 1.0	1.01 to 2.0	2.01 to 3.0				
Quality	Low	Medium	Strong				
Mean Value of COs		1.98					
with PSOs and POs							
Observation	COs of Data Communications and Network – Medium						
	related with PSOs and Pos						

ARUL ANANDAR COLLEGE (AUTONOMOUS)-KARUMATHUR DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS DATA MINING AND DATA WAREHOUSING

Class : MCA

Semester : II

Subject Code : 23PCAE22

Objectives:

The course enables the students to

- Know about data mining
- Understand the technologies of data mining
- Gain knowledge about data warehousing
- Understand the technologies of data warehousing
- Compare and analyze different types of clustering methods for real time problem

UNIT I Data Mining:

Introduction –Motivation for data mining-Learning from your past mistakes-Measuring data mining effectiveness-embedding data mining with your business process-discovery verses prediction-over fitting-state of the industry-comparing the technologies

UNIT II Data Mining Technologies:

Decision Trees —-Where to use Decision tree?-the general idea - how decision tree works?- Artificial Neural Networks — what is Neural network?-Where to use neural network? — general idea- how neural network works?-Nearest Neighbor and Clustering-Where to use Clustering and network neighbor prediction?-general idea-how it works?-clustering types-nearest neighbor prediction-Fuzzy Logic and Genetic Algorithms-usage of genetic algorithm-general idea-how genetic algorithm works?-Rule Induction-Where to use?-The general idea-how it works?-Selecting and using the Right Techniques

UNIT III Data Warehousing:

Introduction-Data warehouse architecture-sourcing, acquisition, cleanup, and transformation tools-metadata-Access tools-data marts-considerations for Building a data warehouse-implementations-Data Warehousing vendors-benefits-Business Analysis-reporting and query tools and applications-tool categories-applications-OLAP-Need of OLAP- Multi Dimensional Data Model - OLAP guidelines-OLAP and the Internet

UNIT IV Decision Making:

Decision making with patterns and models-basic terms-right model – sampling-Experimental Design-Computer intensive statistics-picking the best model – statistics -data, counting, probability-hypothesis testing-prediction-some current statistics tools.

UNIT V Case Studies:

Predicting Wireless Telecommunications Churn with CART - Predicting currency exchange rates with neural network- Image recognition for human handwriting using nearest neighbor and clustering-optimizing predictive customer segments using genetic algorithm-U.S. Census Returns with rule induction

Book for Study:

1. Alex Berson, Stephen J Smith, "Data Mining, Data Warehousing, & OLAP", 2018, TMH.

echniques (12 Hours)

(12 Hours)

(12 Hours)

Part III : Elective2 Hours : 60 Credits: 3

(12 Hours)

(12 Hours)

Books for Reference:

- 1. Usama M. Fayyad, Gregory Piatetsky Shapiro, Padhrai Smyth And RamasamyUthurusamy, Advances In Knowledge Discovery And Data Mining, 1996, The M.I.T Press.
- 2. Ralph Kimball, The Data Warehouse Life Cycle Toolkit, 1998, John Wiley & sons Inc.
- 3. Sean Kelly, Data Warehousing In Action, 1997, John Wiley & Sons Inc.

Web References:

- 1. Introduction to DM and DW:
 - https://www.topcoder.com/thrive/articles/data-warehousing-and-data-mining
- 2. Applications of Data Mining: https://link.springer.com/chapter/10.1007/978-3-540-30480-7_22
- 3. Data Mining: <u>https://onlinecourses.nptel.ac.in/noc20_cs12/preview</u>
- 4. Introduction to Data Mining and OLAP: <u>https://www.youtube.com/watch?v=m-aKj5ovDfg</u>
- 5.ClusterAnalysis:<u>https://www.tutorialspoint.com/data_mining/dm_cluster_analysis_.html</u>

Teaching Methods

- > Lectures
- Group Discussions
- > PPTs
- Learn by Doing
- Video Tutorials

Course Outcomes:

On successful completion of the course students will be able to

CO1: Understand the basic concepts of Data Mining (K2)

CO2: Understand the basic concepts of Data Warehousing (K2)

CO3: Identify appropriate rule mining techniques to solve real world problems (K3)

CO4: Able to analyze different types of classification (K4)

CO5: Compare and evaluate different types of clustering algorithms (K5)

K1=Remember K2=Understand K3=Apply K4=Analysis K5=Evaluate K6=Create

Mapping Course outcome with PO and PSO

	PO	PSO	PSO	PSO	PSO	PSO	Sum of COs							
	1	2	3	4	5	6	7	8	1	2	3	4	5	with PSOs&
											POs			
CO1	3	2	-	-	2	3	2	1	3	2	3	1	3	25
CO2	3	2	-	-	2	2	1	2	3	3	2	2	3	25
CO3	3	2	-	-	2	3	1	1	3	3	2	2	3	25
CO4 3 2 1 2 2 - 2 3 2 1 2										20				
CO5	3	2	-	-	2	3	2	1	3	2	3	1	3	25
Grand total of COs with PSOs and POs										120				

Mean Value of COs with PSOs and POs=Grand total of COs with PSOs and	2.22
POs/Number of COs relating with PSOs and POs=(120/54)	

Strong - 3, Medium - 2, Low -1

Mapping Scale	1	2	3			
Relation	0.01to 1.0	1.01 to 2.0	2.01 to 3.0			
Quality	Low	Medium	Strong			
Mean Value of COs			2.22			
with PSOs and POs						
Observation	COs of Data Mining and Data Warehousing – Strongly related with					
	PSOs and POs					

ARUL ANANDAR COLLEGE (AUTONOMOUS), KARUMATHUR **DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS**

Class : MCA Semester : 11

Part : Core Lab 3 Hours : 75

Subject Code : 23PCAP32

Credit : 3

DATA STRUCTURES AND ALGORITHMS PRACTICAL

COURSE OBJECTIVES:

- To understand Stack , Queue and Doubly Linked ADT structures.
- To implement different ADT structures with real-time scenarios.
- To analyze the recursion concepts.
- To apply different sorting and tree techniques.
- To implement modern data structures with Python language.

IMPLEMENT THE FOLLOWING PROBLEMS USING PYTHON 3.4 AND ABOVE

- 1. Recursion concepts.
 - i) Linear recursion
 - ii) Binary recursion.
- 2. Stack ADT.
- 3. Queue ADT.
- 4. Doubly Linked List ADT.
- 5. Heaps using Priority Queues.
- 6. Merge sort.
- 7. Quick sort.
- 8. Binary Search Tree.
- 9. Minimum Spanning Tree.
- 10. Depth First Search Tree traversal.

COURSE OUTCOME:

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

CO2To become a familiar with implementation of ADT modelsCO3Apply sort and tree search algorithmsK1-K6CO4Evaluate the different data structure modelsK1-K6	CO1	Strong understanding in various ADT concepts	
CO3 Apply sort and tree search algorithms K1-K6 CO4 Evaluate the different data structure models K1-K6	CO2	To become a familiar with implementation of ADT models	
CO4 Evaluate the different data structure models	CO3	Apply sort and tree search algorithms	K1-K6
	CO4	Evaluate the different data structure models	
CO5 Learn how to develop ADT for the various real-time problems	CO5	Learn how to develop ADT for the various real-time problems	

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

MAPPING COURSE OUTCOME WITH POS AND PSOS

	РО	РО	PO	РО	РО	РО	PO	РО	PSO	PSO	PSO	PSO	PSO	Sum of
	1	2	3	4	5	6	7	8	1	2	3	4	5	COs with
										PSOs&				
														POs
CO1	3	3	3	2	1	3	-	-	3	3	-	3	3	27
CO2	3	3	3	2	1	3	-	-	3	3	-	3	3	27
CO3	CO3 3 3 3 2 1 3 3 3 - 3 3										27			
CO4	3	3	3	2	1	3	-	-	3	3	-	3	3	27
CO5	3	3	3	2	1	3	-	-	3	3	-	3	3	27
Grand total of COs with PSOs and POs											135			
Grand total with PSOs and POs														
Mean value of COs with PSOs and POs == (135/50)										2.70				
						1	Numb	er of (COs rela	iting wi	th PSO	s& POs		

Strong – 3, Medium -2, Low - 1

Mapping Scale	1	2	3			
Relation	0.01to 1.0	1.01 to 2.0	2.01 to 3.0			
Quality	Low	Medium	Strong			
Mean Value of COs			2.70			
with PSOs and POs						
Observation	COs Data Structures using C++ Lab – Strongly related with PSOs					
	and Pos					

ARUL ANANDAR COLLEGE (AUTONOMOUS), KARUMATHUR DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

Class : MCA Semester : II Subject Code : 23PCAP42 Part : Core Lab 4 Hours : 75 Credit : 3

WEB TECHNOLOGIES - PRACTICAL

COURSE OBJECTIVES:

At the end of the course, the student should be able to do:

- Learn how to create web pages using HTML, CSS and Javascript.
- Implement dynamic web pages using Javascript, Jquery and Angular Java script
- To create web applications using PHP and MySQL
- Create web pages using XML and Cascading Style Sheets
- Create XML documents and Schemas.

PROGRAM LIST

- 1. Develop a web page to display your education details in a tabular format.
- 2. Develop a web page to display your CV on a web page.
- 3. Design a Homepage having three links: About Us, Our Services and Contact Us. Create separate web pages for the three links.
- 4. Design a web page to demonstrate the usage of inline CSS, internal CSS and external CSS.
- 5. Design an XML document and create a style sheet in CSS & display the document in the browser.
- 6.Develop a web page to Create image maps.
- 7. Design a web page to perform input validation using Angular Javascript.
- 8. Develop a web page in PHP to fetch details from the database.
- 9. Design a web page to hide paragraph using JQuery
- 10. Create a web page and add Javascript to handle mouse events and form

events

COURSE OUTCOMES:

On the successful completion of the course, students will be able

CO1	Design dynamic web pages using JavaScript, Jquery and Angular Java script	K1	LO
CO2	Develop Web pages using HTML, CSS and XML	К2	10
CO3	Create web application using PHP and MySQL	K3, K4	HO
CO4	Develop interactive web pages using Jquery	K2,K3	НО
CO5	To design dynamic web pages using Angular javascript	K4,K5	HO

ARUL ANANDAR COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS CBCS and OBE PATTERN (Those who join from 2022-2023 onwards)

For Two Years MCA

		Semester I		
Part	Sub. Code	Title	Hours per week	Credits
	22PCAC11	Core-1 Data Structure using C++	4	4
	22PCAC21	Core -2 Digital Computer Architecture	4	4
		Core-3 Mathematical Foundations of	4	4
Core	22PCAC31	Computer Science		
		Core-4 Relational Database Management	4	4
	22PCAC41	Systems		
Practical	22PCAP11	Core Lab1-Data Structure using C++ Lab	5	3
	22PCAP21	Core Lab2 -RDBMS Lab	5	3
	22PCAE11	Computer Graphics and Multimedia		
Core		Systems		
Elective I		Software Testing	4	3
		Principles of Management		
		Total	30	25
		Semester II		
	22PCAC52	Core-5 Advanced Java Programming	4	4
	22PCAC62	Core-6 Operating Systems	4	4
	22PCAC72	Core-7 Web Programming	4	4
Core	22PCAC82	Core-8 Computer Networks & Security	4	4
		Core Lab3-Advanced Java Programming	5	3
Practical	22PCAP32	Lab		
	22PCAP42	Core Lab4-Web Programming Lab	5	3
	22PCAE22	Organizational Behavior	4	3
Core		Object Oriented Analysis and Design		
Elective II		Open Source Technologies		
		Total	30	25
		Semester III		
	22PCAC93	Core-9 Data Analysis with Python	4	4
	22PCAD03	Core-10 Programming Smart Devices	4	4
Core	22PCAD13	Core-11 Data Mining and Data	4	4
		Warehousing		
	22PCAD23	Core-12 Machine Learning	4	4

		Core Lab5 – Data Analytics using Python	5	3
	22PCAP53	Lab		
Practical	22PCAP63	Core Lab6- Mobile App Development Lab	5	3
	22PCAE33	Artificial Intelligence	4	3
Core		Cloud Computing		
Elective				
III		Internet of Things		
		Total	30	25
		Semester IV		
	22PCAD34	Core-13-Dot Net Programming	4	4
	22PCAD44	Core-14-Software Engineering	4	4
Core	22PCAD54	Core-15 Project /Internship	-	6
	22PCAD64	Comprehensive Viva	-	1
Practical	22PCAP74	Core Lab-7 Dot Net Programming- Lab	5	2
		Total	13	17

Credits for each Semester

Semester	Semester I		III	IV	Total
Credits	25	25	25	17	92*
		Core	: 83		
		Core Elective	: 09)	
		Total	: 92	2*	

*Self Learning Courses

- 1. SWAYAM/MOOC
- 2. NPTEL
- 3. Any Online Certified Course offered by IIT that is recognized by MHRD

(Each paper is awarded with 2 credits at the end of the course)

ARUL ANANDAR COLLEGE (AUTONOMOUS), KARUMATHUR DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS (Outcome Based Syllabus under CBCS Structure for the students admitted from the Academic Year 2020-2021)

Programme Outcome (PO)

- **PO1:** Demonstrate profound comprehension of the concepts, theories, and principles in the disciplinary knowledge and appreciate its contextual significance.
- **PO2:** Conceptualize the theories, formulate decision making models, and design solutions to the growing national needs together with the reflective analysis of its implications
- **PO3:** Develop the skills of analytical reasoning and associate the relevance of the theoretical concepts in various perspectives
- **PO4:** Critically evaluate the practical utility of translating theory into praxis and lab into land towards societal upliftment.
- **PO5:** Undertake creative research initiatives with innovative Trans-disciplinary approach for catering the contemporary needs of rural development.
- **PO6:** Empower themselves by digital, communication, programming and professional skills for a suitable career in this competitive globe.
- **PO7:** Engage in self-directed and life-long learning and elicit optimal personality by rising in leadership qualities, active involvement in teamwork, and collaboration with the members of the diverse cultural groups in the society.
- **PO8:** Emerge as responsible citizens with the awareness of their role in promoting environmental sustainability and gender equity together with the adsorption of ethical, social, moral and cultural values.

PROGRAMME SPECIFIC OUTCOMES (PSO)

On completion of MCA programme, the students are expected to

- **PSO1:** Understand and apply the technical and domain knowledge on analysis, design and development of applications in the computing discipline.
- **PSO2:** Use of recent technology, skill and knowledge for computing practice with commitment on societal, moral values.
- **PSO3:** Work professionally with positive attitude as an individual or in multidisciplinary teams and communicate effectively.
- **PSO4:** Ability to utilize modern computer technologies, environments, and platforms in creating innovative career paths to be an employable, and contribution towards society.
- **PSO5:** Inculcate employability and entrepreneur skills among students who can develop customizes solutions for small to large Enterprises

ARUL ANANDAR COLLEGE (AUTONOMOUS)-KARUMATHUR DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS DATA ANALYSIS WITH PYTHON

Class : MCA

Semester : 111

Subject Code : 22PCAC93

Objectives:

The course enables the students to

- Explore knowledge domains and implications of data analysis process
- Understand python coding conventions and constructs
- Explore methods and attributes of numpy library of python
- Explore methods and attributes of pandas library of python
- Explore methods and attributes of matplotlib library of python

UNIT- I: INTRODUCTION TO DATA ANALYSIS

Knowledge domains – Nature of Data – Data Analysis process – Data definition – Data extraction - Data preparation - Data Visualization - Data modelling - Model validation -Deployment – Quantitative data analysis – Qualitative data analysis – Open data sources – Case study: An example of Meteorological data

UNIT II: INTRODUCTION TO PYTHON

Primitive Data types – operators – statements – control structures – conditional constructs – looping constructs - strings - List - Tuples - set - Dictionaries - functions - files - operations on file objects – GUI programming with tkinter – widgets and containers – Database Programming with mysqlDB – Creating table objects – manipulating table objects – SQL statements – Miscellaneous standard libraries

UNIT- III: THE NUMPY LIBRARY

Creating an array object – Intrinsic creation of an array – Arithmetic operators – Increment and Decrement operators – Universal functions – Aggregate functions – Indexing arrays – Slicing arrays – Iterating arrays – Boolean arrays – Structured array – Array manipulation

UNIT IV: THE PANDAS LIBRARY

Pandas data structures – The Series – The Dataframe – The Index object – Reindexing – dropping – Arithmetic and data alignment – Flexible Arithmetic methods – Operation between Dataframe and series – Functions by elements – Functions by rows – Functions by columns – Statistics functions – Sorting and Ranking – Correlation and Covariance

UNIT V: THE MATPLOTLIB LIBRARY

Data Visualization with matplotlib - matplotlib architecture - Backend layer - Artist Layer -Scripting layer - the Pyplot library - working with multiple figures and axes - adding text adding grid – adding legends – handling Date values – Chart typology – Line chart – Histogram – Bar chart – Pie chart – Advanced charts – mplot3D – multi panel plots

Books for study

- 4. Fabio Nelli, Python Data Analytics: Data Analysis and Science using pandas, matplotlib and the python programming language, APress, 2015
- 5. Magnus Lie Hetland, Beginning Python: From novice to professional, APress, 2008

(12 HOURS)

(12 HOURS)

(12 HOURS)

(12 HOURS)

(12 HOURS)

Part : III Core 9 Hours : 60Credit:4

Books for Reference

- 1. Wes McKinney, Python for Data Analysis, 201,O'Reilly.
- 2. Peters Morgan, Data Analysis from scratch with Python: Step by step guide, 2016, AI Sciences.

Web References

- 1. Python for Data Science, <u>https://swayam.gov.in/</u>
- 2. Python for Data Science and Machine Learning Bootcamp, <u>https://www.udemy.com/</u>
- 3. Introduction to Python Programming, <u>https://www.udacity.com/</u>
- 4. PYTHON A to Z Full Course for Beginners, <u>https://www.udemy.com/</u>

Course Outcomes

On the successful completion of the course the students will able to

- **CO1:** Explore on data analysis process and its knowledge domains (K3)
- **CO2:** Understand python code constructs and their applications (K2)
- **CO3:** Incorporate in-built methods and attributes of NumPy library of Python for array manipulation (K4)
- **CO4:** Incorporate methods of Pandas library for statistical manipulations and to implement statistical functions (K4)
- **CO5:** Implement Data visualization using matplotlib of python (K6)

K1= Remember K2 = Understand K3= Apply K4=Analysis K5= Evaluate K6= Create **Mapping Course outcome with PO and PSO**

	PO	PO	PO	PO	PO	PO	PO	PO	PSO	PSO	PSO	PSO	PSO	Sum of
	1	2	3	4	5	6	7	8	1	2	3	4	5	COs with
														PSOs &
														POs
CO1	3	3	2	3	2	2	-	-	3	3	-	3	3	27
CO2	3	2	2	2	2	3	-	-	3	2	-	3	3	25
CO3	3	2	3	3	2	3	-	-	3	2	-	3	3	27
CO4	3	2	3	3	2	3	-	-	3	2	-	3	3	27
CO5	3	2	3	3	2	3	-	-	3	2	-	3	3	27
			G	irand	total	of CO	Ds wi	th PS	Os and	l POs				133
Me	Mean Value of COs with PSOs and POs=Grand total of COs with PSOs and													
	P	Os/N	lumb	er of	COs r	elatiı	ng wi	th PS	Os and	POs=	(133/5	0)		

Strong – 3, Medium -2, Low – 1

Mapping Scale	1	2	3						
Relation	0.01 to 1.0	1.01 to 2.0	2.01 to 3.0						
Quality	Low	Medium	Strong						
Mean Value of COs			2.66						
with PSOs and POs									
Observation	Ubservation COs of this course is strongly related with PSOs and POs								

ARUL ANANDAR COLLEGE (AUTONOMOUS), KARUMATHUR **DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS PROGRAMMING SMART DEVICES**

Class : MCA : 111 Semester Subject Code : 22PCAD03

Objectives:

The course enables the students to

- Understand the features of React Native.
- Apply knowledge and skills of Project Components.
- Analyze the elements of Components.
- Apply debugging of react Native app.
- Apply Knowledge to publishing the app.

UNIT I:

Introduction to React Native-Advantages of React Native-Risk and Draw Backs-Working with React Native-Rendering life cycle-Creating Components in React Native-Working with views-JSX-Styling Native Components-Building your first Application-Setting up-Installing-ios Dependencies-Android Dependencies-Creating new Application-Running react native on ios-Running React Native on Android.

UNIT II:

Imports in React Native-Project Components-Building Weather app-Handling user Input-Displaying Data-Adding background Image-Fetching Data from the Web-Components for mobile-Analogy between HTML elements and Native components-Text Components-Image Component-Using Touchable Highlight-React Pan Responder-Working with Organizational Components-Navigators.

UNIT III:

Styles-Declaring and Manipulating styles-Inline Style-Styling with Objects-style Concatenation-Exploring style object-Passing Styles as Prop-Reusing and Sharing Styles-Positioning and Designing Layouts-Layouts with Flexbox-Platform API-Geolocation-Handling Permission-Accessing User Image and Camera-Uploading Image to server.

UNIT IV:

Debugging-Debugging with Console.log-Using Java script Debugger-Working with the react developer tools-React Native Debugging Tools-Common Xcode Problems-Common Android Problems-issues deploying to an ios device.

UNIT V:

Deploying to ios App Store-Preparing xcode project-selecting and target ios version-Launch Screen Images-Adding Application icon-Deploying Android application-Launch icon setting-Building the API for release-Beta Testing-Submitting app to play store.

Book for Study

1. Bonnie Eisenmen, "Learning React Native- Building Native Mobile App with Java Script", 2016, First Edition, O' Reilly Media Inc.

(12 HOURS)

(12 HOURS)

(12 HOURS)

(12 HOURS)

(12 HOURS)

: 60 Hours

: Core –10

Credits : 4

Part

Web Sites for Reference

1.<u>https://reactnative.dev/docs/getting-started</u>

2. https://www.netguru.com/glossary/react-native

3. <u>https://www.youtube.com/watch?v=ANdSdIlgsEw</u>

Teaching Methods

- Lecturing
- Group Discussions
- > PPTs
- Learn by Doing
- Video tutorials

Course Outcomes

On the successful completion of the course students will be able to:

CO1:Understand React Native Applications(K2)

CO2:Apply knowledge to create project.(K3)

CO3:Create Component Elements.(K6)

CO4:Analyze debugging of react Native application (42)

CO5:Create Apps for Publish on Play store.(K6)

K1=Remember K2=Understand K3=Apply K4=Analysis K5=Evaluate K6=Create

Mapping Course outcome with PO and PSO

	РО 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	Sum of COs with PSOs&
	_	_		-		•	-		_	_		-	•	POs
CO1	3	3	3	2	1	3	-	-	3	3	-	3	3	27
CO2	3	3	3	2	1	3	-	-	3	3	-	3	3	27
CO3	3	3	3	2	1	3	-	-	3	3	-	3	3	27
CO4	3	3	3	2	1	3	-	-	3	3	-	3	3	27
CO5	3	3	3	2	1	3	-	-	3	3	-	3	3	27
			G	irand	total	of CO	Ds wi	th PS	Os and	l POs				135
Me	Mean Value of COs with PSOs and POs=Grand total of COs with PSOs and POs/Number of COs relating with PSOs and POs=(135/50)													2.7

Strong – 3, Medium -2, Low – 1

Mapping Scale	1	2	3
Relation	0.01 to 1.0	1.01 to 2.0	2.01 to 3.0
Quality	Low	Medium	Strong
Mean Value of COs			2.7
with PSOs and POs			
Observation	COs of Mobile Applica	tion Development–Stro	ongly related with PSOs
	and POs		

ARUL ANANDAR COLLEGE (AUTONOMOUS)-KARUMATHUR DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS DATA MINING AND DATA WAREHOUSING

Class : MCA

Semester : 111

Subject Code : 22PCAD13

Objectives:

The course enables the students to

- Know about data mining
- Understand the basic concepts of data warehousing
- Gain knowledge about various techniques of rule mining
- Able to do classification and prediction among data
- Compare and analyze different types of clustering methods for real time problem

UNIT I DATA MINING

Introduction - Steps in KDD - System Architecture - Types of data -Data mining functionalities -Classification of data mining systems - Data Warehouse Design Methodology - Integration of a data mining system with a data warehouse - Issues - Data Preprocessing- Managing the Data Warehouse - Data Mining Applications

UNIT II DATA WAREHOUSING

Data warehousing components - Building a data warehouse - Multi Dimensional Data Model -OLAP Operation in the Multi Dimensional Model - Three Tier Data Warehouse Architecture -Schemas for Multi-dimensional data Model - Online Analytical Processing (OLAP) - OLAP Vs **OLTP Integrated OLAM and OLAP Architecture**

UNIT III ASSOCIATION RULE MINING

Mining frequent patterns - Associations and correlations - Mining methods - Finding Frequent itemset using Candidate Generation - Generating Association Rules from Frequent Itemsets -Mining Frequent itemset without Candidate Generation - Mining various kinds of association rules - Mining Multi-Level Association Rule-Mining Multi Dimensional Association Rule Mining Correlation analysis - Constraint based association mining.

UNIT IV CLASSIFICATIONAND PREDICTION

Classification and prediction - Issues Regarding Classification and Prediction - Classification by Decision Tree Induction - Bayesian classification - Baye's Theorem - Naïve Bayesian Classification - Bayesian Belief Network - Rule based classification - Classification by Back propagation -Support vector machines - Prediction - Linear Regression

UNIT V CLUSTERING, APPLICATIONS AND TRENDS IN DATA MINING (12 Hours)

Cluster analysis - Types of data in Cluster Analysis - Categorization of major clustering methods -Partitioning methods - Hierarchical methods - Density-based methods - Grid-based methods -Model based clustering methods -Constraint Based cluster analysis - Outlier analysis - Social Impacts of Data Mining- Case Studies: Mining WWW- Mining Text Database Mining Spatial Databases

Book for Study:

1. Michael Corey, Michael Abbey, Ian Abramson, Ben Taub, "Oracle 8i Data Warehousing", 2001, TMH.

Part : III Core 11 Hours : 60 Credits: 4

(12 Hours)

(12 Hours)

(12 Hours)

(12 Hours)

2. Jiawei Han Micheline Kamber, "Data mining & Techniques", 2011, Morgan Kaufmann Publishers.

Books for Reference:

- 4. Alex Berson, Stephen J. Smith, Data Warehousing, Data Mining, & OLAP, 2004, Tata McGraw Hill.
- 5. Usama M. Fayyad, Gregory Piatetsky Shapiro, Padhrai Smyth And Ramasamy Uthurusamy, Advances In Knowledge Discovery And Data Mining, 1996, The M.I.T Press.
- 6. Ralph Kimball, The Data Warehouse Life Cycle Toolkit, 1998, John Wiley & sons Inc.
- 7. Sean Kelly, Data Warehousing In Action, 1997, John Wiley & Sons Inc.

Web References:

- 1. Introduction to DM and DW:
 - https://www.topcoder.com/thrive/articles/data-warehousing-and-data-mining
- 2. Applications of Data Mining: https://link.springer.com/chapter/10.1007/978-3-540-30480-7_22
- 3. Data Mining: <u>https://onlinecourses.nptel.ac.in/noc20_cs12/preview</u>
- 4. Introduction to Data Mining and OLAP: <u>https://www.youtube.com/watch?v=m-aKj5ovDfg</u>
- 5.ClusterAnalysis:<u>https://www.tutorialspoint.com/data_mining/dm_cluster_analysis.ht_ml</u>

Teaching Methods

- Lectures
- Group Discussions
- > PPTs
- Learn by Doing
- Video Tutorials

Course Outcomes:

On successful completion of the course students will be able to

CO1: Understand the basic concepts of Data Mining (K2)

CO2: Understand the basic concepts of Data Warehousing (K2)

CO3: Identify appropriate rule mining techniques to solve real world problems (K3)

CO4: Able to analyze different types of classification (K4)

CO5: Compare and evaluate different types of clustering algorithms (K5)

K1=Remember K2=Understand K3=Apply K4=Analysis K5=Evaluate K6=Create

Mapping Course outcome with PO and PSO

	PO	РО	РО	PO	PO	PO	PO	PO	PSO	PSO	PSO	PSO	PSO	Sum of COs
	1	2	3	4	5	6	7	8	1	2	3	4	5	with PSOs &
														POs
CO1	3	2	-	-	2	3	2	1	3	2	3	1	3	25
CO2	3	2	-	-	2	2	1	2	3	3	2	2	3	25
CO3	3	2	-	-	2	3	1	1	3	3	2	2	3	25
CO4	3	2	-	-	1	2	2	-	2	3	2	1	2	20

CO5	3	2	-	-	2	3	2	1	3	2	3	1	3	25
Grand total of COs with PSOs and POs													120	
Mea	Mean Value of COs with PSOs and POs=Grand total of COs with PSOs and													2.22
	POs/Number of COs relating with PSOs and POs=(120/54)													

Strong - 3, Medium - 2, Low –1

Mapping Scale	1	2	3
Relation	0.01to 1.0	1.01 to 2.0	2.01 to 3.0
Quality	Low	Medium	Strong
Mean Value of COs			2.22
with PSOs and POs			
Observation	COs of Data Mining a	nd Data Warehousing –	Strongly related with
	PSOs and POs		

ARUL ANANDAR COLLEGE (AUTONOMOUS)-KARUMATHUR DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS MACHINE LEARNING

Class : MCA

Semester : III Subject Code : 22PCAD23

Objectives:

The course enables the students to

- Understand Concepts of design in learning system
- To solve Classification and Regression problems
- Compare the Algorithms in machine learning
- Analyze the Bayes theorem and concept learning
- Distinguish Analytical and inductive learning

Unit – 1 INTRODUCTION

Designing a learning system - Perspectives and Issues in machine learning - Concept learning task - Concept learning as search - Version spaces - Candidate Elimination learning algorithm - Inductive Bias.

Unit – 2 DECISION TREE LEARNING

Decision Tree representation - Appropriate Problems for Decision Tree Learning - Basic Decision tree learning algorithm - Hypothesis space search and Inductive Bias in Decision tree learning - Issues in Decision Tree Learning.

Unit – 3 ANN

Perceptions - Back propagation Algorithms. Evaluating Hypothesis: Deriving confidence intervals - Hypothesis testing - comparing learning algorithms.

Unit – 4 BAYESIAN LEARNING

Bayes Theorem and Concept learning - Maximum Likelihood and Least Squared error hypothesis - Maximum Likelihood hypotheses for predicting probabilities - Minimum description Length principle - Bayes optimal classifier - Gibbs algorithm - Naïve Bayes classifier - Bayesian Belief networks -EM algorithm.

Unit – 5 ANALYTICAL AND INDUCTIVE LEARNING

Analytical learning - Explanation based learning - Inductive Analytical approaches to learning - Using prior knowledge to, initialize the hypothesis, alter the search objective and augment search operators.

Book for Study

1. Mitchell Tom M, Machine Learning, 2017, McGraw-Hill Education (India) Private Limited.

Books for References

- 1. Ethem Alpaydin Tom M., Introduction to Machine Learning, Seond Edition, 2010, MIT Press.
- 2. Marsland Stephan, Machine Learning An Algorithmic Perspective", First Edition, 2009, Chapman and Hall.
- 3. Nils Nilsson, Introduction to Machine Learning, 1997, MIT Press.

Web References

Syllabus 2023-24

(12 HOURS)

(12 HOURS)

(12 HOURS)

(12 HOURS)

(12 HOURS)

Page 1869

Part : III Core-12 Hours : 60 Credit : 4

- 1. https://nptel.ac.in/courses/106106139
- 2. https://www.udemy.com/course/understanding-machine-learning/
- 3. https://www.geeksforgeeks.org/introduction-machine-learning/
- 4. https://www.javatpoint.com/basic-concepts-in-machine-learning
- 5. https://www.cs.ox.ac.uk/people/nando.defreitas/machinelearning/
- 6. https://www.techtarget.com/searchenterpriseai/definition/machine-learning-ML

Teaching Methods

- Lecturing
- Group Discussions
- PPT's
- Learning by Doing
- Video tutorials

Course Outcomes

On the successful completion of the course students will be able to:

CO1: Understand about the various Concepts of design a learning system (K2)

CO2: Analyze the Problems for Decision Tree Learning (K3)

CO3: Analyze the concepts of Learning Algorithm (K4)

CO4: Understand the concept of Bayes theorem. (K2)

CO5: Apply the knowledge in analytical and inductive learning (K3)

K1= Remember K2 = Understand K3= Apply K4=Analysis K5= Evaluate K6= Create

Mapping Course Outcome with POs and PSOs

	PO	РО	PO	PO	PO	PO	PO	PO	PSO	PSO	PSO	PSO	PSO	Sum of
	1	2	3	4	5	6	7	8	1	2	3	4	5	COs with
														PSOs &
														POs
CO1	3	3	2	1	1	2	-	-	2	2	-	2	2	20
CO2	3	2	2	1	1	2	-	-	2	2	-	2	3	20
CO3	2	3	3	2	1	2	-	-	3	2	-	2	2	22
CO4	3	2	2	2	1	2	-	-	2	1	-	2	1	18
CO5	3	2	2	1	1	2	-	-	3	1	-	2	1	18
Grand total of COs with PSOs and POs													98	
Mean Value of COs with PSOs and POs=Grand total of COs with PSOs and													1.96	
	POs/Number of COs relating with PSOs and POs=(98/50)													

Strong – 3, Medium -2, Low - 1

Mapping Scale	1	2	3					
Relation	0.01to 1.0	1.01 to 2.0	2.01 to 3.0					
Quality	Low	Medium	Strong					
Mean Value of COs		1.96						
with PSOs and POs								
Observation COs of Machine Learning– Medium related with PSOs and POs								

ARUL ANANDAR COLLEGE (AUTONOMOUS), KARUMATHUR DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS DATA ANALYSIS USING PYTHON LAB

Class : MCA

Semester : 111 Part : Core Lab-5

Hours:75

Credit:3

Subject Code : 22PCAP53

Objectives:

The course enables the students to

- Explore knowledge on collection data types in python
- Practice standard libraries and in-built methods for array processing
- Implement data analysis process by using numerical library of python
- Implement statistical distributions and functions with pandas libraries
- Develop simple tool for the implementation of regression based machine learning algorithms

Program List

- Implement data analysis process using collection data types
- 22. Create an user interface for a typical data form using GUI containers and widgets
- 23. Implement statistical functions by using pre-processed database objects.
- 24. Implement various array manipulation methods using NumPy of Python
- 25. Implement probability distribution functions using NumPy of Python
- 26. Implement vectorization by using universal functions of NumPy of Python
- 27. Implement Data cleaning process for a given dataset. Consider all possible cases to fix bad data of the given dataset
- 28. Create a database and generate scatter plot for the pre-processed table of data using pandas of Python
- 29. Create a database and generate histogram for stored dataset using pandas of python
- 30. By using database, generate decision tree by using pandas of Python
- 31. Create a database and generate line graph plot by using PlotPy of matplotlib
- 32. Create a database and generate bar graph by using PloyPy of matplotlib
- 33. Create a database and generate Pie graph by using PloyPy of matplotlib
- 34. Implement linear regression for a given datasets. Use database as data source
- 35. By using database, implement polynomial regression by using matplotlib
- 36. By using database, implement unsupervised learning method by using matplotlib

Course Outcomes

On the successful completion of the course the students will able to

CO1: Understand collection data types and their methods (K2)

CO2: Explore standard libraries and in-built functions to handle arrays (K3)

CO3: Apply numerical in-built libraries for implementing data analysis process (K4)

CO4: Incorporate pandas library for implementing statistical functions and distributions (K4)

CO5: Develop simple tool for regression analysis (K6)

K1= Remember K2 = Understand K3= Apply K4=Analysis K5= Evaluate K6= Create

	PO	РО	PO	PO	PO	PO	PO	PO	PSO	PSO	PSO	PSO	PSO	Sum of COs
	1	2	3	4	5	6	7	8	1	2	3	4	5	with PSOs &
														POs
CO1	3	3	3	3	2	2	-	-	3	3	-	3	3	28
CO2	3	2	3	3	2	3	-	-	3	2	-	3	3	27
CO3	3	2	2	3	2	3	-	-	3	2	-	3	3	26
CO4	3	2	2	3	2	3	-	-	3	2	-	3	3	26
CO5	3	2	2	3	2	3	-	-	3	2	-	3	3	26
			G	irand	total	of C	Os wi	th PS	Os anc	l POs				133
Me	Mean Value of COs with PSOs and POs=Grand total of COs with PSOs and													2.66
	F	POs/N	lumb	er of	COs r	elati	ng wi	th PS	Os and	POs=	(133/5	0)		

Mapping Course outcome with PO and PSO

Mapping Scale	1	2	3					
Relation	0.01to 1.0	1.01 to 2.0	2.01 to 3.0					
Quality	Low	Medium	Strong					
Mean Value of COs			2.66					
with PSOs and POs								
Observation COs of this course is strongly related with PSOs and POs								

ARUL ANANDAR COLLEGE (AUTONOMOUS), KARUMATHUR DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS MOBILE APPLICATION DEVELOPMENT – LAB

Class :MCA

Semester :III

Subject Code :22PCAP63

Objectives:

The course enables the students to

- □ Understand the IDE for mobile emulators and devices
- □ Understand variables, class and string in typescript
- □ Understand the concepts of Angular JSComponents and Templates
- □ Develop program using lonic features
- Design and Develop test based mobile applications
- 1. Environment Setup
 - Node, Git
 - Apache Cordova CLI
 - Ionic CLI
 - Platform Toolsi OS, Android, Windows
 - Setting Emulators
 - Setting up the Device
 - Preview on Emulator and Device
- **2.** Typescript(Typescript&Es6)
 - Variables, Classes
 - Promises
 - Observables
 - Template Strings
 - Arrow functions
 - Types
- 3. Angular
 - Components
 - Inputs
 - Templates
 - Events
 - Pipes
 - @View Child
- 4. Apache Cordova Configuring the Cordova App
 - Device Access(Plugins)
- 5. Ionic
 - Ionic Components
- 6. Ionic2DoApp
- 7. Debugging, Testing & Deploying

Part :Core Lab-6 Hours :75 Credit :3

Course Outcomes

On the successful completion of the course the students will able to

CO1: Create simple programs using mobile emulator and devices.(K3)

CO2: Implement variables, class and string in Programming.(K3)

CO3: Create programs using angular JSComponents and Templates.(K6)

CO4: Apply Ionic programming concepts in developing mobile App.(K3)

CO5: Develop test based mobile applications.(K3)

K1=Remember K2=Understand K3=Apply K4=Analysis K5=Evaluate K6=Create Mapping Course Outcome with POs and PSOs

	PO	РО	РО	РО	PO	PO	РО	PO	PSO	PSO	PSO	PSO	PSO	Sum of
	1	2	3	4	5	6	7	8	1	2	3	4	5	COs with
														PSOs &
														POs
CO1	3	3	3	3	2	2	-	-	3	3	-	3	3	28
CO2	3	2	3	3	2	3	-	-	3	2	-	3	3	27
CO3	3	2	2	3	2	3	-	-	3	2	-	3	2	25
CO4	3	2	2	3	2	3	-	-	3	2	-	2	3	25
CO5	3	2	2	3	2	3	-	-	3	2	-	3	2	25
				C	Grand	total o	of COs	with	PSOs	and F	Os			130
Mean Value of COs with PSOs and POs=Grand total of COs with PSOs and POs														
/Nur	/Number of COs relating with PSOs and POs=(130/50)													2.6

Strong–3, Medium -2, Low-1

Mapping Scale	1	2	3
Relation	0.01to1.0	1.01to 2.0	2.01to 3.0
Quality	Low	Medium	Strong
Mean Value of COs			2.6
with PSOs and POs			
Observation	COs of Mobile Applic	ation Development La	b–Strongly related
	with PSOs and POs		

ARUL ANANDAR COLLEGE (AUTONOMOUS)-KARUMATHUR DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

Class : MCA Semester : III Subject Code : 20PCAE33

ARTIFICIAL INTELLIGENCE

Objectives:

The course enables the students to CEO1:understand the concepts of Artificial Intelligence CEO2:Understand the Parsing Techniques and concept of grammars CEO3:Describe the Knowledgeable Representation of Nets and Grammar Theory CEO4: Understand the concepts of Expert Systems CEO5: Understand the use of Pattern Recognition in Programming Language

UNIT-I (INTRODUCTION)

Introduction to Artificial Intelligence, Simulation of sophisticated & Intelligent Behavior in different area, problem solving in games, natural language, automated reasoning visual perception, heuristic algorithm versus solution guaranteed algorithms.

UNIT-II (UNDERSTANDING NATURAL LANGUAGES)

Parsing techniques, context free and transformational grammars, transition nets, augmented transition nets, Fillmore's grammars, Shanks Conceptual Dependency, grammar free analyzers, sentence generation, and translation.

UNIT-III (KNOWLEDGE REPRESENTATION)

First order predicate calculus, Horn Clauses, Introduction to PROLOG, Semantic Nets Partitioned Nets, Minskey frames, Case Grammar Theory, Production Rules Knowledge Base, The Inference System, Forward & Backward Deduction.

UNIT-IV (EXPERT SYSTEM)

Existing Systems (DENDRAL, MYCIN), domain exploration, Meta Knowledge, Expertise Transfer, Self-Explaining System.

(12 HOURS)

(12 HOURS)

Part : Core Elective - III

Hours: 60

Credit: 3

(12 HOURS)

(12 HOURS)

UNIT-V (PATTERN RECOGNITION)

(12 HOURS)

Introduction to pattern Recognition, Structured Description, Symbolic Description, Machine perception, Line Finding, Interception, Semantic, & Model, Object Identification, Speech Recognition, Programming Language: Introduction to programming Language, LISP, PROLOG

BOOKS FOR REFERENCE

- 1. CharniakEugene, Introduction to Artificial Intelligence", Addision Wesley.
- 2. CharniakRich, Knight, Artificial Intelligence, TMH
- 3. Winston, *LISP*, Addison Wesley.
- 4. Marcellous, "Expert Systems Programming", PHI.

Teaching Methods

- Lecturing
- Group Discussions
- > PPT s
- Learn by Doing
- Video Tutorials

Course Outcomes

On the successful completion of the course students will be able to:

- **CO1:** Understand the Basic principles and identify the problems that are amenable to solution by AI methods. (K2)
- **CO2:** Understand and Implement the concept of Expert Systems. (K2)
- **CO3:** Analysis the Representation of Nets and Grammar Theory. (K4)
- CO4: Evaluate the concept of Expert Systems. (K5)
- **CO5:** Apply thePattern to Recognizeand Programming Language (K3)

K1= Remember K2 = Understand K3= Apply K4=Analysis K5= Evaluate K6= Create

Mapping Course Outcome with POs and PSOs

	РО	РО	РО	РО	РО	РО	РО	РО	PSO	PSO	PSO	PSO	PSO	Sum
														of COs
	1	2	3	4	5	6	7	8	1	2	3	4	5	with
														PSOs&
														POs
CO1	3	2	2	3	3	2	-	-	3	1	-	3	3	25
CO2	3	2	3	1	1	2	-	-	3	1	-	3	3	22
CO3	3	2	3	2	2	2	-	-	2	1	-	2	2	21
CO4	3	3	2	2	1	2	-	-	3	1	-	2	2	21
CO5	2	2	2	1	2	1	-	-	2	1	-	2	3	18
					Grar	nd tota	l of CO	s with	PSOs ar	nd POs				107
Grand total with PSOs and POs														
Mean value of COs with PSOs and POs = =(107/50)											2.14			
Number of COs relating with BSOs& BOs														
						inum	per of	cos re	iating W	101 230	sa pus			

Strong – 3, Medium -2, Low – 1

Mapping Scale	1	2	3
Relation	0.01to 1.0	1.01 to 2.0	2.01 to 3.0
Quality	Low	Medium	Strong
Mean Value of COs			2.14
with PSOs and POs			
Observation	COs of Artificial Inte	lligence – Strongly rela	ted with PSOs and
	POs		

ARUL ANANDAR COLLEGE (AUTONOMOUS)-KARUMATHUR DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS CLOUD COMPUTING

Class : MCA

Semester : III Subject Code : 22PCAE33 (B) **Objectives:**

The course enables the students to

- Understand the cloud basic concepts and architecture
- Familiarize varies tools and mechanism of virtualization
- Understand the process of cloud storage and resource management
- Compare various cloud programming paradigms
- Analyze the concepts of cloud security

UNIT I CLOUD ARCHITECTURE AND MODEL

Technologies for Network Based System – System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture – Characteristics – Cloud Services. **Cloud Models** (IaaS, PaaS, SaaS) – Public vs Private Cloud – Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.

UNIT II VIRTUALIZATION

Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource Management – Virtualization for Data-Center Automation.

UNIT III CLOUD INFRASTRUCTURE

Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources.

UNIT IV PROGRAMMING MODEL

Parallel and Distributed Programming Paradigms – Map Reduce, Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - Cloud Software Environments -Eucalyptus, Open Nebula, Open Stack, Aneka, Cloud Sim.

UNIT V SECURITY IN THE CLOUD

Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control – Autonomic Security.

Books for Study

- 1. Kai Hwang, Geoffrey. C Fox, Jack Dongarra, Distributed and Cloud Computing, From Parallel Processing to the Internet of Things, 2013, Morgan Kaufmann Publishers.
- 2. John W. Rittinghouse, James F. Ransome, Cloud Computing: Implementation, Management, and Security, 2009, CRC Press.

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Part : Core Elective - III Hours : 60 Credit : 3

12 HOURS

12 HOURS

12 HOURS

12 HOURS

12 HOURS

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Books for Reference

- 1. Buyya Rajkumar, Vecchiola Christian, S Thamarai Selvi , Mastering Cloud Computing, 2013, Tata McGraw-Hill Education.
- 2. Velte Toby, Velte, Elsenpeter Robert, Cloud Computing, A Practical Approach, 2009, Tata McGraw-Hill Professional.
- 3. Saurabh Kumar, Cloud Computing Insights into New-Era Infrastructure, Wiley India, 2011.
- 4. Reese George, Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, 2009, O'Reilly Media, Inc.

Web References

- 1. https://nptel.ac.in/courses/106105167
- 2. https://nptel.ac.in/courses/106105223

Teaching Methods

- Lecturing
- Group Discussions
- PPTs
- Quiz Program
- Video Tutorials

Course Outcomes

On the successful completion of the course students will be able to:

CO1: Understand the cloud architecture. (K2)

CO2: Apply the concept of virtualization. (K3)

CO3: Analyze the usage of cloud resources. (K4)

CO4: Evaluate different types of programming paradigms. (K5)

CO5: Analyse the cloud security issues. (K4)

K1= Remember K2 = Understand K3= Apply K4=Analysis K5= Evaluate K6= Create

Mapping Course Outcome with POs and PSOs

	PO	PO	РО	РО	PO	РО	РО	PO	PSO	PSO	PSO	PSO	PSO	Sum of
	1	2	3	4	5	6	7	8	1	2	3	4	5	COs with
														PSOs&
														POs
CO1	3	3	3	1	1	2	-	-	3	3	-	3	3	25
CO2	3	3	3	2	2	3	-	-	3	3	-	3	3	28
CO3	3	3	3	2	1	3	-	-	3	3	-	3	3	27
CO4	3	3	3	2	2	3	-	-	3	3	-	3	3	28
CO5	3	3	3	3	2	3	-	-	3	3	-	3	3	29
				Gra	and to	otal of	COs w	ith P	SOs an	d POs				137
Grand total with PSOs and POs														
Mean value of COs with PSO and POs =												2.74		
Number of COs relating with PSOs& POs														
Strop	Strong 2 Modium 2 Low 1													

Strong – 3, Medium -2, Low - 2

Mapping Scale	1	2	3						
Relation	0.01 to 1.0	1.01 to 2.0	2.01 to 3.0						
Quality	Low	Medium	Strong						
Mean Value of COs			2.74						
with PSOs and POs									
Observation	COs of Cloud Computing – Strongly related with PSOs and POs								

ARUL ANANDAR COLLEGE (AUTONOMOUS)- KARUMATHUR DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS INTERNET OF THINGS

Class : MCA

Semester : IV Subject Code : 22PCAE33 (C)

Objectives:

The course enables the students to

- Understand the Basic concepts in IoT
- Analyze various IoT Devices
- Understand the Functions of Data and Human Interaction with IoT
- Understand the scope of IoT Applications
- Analyze various case studies in IoT Applications

UNIT – I: INTRODUCTION TO IOT

Definition of the Internet of Things - main assumptions and perspectives- Platform for IoT devices -Economics and Technology of the IoT –Issues in IoT and solutions-Architecture of IoT.

UNIT - II IOT DEVICES

Temporary and Ad-hoc devices-Addressing issues-End devices in dedicated networks- Small data Building a web of things-Autonomy and co-ordination-Structuring a tree-Housekeeping message-Role of integrator function-Degrees of functionality.

UNIT - III DATA AND HUMAN INTERACTION:

Functions of IoT-Analysis and control-Neighborhood - Human interface and control points- Collaborative scheduling tools-Packaging and provisioning- Distributed integrator functions- Filtering the streams-IP Alternative-Protocol based on category classification.

UNIT - IV IOT APPLICATIONS:

Moore's Law –Intelligence near the edge- Incorporating legacy devices- Staying in the loop -Social machines-Efficient process control-Factory application- Natural sciences- Living applications- Shared software and business process vocabularies.

UNIT – 5 CASE STUDIES ILLUSTRATING IOT DESIGN

Home Automation - Cities - Environment - Agriculture - Productivity Applications

Books for Study:

- 1. Da Francis, Costa, Rethinking the Internet of Things-A scalable approach to connecting everything, 2013, Apress open publication.
- 2. Waher Peter, Learning Internet of Things, 2015, PACKT Publishing-Birmingham-Mumbai.

Books for Reference:

- 1. Bahga Arhdee, Madisetti Vijay, Internet of Things: A Hands on Approach (http://www.internet-ofthings-book.com/). 2015.
- 2. Pfister Cuno, Getting started with the Internet of Things, O'Rielly Publication. 2011.

Web Reference:

- 1. Introduction to IoT:https://www.javatpoint.com/iot-internet-of-things
- 2. Architecture of IoT:https://www.geeksforgeeks.org/architecture-of-internet-of-things-iot/

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(12 HOURS)

(12 HOURS)

(12 HOURS)

(12 HOURS)

(12 HOURS)

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Credit: 3

Part : Core Elective III

Hours: 60

- 3. IoT Devices :<u>https://www.tutorialspoint.com/internet_of_things/index.htm</u>
- 4. Advanced IoT Applications: <u>https://nptel.ac.in/courses/108108123</u>
- 5. IoT Human Interaction: <u>https://www.digimat.in/nptel/courses/video/106106177/L01.html</u>
- 6. IoT designs: https://nlist.inflibnet.ac.in/search/Record/EBC5332124

Teaching Methods

- Lecturing
- Group Discussions
- PPTs
- Learn by Doing
- Video Tutorials

Course Outcomes

On the successful completion of the course students will be able to:

CO1: Understand the basic concepts in IoT. (K2)

CO2: Analyze various IoT Devices. (K4)

CO3: Understand Data and Human Interaction concepts in IoT. (K3)

CO4: Develop IoT Applications for real time applications. (K3)

CO5: Analyze various case studies in IoT Applications. (K4)

K1= Remember K2 = Understand K3= Apply K4=Analysis K5= Evaluate K6= Create

Mapping Course Outcome with POs and PSOs

	РО	PSO	PSO	PSO	PSO	PSO	Sum of							
	1	2	3	4	5	6	7	8	1	2	3	4	5	COs with
														PSOs &
														POs
CO1	3	3	2	1	-	3	-	-	2	3	-	3	2	22
CO2	3	3	2	1	-	2	-	-	3	2	-	3	3	22
CO3	2	3	2	2	-	3	-	-	2	3	-	2	2	21
CO4	3	2	3	1	-	3	-	-	3	3	-	3	3	24
CO5	3	3	2	1	-	3	-	-	3	2	-	2	2	21
Grand total of COs with PSOs and POs									110					
Mean Value of COs with PSOs and POs =Grand total of COs with														
PSOs and POs/Number of COs relating with PSOs and POs =(110/45)											2.44			

Strong – 3, Medium -2, Low – 1

Mapping Scale	1	2	3						
Relation	0.01 to 1.0	1.01 to 2.0	2.01 to 3.0						
Quality	Low	Medium	Strong						
Mean Value of COs			2.44						
with PSOs and POs									
Observation	COs of Internet of Things – Strongly related with PSOs and POs								

ARUL ANANDAR COLLEGE (AUTONOMOUS), KARUMATHUR DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS DOT NET PROGRAMMING

Part : III Core-13

Hours : 60

Credit:04

Class : MCA

Semester : IV

Subject Code : 22PCAD34

Objectives:

The course enables the students to

- Understand Framework Architecture and Components
- Understand the fundamentals of programming such as conditional and iterative execution, classes & methods.
- Understand the ASP.NET web Controls and Web Applications.
- Understand State and Session management.
- UnderstandtheADO.NET

UNIT I

Introduction to .Net Technologies: Introduction to Internet and Web Technologies - HTML Basics -Script – Client side Vs Server side scripts – Advantages and Disadvantages of Client side Vs Server side scripts – History of .Net Platform - .Net Framework Components overview.

UNIT II

Dot Net Building Blocks : Introduction to C# – Integrated Development Environment – Basic Keywords – Data Types – Statements – Conditionals – If Else – Select Case – Switch and Choose – Loops – Do – For Next – while – Window forms – Working with Controls – MDI – functions – OOPs.

UNIT III

Introduction to ASP.Net and ASP.Net controls: Introduction to ASP.Net – Advantages of ASP.Net - ASP.Net Architecture - ASP.Net Page's structure – Sample program in ASP.Net – Page Events – HTML Server Controls – Web User Controls in ASP.Net.

UNIT IV

(12 HOURS)

(12 HOURS)

(12 HOURS)

(12 HOURS)

Objects and Advanced Concepts in ASP.Net: Request Object – Response Object – Code Behind Feature of ASP.Net – Caching in ASP.Net – Output Caching – Fragment Caching – Data Caching – Session / State Management – Events – Error Handling and Debugging – Tracing an Application.

UNIT V

(12 HOURS)

ADO.Net for .Net Application: Introduction to ADO.Net - ADO Vs ADO.Net - Connected ADO.Net Architecture – Disconnected ADO.Net Architecture – Data Adapter - ADO.Net Classes - ADO.Net Namespaces – Interfacing VB.Net Applications with ADO.Net – Interfacing ASP.Net Application with ADO.Net-Crystal Report.

Text Books

1. Alex, "Professional ASP.Net 1.1", Homler and Group Wrox Publications.

2. David Sceppa, "Microsoft ADO.NET (Core Reference), Microsoft Press, 2006, 2nd Edition

3. Joe Duffy, "Professional .Net Framework 2.0", 2006 Edition, Wrox Publications.

4. Steven Holzner, "Visual Basic .NET Programming - Black Book", 2005 Edition, Dreamtech Press.

References

- 1. Muthu C," Visual Basic .Net", 2007, Tata MaGraw-Hill Publication.
- 2. Nitini Pandey, Yesh Singhal, Mridula parihar," Visual Studio.Net Programming", 2002, Wiley-DreamTech India (p) Ltd.
- 3. Nikhil Kothari, Vandana Datye "Developing Microsoft ASP.NET Server Control and Componentsw", 2003, Tata MaGraw-Hill Publication.
- 4. Balagurusamy E, "Programming in C#", 2002, Tata MaGraw-Hill Publication.

Web References

- 1. https://learn.microsoft.com/en-us/training/paths/build-dotnet-applications-csharp/
- 2. https://www.udemy.com/course/high-performance-coding-with-net-core-and-csharp/
- 3. https://www.geeksforgeeks.org/top-50-asp-net-interview-questions-and-answers/

Teaching Methods

- > Lecturing
- Group Discussions
- PPTs
- Learning by Doing
- Videotutorials

Course Outcomes:

On Successful completion of the course the students able to

CO1: Understand the basic concepts to solve standalone applications (K2)

CO2: Apply control statements and methods for complex programs (K3)

CO3: Design and develop Web applications usingASP.NET Web controls(K6)

CO4: Ability to develop responsive and dynamic web applications.(K6)

CO5 : Apply ADO.NET to client and server applications. (K4)

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

Mapping

	РО	PO	PO	РО	PO	PO	PO	PO	PSO	PSO	PSO	PSO	PSO	Sum of
	1	2	3	4	5	6	7	8	1	2	3	4	5	COs with
														PSOs&
														POs
CO1	3	3	-	-	2	1	1	-	1	1	2	1	1	16
CO2	3	2	-	-	2	2	1	-	2	2	2	1	1	18
CO3	3	3	-	-	2	3	1	-	3	3	2	2	2	24
CO4	3	3	-	-	2	2	1	-	3	2	2	2	1	21
CO5	3	3	-	-	2	2	1	-	3	3	3	2	2	24
			Gra	nd to	tal of	^{COs v}	vith P	SOs a	and PO	S				103
MeanValue of COs with PSOs and POs=Grand total of COs with										2.06				
PSOs and POs/Number of COs relating with PSOs and														
POs=(103/50)														

Strong–3, Medium–2, Low – 1

Mapping Scale	1	2	3					
Relation	0.01 to 1.0	1.01 to 2.0	2.01 to 3.0					
Quality	Low	Medium	Strong					
MeanValue of COs With PSOs and POs			2.06					
Observation	COs of Dot Net Programming is Strongly related with PSOs and POs							

ARUL ANANDAR COLLEGE (AUTONOMOUS)-KARUMATHUR DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS SOFTWARE ENGINEERING

Class : MCA

Semester : IV

Subject Code : 22PCAD44

Objectives:

The course enables the students to

- Understand the basic software engineering design concepts and models.
- Analyze varies requirement engineering tasks.
- Understand the various software design models and concepts.
- Analyze the various software testing strategies.
- Describe managerial techniques and Software Quality Assurance. •

UNIT I:

Generic View of Process – Process Models - The Waterfall Model - Incremental Model -Evolutionary Model - The Unified Process–Agile Process – Agile Models – Software Cost Estimation – Planning – Risk Analysis – Software Project Scheduling.

UNIT II:

System Engineering Hierarchy – System Modeling – Requirements Engineering Tasks-Initiating the Process - Eliciting Requirements - Negotiating Requirements - Validating Requirements - Building the Analysis Models. (12 HOURS)

UNIT III:

Design Concepts – Design Models – Pattern Based Design – Architectural Design – Component Level Design – Component – Class Based And Conventional Components Design – User Interface – Analysis And Design.

UNIT IV:

Software Testing Strategies: Conventional - Object Oriented – Validation Testing – Criteria – Alpha – Beta Testing- System Testing – Recovery – Security – Stress – Performance - Testing Tactics – Testing Fundamentals - Black Box – White Box – Basis Path - Control Structure. (12 HOURS)

UNIT V:

Software Configuration and Management: Features – SCM Process – Software Quality Concepts – Quality Assurance – Software Review – Technical Reviews – Formal Approach to Software Quality Assurance – Reliability – Quality Standards – Software Quality Assurance Plan

Book for Study

1. Pressman Roger, Software Engineering: A Practitioner's Approach, Seventh Edition, Tata McGraw Hill, 2017.

Books for Reference

- 1. Pfleeger Lawrence Shari, Software Engineering: Theory and Practice, 2003, Prentice Hall.
- 2. Ghezzi Carlo, Jazayari Mehdi, Mandrioli Dino, Fundamentals of Software Engineering, 2003, Prentice Hall of India.
- 3. Sommervillelan, Software Engineering, Tenth Edition, 2017, Pearson Publications.

(12 HOURS)

Part : Core-14

Hours: 60

Credit:4

(12 HOURS)

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(12 HOURS)

Web reference

- 1. Software quality factors: <u>https://www.tutorialspoint.com/software quality management/software quality management factor</u> <u>s.htm</u>
- 2. Cost estimation model: <u>https://www.geeksforgeeks.org/cost-estimation-models-in-software-engineering/</u>
- 3. SRS document:

https://www.geeksforgeeks.org/software-requirement-specification-srs-format/

4. Design Techniques:

https://www.tutorialspoint.com/software_engineering/software_design_strategies.htm

5. Verification & validation: https://www.javatpoint.com/verification-and-validation-testing

ARUL ANANDAR COLLEGE (AUTONOMOUS)-KARUMATHUR DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS PROJECT WORK/INTERNSHIP

Class : MCA

Semester : IV

Subject Code : 22PCAD54

Part : III Core - 15

Hours : Credit : 6

Objectives:

The course enables the students to

- Understand and Plan the real problem of the Project.
- Analyze the problem.
- Design the Project.
- Implement the Project.
- Configured and Test the Project.

Guidelines

- All the students are expected to choose project in IT Related Company/Industry/real project in schools/College/any authorized organization/Institutions.
- Each student will be allocated guide/supervisor by the department for smooth/best way to complete the project.
- All the students are expected to submit attendance and company undertaking and project completion certificate during the period of project allotted duration.
- Three copies of the thesis/record note book must be submitted to the department duly signed by guide/supervisor and Head of the Department.

Examination/ Evaluations

The thesis/record notebook will be evaluated by the internal examiner and external examiner who are appointed by the Office of the Controller of Examination. The candidate also will be evaluated based on viva-voce and presentation of the thesis/record notebook and will be graded as shown below.

Excellent	85% and above
Very Good	75% and above but below 85%
Good	60% and above but below 75%
Satisfactory	50% and above but below 60%
Rejected	Less than 50%

Course Outcomes:

On successful completion of the course students will be able to

CO1: Identify and plan the real problem of the Project. (K2)

CO2: Analyze the problem of the Project. (K4)

CO3: Apply and Design the Project. (K3)

CO4: Implement the Project.(K5)

CO5: Create the Project.(K6)

K1=Remember K2=Understand K3=Apply K4=Analysis K5=Evaluate K6=Create

Mapping Course outcome with POs and PSOs

	РО	PSO	PSO	PSO	PSO	PSO	Sum of							
	1	2	3	4	5	6	7	8	1	2	3	4	5	COs with
														PSOs &
														POs
CO1	3	2	2	-	1	3	1	-	3	3	2	3	3	26
CO2	3	2	2	-	2	3	1	-	3	3	2	3	3	27
CO3	3	2	3	-	2	3	1	-	3	3	2	3	2	27
CO4	2	3	3	-	2	3	1	-	2	2	2	2	3	25
CO5	3	3	3	-	2	2	1	-	3	3	2	3	2	27
Grand total of COs with PSOs and Pos									132					
Mean Value of COs with PSOs and POs=Grand total of COs with PSOs and POs										2.4				
/Number of COs relating with PSOs and POs=(132/55)														

Strong -3, Medium -2, Low -1

Mapping Scale	1	2	3						
Relation	0.01to1.0	1.01to2.0	2.01to3.0						
Quality	Low	Medium	Strong						
MeanValue of COs With PSOs and POs			2.4						
Observation	COs of Project Work/Internship Strongly related with PSOs and POs								

ARUL ANANDAR COLLEGE (AUTONOMOUS), KARUMATHUR DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS DOT NET PROGRAMMING LAB

Class : MCA

Semester : IV Subject Code : 22PCAP74 Part : III Core Lab-7

- Hours : 75
- Credit : 2

Objectives:

The course enables the students to

- Understand basicsofVB.NET windows application and its execution.
- Develop applications on console applications that implements OOPs.
- Develop programs on Window Based Components.
- Develop Dynamic application using ADO.NET.
- Develop applications on session Management.

List of Exercises

Windows Application

- 1. Biggest and Smallest Using Event Procedure
- 2. Simple and Compound Interest Using Even Procedure
- 3. Money Conversion
- 4. Arithmetic Calculator Using Event Procedure
- 5. Pre-Defined and User-Defined Date And Time Formats
- 6. Swapping List Box Items
- 7. Demo the Dialog Boxes
- 8. Menu Editor
- 9. Context Menu

Console Applications

- 10. Sum of N Natural , Square and Cube Numbers
- 11. Math And String Function
- 12. Call By Value and Call By Reference
- 13. Net Salary Calculation
- 14. Sorting the Numbers

ADO.Net

- 15. Load the Field Values in the List Box
- 16. Employee Data Manipulation
- 17. Simple Data Binding
- 18. Complex Data Binding
- 19. Load the Tables In the Data Grid
- 20. Stored Procedure
- 21. Crystal Report

ASP.NET

- 22. Registration Form Using Validation Controls
- 23. Login form Validation

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24. Master Page Creation

25. Session and state Management

Outcomes:

On successful completion of the course the students able to

CO1: Apply Windows components on applications.(K3)

CO2: Understand and Apply Object oriented features and .NET Console applications.(K3)

CO3: Apply the concept of ADO.NET Database connectivity (K3)

CO4: Generate Crystal report on windows form control.(K3)

CO5: Develop applications on session management and cookies.(k6)

K1=Remember K2=Understand K3=Apply K4=Analysis K5=Evaluate K6=Create

Mapping

	PSO	PSO	PSO	PSO	PSO	РО	PO	PO	PO	PO	PO	PO	РО	Sum of
	1	2	3	4	5	1	2	3	4	5	6	7	8	COs with
														PSOs &
														POs
CO1	3	2	2	1	2	3	3	-	-	2	1	1	-	20
CO2	2	2	2	2	2	3	2	-	-	2	2	2	-	21
CO3	3	3	2	2	2	3	3	-	-	2	3	3	-	26
CO4	3	2	2	2	1	З	3	-	-	2	2	1	-	21
CO5	3	3	3	1	2	З	3	-	-	1	1	1	-	21
	Grand Total of Cos with POs PSOs								109					
Mean Value of COs with PSOs and POs= Grand total of COs with PSOs and									2.18					
POs/Number of COs relating with PSOs and POs=(109/50)														

Strong–3, Medium–2, Low – 1

Mapping Scale	1	2	3			
Relation	0.01to1.0	1.01to2.0	2.01to3.0			
Quality	Low	Medium	Strong			
MeanValue of COs With PSOs and POs			2.18			
Observation	COs of dot net programming lab is Strongly related with PSOs and POs					