SRI MEENAKSHI GOVT. ARTS COLLEGE FOR WOMEN

(AUTONOMOUS)

MADURAI – 625 002.

DEPARTMENT OF COMPUTER APPLICATIONS

MASTER OF COMPUTER APPLICATIONS

SYLLABUS TO BE INTRODUCED FOR THE ACADEMIC YEAR 2022 – 2023

OUTCOME BASED EDUCATION

UNDER C.B.C.S.

SRI MEENAKSHI GOVT ARTS COLLEGE FOR WOMEN (AUTONOMOUS)
DEPARTMENT OF COMPUTER APLICATIONS

DEPARMENT NAME : Department of Computer Applications (M.C.A)

INTRODUCTION:

The Department of Computer Applications blossomed in the year 1998 offering Master of Computer Applications course approved by AICTE. In August 2018 BCA course was started. The Department has an enterprising faculty team of 3 Assistant Professors, 2 Guest faculties and 1 Programmer. It has more than 100 research publications to its credit. They contribute and share their knowledge to academic community through Invited Talks and Paper presentations in National / International Conferences. The Department takes continuous efforts in upgrading the course content and enhancing student's skills.

COURSES OFFERED:

- **B.C.A**
- **M.C.A**
- **M.Phil. Computer Applications.**

VISION

Enabling Students to become enterprising Academicians, Young Entrepreneurs and Responsible Citizens.

MISSION

Imparting Quality Knowledge and Essential Virtues Treading Towards Holistic Development.

PROGRAMME OUTCOME OF M.C.A

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

PO1. Apply the understanding of management principles with computing knowledge to manage The projects in multidisciplinary environments.(P)

PO2. Computing Skills and apply knowledge of computing to produce effective designs And solutions for specific problems. (E).

PO3. Applying IT related solutions in an economic, social and environment context.(P)

PO4. Understand and commit to Cyber regulations and responsibilities in Professional Computing Practices(C)

PO5. Identify opportunities and use innovative ideas to create value and wealth for the Betterment of the individual and society.(K) .

Programme Specific Outcome (PSO)

After the completion of the programme Post graduate students will be able to

PSO1.An ability to design, develop and evaluate new computer based systems for novel Applications which meet the desired needs of industry and society.(C)

PSO2. Understanding and ability to use advanced computing techniques and tools.(U)

PSO3: Enable the students to apply the computing and soft skills acquired in the MCA program For designing and developing innovative applications for the betterment of the society.

PSO4: Provide exposure to techniques that would enable the students to design, implement and evaluate IT solutions.

PSO5: To enable the students to meet the challenges of research and development in computer Science and applications.

PSO6: Comprehend the concepts and applications of International business in the areas related to Finance, Marketing, entrepreneurship, HR, Logistics and supply chain etc.,

PSO7: Communicate professionally and face challenges ethically with concern to social welfare

SRI MEENAKSHI GOVT. ARTS COLLEGE FOR WOMEN (AUTONOMOUS)
MADURAI-2

Programme : M.C.A

SEMESTER –I

Course Type	CODE	Title of the Course		Hrs/ Week	Credits	Exam Hrs	Marks		
							Int	Ext	Total
CCI	P22CC1	Core Course I -MFC		5	5	3	25	75	100
CC II	P22CC2	Core Course II - OS		5	4	3	25	75	100
CC III	P22CC3	Core Course III - C++ &DS		5	5	3	25	75	100
CC IV	P22CC4P	Core Course V-Practical - C++ &DS lab		6	3	5	40	60	100
DSEC- I	P22DSC1A	Object Oriented Analysis and Designs		5	4	3	25	75	100
	P22DSC1B	Management Information System							
	P22DSC1C	Soft Skills							
SEC -I	P22SEC1P	Multimedia and UML lab		4	2	2	40	60	100
Total				**30**	**23**				**600**
		SEMESTER –II							
CC V	P22CC5	Core Course VI RMT		4	4	3	25	75	100
CC VI	P22CC6	Core Course VII - RDBMS		4	4	3	25	75	100
CCVII	P22CC7	Core Course VIII - Financial Accounting		5	5	3	25	75	100
CC VIII	P22CC8	Core Course IX – Data Communication and Networking		5	5	3	25	75	100
CC XI	P22CC9P	Core Course X – Practical Client Server Lab		5	3	3	40	60	100
DSEC-II	P22DSC2A/ P22DSC2B/ P22DSC2C	Major Based Elective Course II Elective - II		4	4	3	25	75	100
SEC- II	P22SEC2P	Skill Enhancement Course II	NS	2	2	2	20	60	100
			NS Lab	1		2	20		
Total				**30**	**27**				**600**

SEMESTER –III								
CC– X	P22CC10	Core Course XI EWA	5	4	3	25	75	100
CC– XI	P22CC11	Core Course XII Python Programming	5	4	3	25	75	100
CC – XII	P22CC12	Core Course XIII DIP	5	4	3	25	75	100
CC–XIII	P22CC13P	Core Course XV Practical _ python lab	5	3	3	40	60	100
CC–XIV	P22CC14P	Core Course XV Practical _ EWA lab	5	3	3	40	60	100
MBEC–III	P22DSC3A/ P22DSC3B/ P22DSC3C	Major Based Elective Course III – Elective 3	5	4	3	25	75	100
CC–XV	P22CCPS	Internship *		2	3	25	75	100
		Total	**30**	**24**				**700**
SEMESTER –IV								
CC– XVI	P22CC16	Core Course XIV Data Mining	5	4	3	25	75	100
CP	P22CCPW	Core Course XVII (Project)	20	8	-	80	20	100
MBEC–IV	P22DSC4	Major Based Elective Course IV Elective IV	5	4	3	25	75	100
		Total	**30**	**12**				**500**

*Internship will be carried out during the summer vacation of the second semester and the students have to submit a report after the internship. The report will be evaluated by two examiners within the department. The marks will be included in the third semester statement of marks.

Course Type	Title of the Course	Hrs/Week	Credits	Exam Hrs	Marks		
					Int	Ext	Total
SEC-1	Multimedia and UML lab	4	2	3	25	75	100
SEC -II	Network Security and Network security Lab	3	2	3	40	60	100

Electives

Semester–I

P22DSC1A. Object Oriented Analysis and Design
P22DSC1B. Management Information System
P22DSC1C. Soft Skills

Semester–II

P22DSC2A. Cloud Computing
P22DSC2B. Internet of Things
P22DSC2C. Digital Principles and Computer Organization

Semester–III

P22DSC3A.Human Resource Management
P22DSC3B. Artificial Intelligence
P22DSC3C. Soft Computing

Semester – IV

Mobile Computing
Machine learning
Compiler Design

COURSE STRUCTURE ABSTRACT

FOR M.C.A, PROGRAMME

Extra credit courses* - to be discussed

PART	COURSE	TOTAL NO OF COURSE	HOURS	CREDIT	MARK
III	Core Course	15	74	60	1600
III	Core Project	1	25	8	100
III	Major Based Elective Course	4	17	16	400
III	Internship	1	-	2	100
III	Skill Enhancement Course	2	4	4	200
Total		**24**	**120**	**90**	**2400**
Extra credit courses*					
Value Added Course (VAC)		1	-	2	100
Self Sudy Course (SSC)		1	2	2	100
Total		**25**	2	**2**	**2500**

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Madurai - 625 002

M.C.A. DEGREE EXAMINATION – FROM 2021 TO 2023

BLUE PRINT

	Part-A	Part-B
UNIT-I	2	1
UNIT-II	2	1
UNIT-III	2	1
UNIT-IV	2	1
UNIT-V	2	1

PART - A --> 6 x 5 = 30 (6 out of 10)

PART - B --> 3 x 15 = 45 (3 out of 5)

Total = 75

Programme:M.C.A **Part III:Core**
Semester : I **Hours : 5 P/W 60HrsP/S**
Sub.Code : P22CC1 **Credits:5**

TITLE OF THE PAPER: Mathematical Foundations of Computer Science

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	5	4	-	1	-

PREAMBLE:

To know the basic concepts of Mathematical logic, Sets and Lattices, and Boolean Algebra.

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
UNIT1CO1: Logical operations and predicate calculus needed for computing skill.	1	12
UNIT 2 CO2: Basic knowledge set theory, functions and relations concepts needed for designing and solving problems.	2	12
UNIT 3 CO3: Design and solve Boolean functions, induction principles for defined problems.	3	12
UNIT 4 CO4: Apply the acquired knowledge of lattices in the area of designing.	4	12
UNIT 5 CO5: Design Apply the acquired knowledge of finite automata theory and to design discrete problems to solve by computers.	5	12

SYLLABUS

UNIT - I: Mathematical Logic

Statements and notations – connectives: Negation, conjunction, disjunction, statement formulas & truth tables, conditional and bi-conditional, well-formed formula, tautologies, equivalence of formulas, duality law, tautological implications, formulas with distinct truth tables, functionally complete sets of connectives, other connectives.

UNIT - II: Counting

Counting: Introduction – Basic counting Principles – Factorial Notation – Binomial Coefficients – Permutations – Combinations. The Pigeonhole Principle.

UNIT - III: Properties of the Integers

Introduction – Order and inequalities, Absolute value – Mathematical Induction – Division Algorithm – Divisibility, Primes – Greatest Common Divisor, Euclidean Algorithm – Fundamental theorem of arithmetic.

UNIT - IV: Sets and Lattices

Ordered pairs n-tuples, Cartesian product – Relations and ordering: Relations, properties of binary relation, relation matrix and graph of relation, partition and covering of a set equivalence and compatibility relations, composition of binary relations partial ordering, partial ordered set. Lattices as partially ordered sets.

UNIT - V: Boolean Algebra

Boolean algebra- Boolean functions. Finite state machines: Introductory sequential circuits, equivalence of finite state machines.

TEXT BOOK(S)

1. Discrete Mathematical Structures with Applications to Computer Science.
by J.P. Tremblay &R.Manohar, Tata McGraw Hill, Publishing Company Ltd.
(35th Reprint 2008)

. Schaum's Outlines- Discrete Mathematics by Seymour Lipschutz, Marc Lars Lipson, III-Edn.
Tata McGraw Hill, Education Pvt. Ltd.,
New Delhi.5th Reprint 2012.
UNIT-I : TB 1 – Chapter 1 – Section 1.1, 1.2
UNIT-II : TB 2 – Chapter 6 – Section 6.1 – 6.6
UNIT-III: TB 2 – Chapter 11 – Section 11.1 – 11.7
UNIT-IV : TB 1 – Chapter 2 – Section 2.1.8, 2.1.9, 2.3.1 – 2.3.9, 4.1.1 – 4.1.5
UNIT-V : TB 1 – Chapter 4 – Section 4.2 – 4.3, 4.6

REF. BOOK(S)

1. Discrete Mathematics by G.Balaji, II-ed., G.Balaji Publishers

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT 1			
	Statements and notations – connectives: Negation, conjunction, disjunction, statement formulas & truth tables,	4	Black board
	conditional and bi- conditional, well-formed formula, tautologies, equivalence of formulas,	4	Black board
	duality law, tautological implications, formulas with distinct truth tables, functionally complete sets of connectives, other connectives.	4	Black board

UNIT 11			
	Counting: Introduction – Basic counting Principles	4	Black board
	Factorial Notation – Binomial Coefficients	4	Black board
	Permutations – Combinations. The Pigeonhole Principle.	4	Black board
UNIT III			
	Introduction – Order and inequalities, Absolute value – Mathematical Induction	4	Black board
	Division Algorithm – Divisibility, Primes – Greatest Common Divisor , Euclidean Algorithm –	4 1	Black board PPT Presentation
	Fundamental theorem of arithmetic.	3	Black board
UNIT IV			
	Ordered pairs n-tuples, Cartesian product – Relations and ordering: Relations, properties of binary relation, relation matrix and graph of relation,	4	Black board
	partition and covering of a set equivalence and compatibility relations, composition ofbinary relations partial ordering,	4	Black board
	partial ordered set. Lattices as partially ordered sets.	4	Black board
UNIT V			
	Boolean algebra - Boolean functions.	4	Black board

	functions. Finite state machines:	4	PPT presentations
	Introductory sequential circuits, equivalence of finite state machines.	4	Black board

Course Outcomes (Cos)	Programme Outcomes (Pos)					Programme Specific Outcomes (PSOs)							Mean scores of Cos
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	
CO1	4	4	4	3	2	4	4	2	4	4	4	2	3.5
CO2	4	5	4	4	2	4	5	2	4	4	5	2	3.6
CO3	4	5	4	4	2	4	4	2	4	5	4	2	3.7
CO4	4	4	5	3	2	5	4	2	4	5	4	2	3.6
CO5	4	5	4	5	2	5	4	2	5	4	4	2	3.7
Mean Overall Score													3.62

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score ofCOs = $\frac{\text{Total ofValue}}{\text{Total No. of Pos\& PSOs}}$ $\frac{\text{l of Mean Score}}{\text{tal No. of Cos}}$

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
KNOWLEDGE	50%	50%
UNDERSTANDING	30%	30%
APPLY	20%	20%

Course Designer: Department of Computer Applications

Programme : M.C.A **Part III:Core**
Semester : I **Hours : 5 P/W 60 HrsP/S**
Sub.Code : P22CC2 **Credits :4**

TITLE OF THE PAPER: OPERATING SYSTEMS

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	5	3	-	1	1

PREAMBLE:

The objective of this course is to enable the students to clearly understand the underlying concepts of the operating system.

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
UNIT 1 CO1: Implement the algorithms in process management and solving the issues of IPC.	1	12
UNIT 2 CO2: Able to demonstrate the mapping between the physical memory and virtual memory.	2	12
UNIT 3 CO3: Able to understand file handling concepts in OS perspective	3	12
UNIT 4 CO4: Able to perform the services with the recent OS.	4	12
UNIT 5 CO5: Understand the basic structure used in the current operating system.	5	12

SYLLABUS

UNIT-I

Introduction: What is an Operating System – Mainframe Systems – Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems – Real-Time Systems – Handheld Systems – Processes: Process Concept – Process Scheduling – Operation on Processes – Cooperating Processes – Interprocess Communication – Communication in Client-Server Systems.

UNIT-II

CPU Scheduling: Basic Concepts – Scheduling Criteria – Scheduling algorithms – Multiple-Processor Scheduling - Real-Time Scheduling - Process Synchronization: Background – The Critical-Section Problem – Synchronization Hardware – Semaphores – Classical Problems of Synchronization – Critical Regions.

UNIT-III

Deadlocks: System Model – Deadlock Characterization – Methods for Handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery from Deadlock - File-System Interface: File Concept – Access Methods – Directory Structure – Protection.

UNIT-IV

Memory Management: Background– Swapping – Contiguous Memory Allocation – Paging – Segmentation – Segmentation with Paging – Virtual Memory: Background – Demand Paging Process Creation – Page Replacement –Allocation of Frames – Thrashing.

UNIT-V

Mass - Storage Structure: Disk Structure – Disk Scheduling – Disk Management.Case Study – Windows 2000 and the LINUX Systems.

TEXT BOOK

Operating System Concepts by Silberschatz Galvin, VI-Ed. Addison-Wesley, Reprint-2012 Publishing Company.

UNIT-I Chapter : 1.1 – 1.8, 4.1 –4.6.
UNIT-II Chapter: 6.1 – 6.5, 7.1 –7.6.
UNIT-III Chapter: 8.1 – 8.7, 11.1 – 11.3, 11.6.
UNIT-IV Chapter: 9.1 – 9.6, 10.1 – 10.6
UNIT-V Chapter: 14.1 – 14.3, 20,21

REF. BOOKS

1. Operating System By MadnicandDonovan
2. Modern Operating System By Andrew S.Tanenbaum, Prentice Hall of India, NewDelhi(1996)
3. Operating System Concepts By William Stallings–Prentice, Hall InternationalPublications.

E-LEARNING RESOURCES:

1. https://nptel.ac.in/courses/106/102/106102132/
2. nptel.ac.in/courses/106108101/
3. w3schools.in/operating-system-tutorial
4. https://swayam.gov.in/course/237-operating-system

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT 1			
	Operating System-classification	4	Black board
	Processes:	4	PPT
	Interprocess Communication	4	Black board
UNIT 11			
	CPU Scheduling	4	Black board
	Scheduling algorithms	4	Black board
	- Process Synchronization Semaphores	4	PPT
UNIT III			
	Deadlocks	4	Black board
	Deadlock Avoidance Algorithm	4	Black board
	File-System Interface	4	PPT

UNIT IV			
	Memory Management	4	Black board
	Paging – Segmentation	4	Black board
	Page Replacement-algorithms	4	Black board

UNIT V			
	Mass - Storage Structure	2	Black board
	Case Study – Windows 2000.	4	PPT
	Case Study –the LINUXSystems.	3	PPT

Course Outcomes (Cos)	Programme Outcomes (Pos)					Programme Specific Outcomes (PSOs)							Mean scores of Cos
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	
CO1	4	4	4	3	2	5	4	2	5	3	4	1	3.3
CO2	5	5	5	4	1	4	5	1	3	5	4	2	3.5
CO3	4	5	4	4	1	4	4	2	4	5	4	1	3.4
CO4	4	3	5	5	2	5	4	2	4	5	5	2	3.5
CO5	4	5	5	5	2	5	4	3	5	4	4	2	3.7
Mean Overall Score													3.5

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score ofCOs = Total of ValueTotal No. of Pos&PSOs

Mean Overall Score of COs = Total of Mean Score
Total No. of Cos

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
KNOWLEDGE	50%	50%
UNDERSTANDING	30%	30%
APPLY	20%	20%

CourseDesigner: Department of ComputerApplications

Programme: M.C.A **Part III: Core**
Semester : I **Hours : 5 P/W 60 HrsP/S**
Sub.Code : P22CC3 **Credits : 5**

TITLE OF THE PAPER: C++ AND DATA STRUCTURES

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	5	4	-	1	-

PREAMBLE:

To enable the students to understand the basic concepts of C++ and data structures and salient features of computer algorithms.

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
UNIT 1 CO1: Able to understand the concepts of data types, data structures and linear structures.	1	12
UNIT 2 CO2: Able to apply the OOPs concepts of Inheritance and over loading	2	12
UNIT 3 CO3: Application of arrays in list and queue structure	3	12
UNIT 4 CO4: To design and implement simple and advanced data structure concepts in C++.	4	12
UNIT 5 CO5: to design a search application using data structures	5	12

SYLLABUS

UNIT I:

Object Oriented Programming concepts- Encapsulation- Programming Elements- Program Structure- Enumeration Types- Functions and Pointers- Default arguments- Overloading Functions- Scope and Storage Class- Pointer Types- Arrays and Pointers- Call-by-Reference.

UNIT II:

Classes- Constructors and Destructors- Static Member and member functions- friend Functions -this Pointer- Overloading- Overloading Operators- Unary Operator Overloading- Binary Operator Overloading- Inheritance- Virtual function- Files- Command lineargument-Template.

UNIT III:

Introduction- Arrays- Operation on arrays- Polynomial Representation- Polynomial Addition- Stack: definition- representation- operations- infix to post fix- evaluation of postfix expression- Queues - definition- Representation- operations - Circular queues- lists- Queue and Linked Lists.

UNIT IV:

Trees- operations on trees-Binary Trees – definitions-Operations on binary trees - Binary Tree

Representations – node representation, internal and external nodes- array representation – linked representation - Binary tree Traversals- converting forest into binary tree-Binary search tree-operations on binary search tree.

UNIT V:

Graphs – application of graphs – array representation – Linked representation of Graphs - Shortest path algorithm– Dijkstra's algorithm - – Graph Traversals-DFS and BFS – spanning tree mining costing spanning tree-Hashing.

TEXT BOOK:

1. "Object Oriented Programming with C++" by E.Balagurusamy, 4th edition. Reprint-2009. Tata McGraw-Hill Publishing Company Limited. NewDelhi
2. Horowitz, Sahni& Dinesh Mehta , "Fundamental of data structures in C++",Galgotia,2003

REFERENCE BOOKS:

1. Schaum's Outlines – "Programming with C++" , Second edition, Tata McGrawHill,2000
2. Jean, Paul tremblay, Paul. G Sorenson, "An introduction to data structures with application", Tata McGraw Hill,2002
3. YashavantKanetkar, "Let Us C++" , BPB publications, First Edition,1999.

E-LEARNING RESOURCES:

1. https://www.w3schools
2. https://www.programiz.com/dsa
3. https://nptel.ac.in/courses/106102064/1
4. https://nptel.ac.in/courses/106/105/106105151/
5. https://nptel.ac.in/courses/106/102/106102064/

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHIN
UNIT 1			
	Object Oriented Programming concepts- Encapsulation- Programming Elements	4	Black Board
	- Program Structure- Enumeration Types- Functions and Pointers- Default arguments- Overloading Functions-	4	PPT

	Scope and Storage Class- Pointer Types- Arrays and Pointers- Call- by-Reference.	4	Black Board
UNIT 11			
	Classes- Constructors and Destructors- Static Member and member functions- friend Functions	4	Black Board
	Overloading- Overloading Operators- Unary Operator Overloading- Binary Operator Overloading-	4	Black Board
	Inheritance- Virtual function- Files- Command line argument- Template.	4	Black Board
UNIT III			
	Introduction- Arrays- Operation onarrays- Polynomial Representation- Polynomial Addition-	4	Black Board
	Stack: definition- representation- operations- infix to post fix- evaluation of postfix expression	4	Black Board
	Queues - definition- Representation- operations - Circular queues- lists- Queue and Linked Lists.	4	Black Board
UNIT IV			
	Trees- operations on trees-Binary Trees – definitions- Operations on binary trees representations	4	Black Board
	Representations – node representation, internal and external nodes- array representation – linked representation -	4	PPT
	Binary Tree Binary tree Traversals- converting forest in to binary tree-Binary search tree- operations on binary search tree.	4	Black Board
UNIT V			

	Graphs – application of graphs – array representation – Linked representation of Graphs	4	PPT
	Shortest path algorithm– Dijkstra's algorithm - – Graph	4	Black Board
	Traversals-DFS and BFS –		
	spanning tree mining costing spanning tree-Hashing.	4	Black Board

Course Outcomes (Cos)	Programme Outcomes (Pos)					Programme Specific Outcomes (PSOs)							Mean scores of Cos
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	
CO1	4	4	4	4	2	5	4	2	5	3	4	1	3.3
CO2	5	5	5	4	2	4	5	2	4	4	5	1	3.6
CO3	4	5	4	5	2	4	4	3	4	5	4	2	3.5
CO4	4	3	5	5	2	5	4	2	5	4	5	2	3.6
CO5	4	4	5	5	2	4	4	3	5	4	4	2	3.5
Mean Overall Score													3.5

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score ofCOs = Total of ValueTotal No. of Pos&PSOs

Mean Overall Score of COs = Total of Mean Score Total No. of COs

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
KNOWLEDGE	50%	50%
UNDERSTANDING	30%	30%
APPLY	20%	20%

CourseDesigner: Department of Computer Applications .

Programme:M.C.A **Part III:Elective**
Semester : I **Hours : 5 P/W 60 HrsP/S**
Sub.Code : P22DSC1A **Credits : 4**

TITLE OF THE PAPER: OBJECT ORIENTED ANALYSIS AND DESIGN

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	5	3	-	1	1

PREAMBLE:

To learn about Object Oriented Analysis and Design Concepts and UML Diagrams.

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
UNIT 1 CO1: Able to understand the object oriented concepts and to apply object oriented life cycle model for a project.	1	12
UNIT 2 CO2: Able to design static and dynamic models using UML diagrams.	2	12
UNIT 3 CO3: Able to perform object oriented analysis to identify the objects from the problemSpecification.	3	12
UNIT 4 CO4: Able to identify and refine the attributes and methods for designing the object oriented system	4	12
UNIT 5 CO5:Able to learn the open source CASE tools and to apply them in various domains.	5	12

SYLLABUS

UNIT - I

Introduction – Two Orthogonal views – object oriented Systems development Methodology – Object orientation – unified approach – Object Basics – object oriented philosophy – objects – classes – attributes – behavior and methods – Message passing -Encapsulation and information hiding – hierarchy – polymorphism – object relationship and associations – aggregation – a case study – advanced topics.

UNIT - II

Object oriented system development life cycle (SDLC) – development process – building high quality software – use-case driven approach – reusability –Object oriented methodologies – introduction – Booch methodology – Jacobson methodologies – patterns – frame works – unified approach.

UNIT - III

Unified modeling language – introduction – static and dynamic models – modeling – unified modeling language - UML diagrams – UML class diagrams – Use-case diagram – UML dynamic modeling- model management –OOA process – introduction – difficulty in analysis - business object analysis – use-case driven object oriented analysis – business processing modeling – use-case model – developing effective documentation.

UNIT - IV

Object analysis – classification – common class patterns approach – use-case driven approach – CRC – naming classes – object relationships – associations – Super-Sub class relationships – aggregation – class responsibility – object responsibility - Object oriented design process and design axioms – introduction – design process – design axioms- design patterns.

UNIT - V

Designing classes – introduction - object oriented design philosophy – UML object constraint – designing classes – class visibility – defining attributes – designing methods and protocols – Packages and managing classes – Access layer – Object storage and object interoperability – introduction – object store and persistence – Database management systems – database organization and access control – distributed databases.

TEXT BOOK:

Object Oriented Systems Development – Ali Bahrami – Irwin/McGraw Hill Publications – 1999. (Chapters 1 to 11)

REF. BOOK: OOAD by Grady Booch

E-LEARNING RESOURCES:

- https://nptel.ac.in/courses/106/105/106105153/

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT 1			
	Introduction — object oriented Systems development Methodology – Object orientation – unified approach	4	Black Board
	Object Basics – object oriented philosophy attributes – behavior and methods	4	Black Board
	a case study – advanced topics	4	ICT -NPTEL
UNIT 11			
	Object oriented system development life cycle (SDLC	4	PPT
	Object oriented methodologies	4	Black board
	patterns – frame works	4	Black board
UNIT III			
	Unified modeling language	4	ICT- NPTEL
	UML diagrams	4	PPT
	OOA process	4	Black board
UNIT IV			
	Object analysis – classification	4	Black board
	object relationships	4	Black board
	Object oriented design process and design axioms	4	Black board
UNIT V			
	Designing classes	4	Black board

	Packages and managing classes –	4	Black board
	Object storage and object interoperability	4	Black board

Course Outcomes (Cos)	Programme Outcomes (Pos)					Programme Specific Outcomes (PSOs)							Mean scores of Cos
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	
CO1	4	4	4	4	2	5	4	2	5	3	4	1	3.3
CO2	5	5	5	4	2	4	5	3	4	5	4	2	3.7
CO3	4	5	4	5	2	4	4	2	4	5	4	1	3.5
CO4	4	3	5	5	2	5	4	2	5	4	5	2	3.6
CO5	4	5	5	5	2	5	4	3	5	4	4	2	3.7
Mean Overall Score													3.6

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score ofCOs = Total of Value Total No. of Pos&PSOs

Mean Overall Score of COs = Total of Mean Score / Total No. of COs

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
KNOWLEDGE	50%	50%
UNDERSTANDING	30%	30%
APPLY	20%	20%

CourseDesigner: Department of ComputerApplications

Programme: M.C.A **Part III:Elective**
Semester : I **Hours : 5 P/W 60 HrsP/S**
Sub.Code : P22DSC1B **Credits: 4**

TITLE OF THE PAPER: MANAGEMENT INFORMATION SYSTEMS

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	5	3	-	2	-

PREAMBLE:

To enrich knowledge on concepts of Management Information Systems: Decision Making, Database Management technology, Client / Server Computing, and Decision Support System.

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
UNIT 1 CO1: Understand the leadership role of Management Information Systems in achieving business competitive advantage through informed decision making.	1	12
UNIT 2 CO2: Analyze and synthesize business information and systems to facilitate evaluation of strategic alternatives	2	12
UNIT 3 CO3: Effectively communicate strategic alternatives to facilitate decision making.	3	12
UNIT 4 CO4: Able to manage the Database design	4	12
UNIT 5 CO5: Able to develop Client – Server programming application basics	5	12

SYLLABUS

UNIT – I

MANAGEMENT INFORMATION SYSTEMS : AN OVERVIEW- Introduction – Management Information Systems – Definitions of MIS – Framework for MIS Organization and Management Triangle – Information Needs and its Economics – Systems Approach – Meaning and Objectives of MIS – Disadvantages of Information Systems – approaches of MIS Development – Constraints in Developing an MIS – MIS and Use of Computer – Limitations of MIS.

UNIT - II

INFORMATION SYSTEMS FOR DECISION MAKING: Introduction – Transaction Processing Systems – Management Information Systems – Intelligent Support Systems – Office Automation Systems.

UNIT - III

DATABASE MANAGEMENT TECHNOLOGY: Introduction – Data vs Information – Data Hierarchy – Methods for Organizing Data in Files – limitations of File-Based Systems – Database and Database Management Systems – Entity Relationship Diagram – Fourth Generation Languages(4GLs) – Recent Development in Databases – Principles of Database Management – The Database Administrator.

UNIT - IV

CLIENT-SERVER COMPUTING: Introduction – Definition of Client-Server Computing – Components and Functions of a Client-Server System – Development of Client-Server System–

Client-Server Security – Client-Server Costs Computation – Advantages of Client-Server System – Disadvantages/Obstacles of a Client-Server System.

UNIT - V

DECISION SUPPORT SYSTEM: Introduction – Definitions – Evolution of DSS - Objectives of DSS – Classifications of DSS – Characteristics of DSS – Components of a DSS – Functions of a DSS – Development of DSSs – Group Decision Support Systems – Executive Information Systems – Success Criteria for DSS/EIS – Relationship between MIS and DSS – DSS Measures of Success in Organizations – Applications of a DSS – TPS, MIS, DSS and EIS – Future Developments in DSS.

TEXT BOOK(S):

1. Management information systems by A.K.GuptaS.Chand& Company Ltd., New Delhi,II-Edition 2003.

REFERENCE BOOK(S):

1. Management Information Systems by Kenneth C. Laudon , Carol GuercioTraver, 12thEdition.

E-LEARNING RESOURCES:

1. https://nptel.ac.in/courses/122/105/122105022/

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT 1			
	MANAGEMENT INFORMATION SYSTEMS : AN OVERVIEW	4	Black Board
	Framework for MIS Organization and Management	4	PPT
	Systems Approach-MIS	4	PPT
UNIT 11			
	INFORMATION SYSTEMS FOR DECISION MAKING Transaction Processing Systems	4	Black Board
	Management Information Systems – Intelligent Support Systems	4	PPT
	Office Automation Systems.	4	PPT
UNIT III			
	DATABASE MANAGEMENT TECHNOLOGY	4	Black Board
	Entity Relationship Diagram – Fourth Generation Languages(4GLs)	4	Black Board
	The Database Administrator- recent development.	4	PPT
UNIT IV			
	Definition of Client-Server Computing	4	Black Board

	Components and Functions of a Client-Server System	4	Black Board
	Development of Client-Server System	4	PPT
UNIT V			
	Definitions – Evolution of DSS Objectives of DSS – Classifications of DSS	4	Black Board
	Components of a DSS – Functions of a DSS	4	Black Board
	Relationship between MIS and DSS – DSS Measures of Success in Organisations – Applications of a DSS – TPS, MIS, DSS and EIS	4	PPT

Course Outcomes (Cos)	Programme Outcomes (Pos)					Programme Specific Outcomes (PSOs)							Mean scores of Cos
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	
CO1	4	4	4	4	2	5	4	2	4	3	4	1	3.3
CO2	5	5	4	4	2	4	5	3	4	5	4	2	3.6
CO3	4	5	4	5	2	4	4	2	4	5	4	1	3.5
CO4	4	3	5	4	2	5	4	2	5	4	5	2	3.5
CO5	4	5	5	5	2	4	4	3	5	4	4	2	3.6
Mean Overall Score													3.5

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score ofCOs = Total of Value Total No. of POs &PSOs

Mean Overall Score of COs = Total of Mean Score / Total No. of COs

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
KNOWLEDGE	50%	50%
UNDERSTANDING	30%	30%
APPLY	20%	20%

CourseDesigner: Department of Computer Applications.

Programme : M.C.A **Part III : Elective**
Semester : I **Hours : 5 P/W 60Hrs P/S**
Sub.Code :P22DSC1C **Credits : 4**

TITLE OF THE PAPER: SOFT SKILLS

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	5	4	-	1	-

PREAMBLE:
To sharpen memory skills and other study skills which are vital for academic excellence.
To give training for positive thinking which will keep the students in a good stead at the time of crisis

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
UNIT 1 CO1: Resilience – learning to keep going when things don't go according to plan, coping with the unfamiliar, managing disappointment and dealing with conflict.	1	12
UNIT 2 CO2: time and resource management, conflict resolution, teaching and mentoring others	2	12
UNIT 3 CO3: **Teamwork** – learning to connect and work with others to achieve a set task and group learning to increase the memory power.	3	12
UNIT 4 CO4: **Communication** – demonstrating clear briefing and listening skills, not being afraid to ask for help and support when necessary.	4	12
UNIT 5 CO5: Positive thinking and **Leadership** – assessing the requirements of a task, identifying the strengths within the team, utilizing the diverse skills of the group to achieve the set objective, awareness of risk/safety.	5	12

SYLLABUS

Unit I - Introduction

- Definition of Personality
- Components of Personality – structural and functional aspects.
- Determinants of Personality- biological, psychological and socio-cultural factors.
- Assessment of Personality – observation, interview and psychological tests.
- Misconceptions and Classifications.
- Need for personality development.

Unit II - Self-Awareness and Self Motivation

- Self analysis through SWOT and Johariwidow.
- Elements of motivation.
- Seven rules of motivation.
- Techniques and strategies for self motivation.
- Motivation checklist and Goal setting based on the principle of SMART.
- Self motivation and life.

Unit III - General Knowledge and current affairs

- Regional, National and International events.

- Geographical, political and historical facts.
- Information on sports and other recreational activities.
- Basic knowledge with regard to health and health promotion.

Unit IV - Memory, decision making and study skills

- Definition and importance of memory.
- Causes offor getting.
- How to forget (thought stopping), how to remember (techniques for improving memory)
- The technique of passing exams.
- The rational decision making process.
- Improving creativity in decision making and components of creativity.

Unit V - Power of positive thinking

- Thinking power- seven steps for dealing with doubt.
- Traits of positive thinkers and high achievers,\
- Goals and techniques for positive thinking.
- Enhancement of concentration through positive thinking.
- Practicing a positive lifestyle.

PRACTICAL TRAINING

The course would include the following practical exercises.
Ice-breaking, Brainstorming and stimulation exercises. Thought stopping .Memory and study skills training.

REFERENCES:

1. Mile, D.J. Power of positive thinking. Delhi: Rohan Book Company.
2. Pravesh Kumar. All about self-motivation. New Delhi: Goodwill Publishing House.
3. Dudley, G.A. Double your learning power. Delhi: Konark Press. Thomas publishing Group Ltd.
4. Lorayne, H. How to develop a super power memory. Delhi: Konark Press. Thomas publishing Group Ltd.
5. Hurlock, E.B. Personality Development, 28th Reprint. New Delhi: Tata McGraw Hill.

E-LEARNING RESOURCES:

1. **https://nptel.ac.in/courses/109/107/109107121/**

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT 1			
	Definition of Personality Components of Personality – structural and functional aspects.	4	Black Board
	Determinants of Personality-biological, psychological and socio-cultural factors.	4	Black Board

	Assessment of Personality – observation, interview and psychological tests.		
	Misconceptions and Classifications. Need for personality development.	4	PPT
UNIT 11			
	Self analysis through SWOT and Johari widow. Elements of motivation.	4	Black Board
	Seven rules of motivation. Techniques and strategies for self motivation.	4	Black Board
	Motivation checklist and Goal setting based on the principle of SMART. Self motivation and life.	4	PPT
UNIT III			
	Regional, National and International events. Geographical, political and historical facts.	4	Black Board
	Information on sports and other recreational activities.	4	Black Board
	Basic knowledge with regard to health and health promotion.	4	PPT
UNIT IV			
	Definition and importance of memory. Causes of forgetting.	4	Black Board
	How to forget (thought stopping), how to remember (techniques for improving memory) The technique of passing exams.	4	Black Board
	The rational decision making process.	4	PPT

	Improving creativity in decision making and components of creativity.		
UNIT V			
	Thinking power- seven steps for dealing with doubt. Traits of positive thinkers and high achievers,	4	Black Board
	Goals and techniques for positive thinking. Enhancement of concentration through positive thinking.	4	Black Board
	Practicing a positive life style.	4	PPT

Course Outcomes (Cos)	Programme Outcomes (Pos)					Programme Specific Outcomes (PSOs)							Mean scores of Cos
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	
CO1	3	3	3	2	4	2	3	4	3	3	4	4	3.3
CO2	3	2	3	3	4	4	3	4	4	3	4	3	3.5
CO3	3	2	3	2	4	2	3	4	4	3	4	4	3.4
CO4	3	3	3	3	4	3	3	4	3	4	5	4	3.5
CO5	3	2	3	2	2	3	4	4	3	4	3	5	3.3
Mean Overall Score													3.4

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score ofCOs = Total of Value / Total No. of Pos&PSOs

Mean Overall Score of COs = Total of Mean Score / Total No. of COs

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
KNOWLEDGE	50%	50%
UNDERSTANDING	30%	30%
APPLY	20%	20%

CourseDesigner: Department of Computer Applications .

Programme : M.C.A **Part III: Practical**
Semester : I **Hours : 6 P/W 75 rsP/S**
Sub.Code : P22CC4P **Credits: 3**

TITLE OF THE PAPER: C++ AND DATA STRUCTURES LAB

Pedagogy	Hours	PracticalLab	TUTORIAL	ICT
	5	4 -	1	-

PREAMBLE:

The basic aim of this paper is to develop the programming skill to the students to solve the problems using Data structure algorithm

COURSE OUTCOME At the end of the Semester, the Students will be able to		
CO1 : able to understand the OOPs concepts		
CO2 : able to apply all functionalities into programs		
CO3 : able to implement basic data structure operations.		
CO 4 : Understand the concepts of TREE traversal and its implementations		

LAB CYCLE: C++ AND DATA STRUCTURES LAB

1. Program for function overloading.
2. Program for default arguments.
3. Program for unary operator overloading using memberfunction.
4. Program for binary operator overloading using memberfunction.
5. Program for unary operator overloading using friendfunction.
6. Program for binary operator overloading using friendfunction.
7. Program for sequential filehandling.
8. Program for polynomial addition usingarrays.
9. Program for singleinheritance.
10. Program for virtualfunction.
11. Program for stack class implementation usingarrays.
12. Program for stack class implementation using linkedlists.
13. Program for queue class implementation usingarrays.
14. Program for queue class implementation using linkedlists.
15. Program for infix to postfixconversion.
16. Program for evaluation of post fix expression.
17. Program for operations on singly linkedlist.
18. Program for operations ongraphs.
19. Program for binary treetraversals.

Programme: M.C.A **Part III: Practical**
Semester : I **Hours: 4 P/W Hrs.P/S**

Sub.Code : P22SEC1P (Skill enhancement Course) **Credits: 2**

TITLE OF THE PAPER: MULTIMEDIA AND UML LAB

Pedagogy	Hours	Practical Lab	TUTORIAL	ICT
	2	1 -	1	-

PREAMBLE:

1. To manipulate images by various techniques supported by image editingtools.
2. To create 2D animation using guide layer, various tweening methods supported by animationsoftware.
3. To model the object using wireframe and making it to animate andtransform.

COURSE OUTCOME At the end of the Semester, the Students will be able to		
CO1 : able to develop an animation using Flash		
CO2 : Able to develop an application and modification using Photoshop		
CO 3 : understand the concepts of 3D object development using 3D Max		
CO4 : able to draw all types of UML diagram using Star UML.		

LAB CYCLE:

Adobe Photoshop – (Image creation and Manipulation):

1. Working with Selection Tools , Copy, Cut, Paste, MoveTool
2. Working with Lasso, Polygonal Lasso tool , Transform and Opacityoptions
3. Working with Quick Select Tool (or Magic Wand Tool), Invert SelectionTool
4. Working with Paint Bucket Tool, Color Picker, BrushTool
5. Working with Layers, EraserTool
6. Working with Text and TransformTool
7. Working with ColorBalance
8. Working with Crop andCanvas
9. Working with Clone Stamp Tool, SmudgeTool
10. Working with Filters ,effects

Macromedia FLASH – (2D Animation):

1. MotionTweening
2. ShapeTweening
3. Working with multipleLayers
4. Animation using guidelayer
5. Animation using MaskingEffect
6. Working with Fade-in, Fade-out and Zoom-in, Zoom-outoptions
7. Working with Image Effects like blur,ripple
8. Sparkling GlassEffect
9. Flash Slide ShowPresentation
10. Working with Flash Scripts in order to control theanimation

3D Studio MAX – (3D Animation and rendering):

1. Working with Build-in 3Dobjects.
2. Simulation of abuilding.
3. Materials andTextures
4. Creation of user defined objects and Organization of Objects in aScene.
5. Simulation of Bombblast.
6. Illuminating Scenes UsingLights.
7. Creating an UnderwaterScene
8. Cloth, Hair, and FurCreation
9. CharacterAnimation

UML DIAGRAMS USING TOOLS

Programme : M.C.A **Part III: Core**
Semester : II **Hours : 4 P/W 60 HrsP/S**
Sub.Code : P22CC5 **Credits :4**

TITLE OF THE PAPER: RESOURCE MANAGEMENT TECHNIQUES

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	5	5	-	-	-

PREAMBLE:

To focus on logics of Resource Management techniques.

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
UNIT 1 CO1: Analyze the LPP and IPP Understand of Transportation problem	1	12
UNIT 2 CO2: Apply transportation and assignment models to find optimal solution in warehousing and Travelling,	2	12
UNIT 3 CO3: To prepare project scheduling using PERT and CPM	3	12
UNIT 4 CO4: Able to use optimization concepts in real world problem	4	12
UNIT 5 CO5: Identify and analyze appropriate queuing model to reduce the waiting time in queue.	5	12

SYLLABUS

UNIT-I

Simplex Method – Big M method – Two phase simplex method.

UNIT-II

Transportations and Assignment problems.

UNIT-III

Network Model – CPM and PERT.

UNIT-IV

Game Theory – Simulations – Monte – Carlo Simulation – Generation of random numbers.

UNIT-V

Dynamic programming Cargo loading Model – Work - force size Model – Equipment Replacement model – Investment model.

TEXT BOOKS

Operations Research – An Introduction by HamdyA.Taha. Ninth Edition, Dorling Kindersley Pvt. Ltd., Noida, India, 2012.

UNIT -I: Chapter 3 – 3.3,3.4
UNIT -II: Chapter 5 – 5.3.1,5.3.2, 5.4
UNIT-III: Chapter 6 – 6.1, 6.2,6.5
UNIT –IV: Chapter 15 – 15.4 (Exclude LPP Method)
Chapter 19 – 19.1, 19.2,19.4
UNIT - V : Chapter 12 – 12.3.1, 12.3.2, 12.3.3, 12.3.4

REFERENCEBOOKS

1. Resource Management Techniques by V.Sundaresan, K.S.Ganapathy Subramanian, K.Ganesan, A.R.Publications, Chennai, (7thEditon).

2. Operations Research by KarthiSwarup, P.K.GuptaandManmohan, Sultan Chand and Sons, (9th Edition), NewDelhi.

3. Linear Programming by Dr.S.Arumugam and A.Thangapndi,Isacc, New Gamma Publishing House,Palyamkottai.

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT 1			
	Simplex method	4	Black Board
	Big M method	4	Black Board
	Two phase simplex method.	4	Black Board
UNIT 11			
	Transportations problems.	4	Black Board
	Assignment problems.	4	Black Board
	Problem practices	4	Black Board
UNIT III			
	Network model	4	Black Board
	PERT	4	Black Board
	CPM	4	Black Board
UNIT IV			
	Game Theory – Simulations –	4	Black Board

	Generation of random numbers.		
	Monte – Carlo Simulation –	4	Black Board
	Generation of random numbers.	4	Black Board
UNIT V			
	Dynamic programming Cargo loadingModel	4	Black Board
	Work - force size Model	4	Black Board
	Equipment Replacement model – Investment model.	4	Black Board

Course Outcomes (Cos)	Programme Outcomes (Pos)					Programme Specific Outcomes (PSOs)							Mean scores of Cos
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	
CO1	4	4	4	4	2	5	4	2	5	3	4	1	3.3
CO2	5	5	5	4	2	4	5	3	4	5	4	2	3.7
CO3	4	5	4	5	2	4	4	2	4	5	4	1	3.46
CO4	4	3	5	5	2	5	4	2	5	4	5	2	3.6
CO5	4	5	5	5	2	5	4	3	5	4	4	2	3.66
Mean Overall Score													3.6

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score ofCOs = Total of ValueTotal No. of Pos&PSOs

Mean Overall Score of COs = Total of Mean Score / Total No. of COs

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
KNOWLEDGE	50%	50%
UNDERSTANDING	30%	30%
APPLY	20%	20%

CourseDesigner: Department of Computer Applications .

Programme: M.C.A **Part III: Core**
Semester : II **Hours : 4 P/W 60 HrsP/S**
Sub.Code : P22CC6 **Credits : 4**

TITLE OF THE PAPER: RELATIONAL DATABASE MANAGEMENT SYSTEMS

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	5	4	-	1	-

PREAMBLE:

1. To learn the data correlation and know about various databasemodels.
2. To enrich the importance of and process of datanormalization.
3. To learn the transactions and concurrent executions of transactions and identify the issues and supporting mechanisms ofRDBMS.

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
UNIT 1 CO1: Identify the methodology of conceptual modeling through Entity Relationship model.	1	12
UNIT 2 CO2: Define program-data independence, data models for database systems, database schema and database instances	2	12
UNIT 3 CO3: Identify Structure Query Language statements used in creation and manipulation of Database. Develop a simple database applications using normalization.	3	12
UNIT 4 CO4: understand the concepts of Data Storages.	4	12
UNIT 5 CO5: Acquire the knowledge about different special purpose databases and to critique how they differ from traditional database systems	5	12

SYLLABUS

UNIT – I

Purpose of database systems – View of data – Data models – Database languages – Transaction and storage management – Database Administrator – Types of database user – Structure of database management system – Entity Relationship model – Basic concepts – Design issue – Mapping constraints – keys – ER diagram – Weak entity set – Extended ER features – Design of ERschema.

UNIT – II

Relational model – Structure of Relational Databases – Relational Algebra – The tuple relational calculus – SQL – Basic structure – Set operations – Aggregate functions – Null values–Nestedsubqueries–Derivedrelation–Views–Modificationofdatabase–Joined relation–DataDefinitionLanguage–IntegrityConstraints–Domainconstraint–Referential integrity – Assertion – Trigger – Functional dependencies.

UNIT – III

Relational database design – Decomposition – Normalization using functional dependency – Normalization using multivalued dependencies – Normalization using join dependency – Domain key normal form – Object oriented data model – Persistent programming language – Object relational databases – Complex types – Querying with complex type – Comparison of object oriented and object relational databases.

UNIT – IV

Storage and file structure – RAID – Tertiary storage – File organization – Organization of records in file – Data dictionary storage – Storage structure for object oriented database – Indexing and Hashing – Ordered indices – B+ tree index files – B tree index files – Static hashing – Dynamic hashing – Multiple key access.

UNIT – V

Transactions – Transaction state – Implementation of atomicity and durability – Concurrent executions – Serializibility – Recoverability – Implementation of isolation – Transaction definition in SQL – Testing for serializibility – Concurrency control – Lock based protocols – Time stamp based protocols – Validation based protocols – deadlock handling – Recovery system – failure classification – log based recovery – Shadow paging – Recovery with concurrent transactions –Buffer management.

TEXT BOOKS

Database system concepts, A.Silberchatz, H.F.Korth and S.Sudarshan, Tata Mcgraw hill publications, III edition.

Unit –I : Chapter 1,2.1 to 2.8

Unit –II : Chapter 3.1 to 3.3, 4.2 to 4.11, 6.1 to 6.5

Unit – III : Chapter 7.2 to 7.6, 8.2,8.4,9.2,9.3,9.5

Unit – IV: Chapter 10.3 to 10.8, 11.2 to 11.6

Unit – V : Chapter 13.3 to 13.9, 14.1 to 14.3, 14.6,15.1,15.4,15.5 to 15.7.

REFERENCE BOOKS

1. Database Management Systems ,Raghuramakrishnan, Mcgraw Hill, 1998.

2. Introduction to database system, C.J.Date, Addsionweslwy publications, VIedition.

3. Modern database management, Mefadden, IVedition.

E-RESOURSES:

1. https://www.pearson.com
2. www.tutorialspoint.com/sql/ sq1-rdbms-concepts.htm
3. beginnersbook.com/2015/04/rdbms-concepts
4. beginnersbook.com/2015/04/dbms-tutorial
5. www .tutorialspoint.com/dbms/index.htm

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT 1			
	Purpose of database systems – View of data – Data models – Database languages	4	Black Board
	Transaction and storage management – Database Administrator – Types of database user – Structure of database managementsystem	4	Black Board
	— Entity Relationship model – Basic concepts – Design issue – Mapping constraints – keys – ER diagram – Weak entity set – Extended ER features – Design of ER schema.	4	Black Board
UNIT 11			
	Relational model – Structure of Relational Databases – Relational Algebra – The tuple relational calculus –	4	Black Board
	SQL – Basic structure – Set operations – Aggregate functions – Null values – Nested sub queries – Derived relation – Views – Modification ofdatabase – Joined relation –	4	PPT

	Data Definition Language – Integrity Constraints – Domain constraint – Referential integrity – Assertion – Trigger – Functionaldependencies.	4	Black Board
UNIT III			
	Relational database design – Decomposition – Normalization using functional dependency – Normalization using multivalued dependencies – Normalization using join dependency –	4	Black Board
	Domain key normal form – Object oriented data model – Persistent programminglanguage – Object relational databases – Complex types –	4	Black Board
	Querying with complex type – Comparison of object oriented and object relationaldatabases.	4	Black Board
UNIT IV			
	Storage and file structure – RAID – Tertiary storage – File organization – Organization of records in file –	4	Black Board
	Data dictionary storage – Storage structure for object oriented database	4	PPT
	Indexing and Hashing – Ordered indices – B+ tree index files – B tree index files – Static hashing – Dynamic hashing – Multiple key access	4	Black Board
UNIT V			
	Transactions – Transaction state – Implementation of atomicity and durability – Concurrent executions –	4	Black Board
	Serialibility – Recoverability – Implementation of isolation – Transaction definition in SQL – Testing for serialibility –	4	PPT

	Concurrency control – Lock based protocols – Time stamp based protocols – Validation based protocols – deadlock	4	Black Board
	handling – Recovery system – failure classification – log based recovery – Shadow paging – Recovery with concurrent transactions –Buffer management.		

Course Outcomes (Cos)	Programme Outcomes (Pos)					Programme Specific Outcomes (PSOs)							Mean scores of Cos
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	
CO1	4	4	4	4	2	5	4	2	5	3	4	1	3.3
CO2	5	5	5	4	2	4	5	3	4	5	4	2	3.7
CO3	4	5	4	5	2	4	4	2	4	5	4	1	3.46
CO4	4	3	5	5	2	5	4	2	5	4	5	2	3.6
CO5	4	5	5	5	2	5	4	3	5	4	4	2	3.7
Mean Overall Score													3.56

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score ofCOs = Total of Value Total No. of Pos&PSOs

Mean Overall Score of COs = Total of Mean Score Total No. of COs

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
KNOWLEDGE	50%	50%
UNDERSTANDING	30%	30%
APPLY	20%	20%

CourseDesigner: Department of Computer Applications .

Programme: M.C.A **Part III: Core**
Semester : II **Hours : 5 P/W 60 HrsP/S**
Sub.Code : P22CC8 **Credits : 5**

TITLE OF THE PAPER: DATA COMMUNICATIONS AND NETWORKING

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	5	3	-	1	1

PREAMBLE:

To enable the students

- to understand about fundamentals ofnetworks
- to learn about networkconcepts
- to learn about layerfunctions

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
UNIT 1 CO1: Understand the components of a data communications system.	1	12
UNIT 2 CO2: Identify key considerations in selecting various transmission media in networks.	2	12
UNIT 3 CO3: Usage of the various error detection and correction schemes and the various types of signals and their features.	3	12
UNIT 4 CO4: Identify and de.ne roles and features of various data transmission protocols.	4	12
UNIT 5 CO5: Understand the network security methods and its applications	5	12

SYLLABUS

UNIT I

Introduction: Data Communication – Networks – Distributed Processing, Network criteria, Applications -Protocols and Standards, - Standards Organizations – Standards Creation committees, Forums, Regulatory Agencies. Basic Concepts: Line Configuration – Point-to-Point, Multipoint - Topology – Mesh, Star, Tree, Bus, Ring, Hybrid Topologies -Transmission Mode – Simplex, Half-Duplex - Full Duplex - Categories of Networks – LAN, WAN, MAN - Internetworks. The OSI Model: The Model – Functions of the Layers.

UNIT II

Transmission of Digital Data: Interfaces and Modems: Digital Data Transmission – Parallel Transmission, Serial Transmission - Transmission Media: Guided Media – Twisted-Pair Cable, Coaxial Cable, Optical Fiber - Unguided Media – Radio Frequency Allocation, Propagation of Radio Waves, Terrestrial Microwave, Satellite Communication, Cellular Telephony. Error Detection and Correction: Types of Errors, Detection, Vertical Redundancy Check, Longitudinal Redundancy Check, Cyclic Redundancy Check, Checksum, ErrorCorrection.

UNIT III

Data Link Control: Line Discipline – ENQ/ACKJ, Poll/Select - Flow Control – Stop-and-Wait, Sliding Window - Error Control – Automatic Repeat Request, Stop-and-Wait ARQ, Sliding Window ARQ. Switching: Circuit Switching – Space-Division Switches, Time-Division

Switches, TDM Bus, Space-and Time division switching combinations, Public switched telephone network – Packet Switching – Datagram Approach, Virtual circuit approach, Circuit-switched connection versus virtual-circuit connection - Message Switching.

UNIT IV

Local Area Networks: Project 802 – IEEE 802, LLC, MAC, PDU – Ethernet – Access method: CSMA/CD, Addressing, Electrical specifications, Frame format, Implementation -Other Ethernet Networks – Switched Ethernet, Fast Ethernet, Gigabit Ethernet – Token Bus – Token Ring – Access method: Token passing, Addressing, Electrical specifications, Frame format, Implementation - FDDI – Access method: Token passing, Addressing, Electrical specifications, Frame format, Implementation - Comparison. Metropolitan Area Networks: IEEE 802.6 (DQDB) – Access method: Dual Bus, Distributed Queues – Ring Configuration – Operation, and Implementation. Networking and Internetworking Devices: Repeaters – Bridges – Routers – Gateways – Other Devices – Multiprotocol Routers, Brouters, Switches, Routing Switches.

UNIT V

Network Security: Security Attacks - Security Services – A model for network security – Symmetric encryption principles –Symmetric block encryption algorithms – Public-Key cryptography Principles – Public-Key cryptography algorithms – X.509 certificates.

TEXT BOOK:

1. Data Communications and Networking, Behrouz A Forouzan, Tata McGraw Hill Publishing Company Limited, New Delhi, 2nd Edition, Third Reprint 2001. (Unit I to UnitIV)

UNIT-I

Chapter 1(Sections 1.2-1.5), Chapter 2(Sections 2.1-2.5), Chapter 3(Sections 3.1,3.2)

UNIT-II

Chapter 6(Sections 6.1-6.1), Chapter 2(Sections 7.1-7.2), Chapter 9

UNIT-III

Chapter10, Chapter 14(Sections 14.1 –14.3)

UNIT-IV

Chapter 12, Chapter 13(Sections 13.1), Chapter 21 (Sections:21.1-21.5)

2. Network Security Essentials: Applications and Standards by William Stallings, Fourth Edition, Second Impression 2012, Pearson Education Publications. (UnitV)

UNIT-V

Chapters 1 (Sections: 1.3,1.4,1.7), Chapter 2 (Sections: 2.1,2.2,3),
Chapter 3 (Sections: 3.4,3.5), Chapter 4 (Sections: 4.4)

REFERENCE BOOK(s):

1. Computer Networks, Andrew S. Tanenbaum, Prentice Hall of India, 4th Edition, 2006.

E-LEARNING RESOURCES:

1. https://nptel.ac.in/courses/106/105/106105082/

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT 1			
	Introduction: Data Communication – Networks – Distributed Processing, Network criteria,Applications	4	Black Board
	Protocols and Standards, - Standards Organizations – Standards Creation committees, Forums, Regulatory Agencies. Basic Concepts: Line Configuration – Point-to-Point, Multipoin - Topology – Mesh, Star, Tree, Bus, Ring, Hybrid Topologies	4	Black Board
	Transmission Mode – Simplex, Half-Duplex - Full Duplex - Categories of Networks – LAN, WAN, MAN - Internetworks. The OSI Model: The Model – Functions of the Layers.	4	PPT
UNIT 11			
	Transmission of Digital Data: Interfaces and Modems: Digital Data Transmission – Parallel Transmission, Serial Transmission	4	Black Board
	Transmission Media: Guided Media – Twisted-Pair Cable, Coaxial Cable, Optical Fiber - Unguided Media – Radio Frequency Allocation, Propagation of Radio Waves, Terrestrial Microwave, Satellite Communication,	4	Black Board
	Cellular Telephony. Error Detection and Correction: Types of Errors, Detection, Vertical Redundancy Check, Longitudinal Redundancy Check, Cyclic Redundancy Check, Checksum, Error Correction	4	PPT

	Data Link Control: Line Discipline – ENQ/ACKJ, Poll/Select - Flow Control – Stop-and-Wait, Sliding Window - Error Control – Automatic Repeat Request, Stop-and-Wait ARQ, Sliding Window ARQ. Datagram Approach, Virtual circuit approach, Circuit-switched connection versus virtual-circuit connection - MessageSwitching.	4	Black Board
	Switching: Circuit Switching – Space-Division Switches, Time-Division Switches, TDM Bus, Space-and Time division switching combinations, Public switched telephone network – Packet Switching –	4	Black Board
	Datagram Approach, Virtual circuit approach, Circuit-switched connection versus virtual-circuit connection - Message Switching.	4	PPT
UNIT IV			
	Local Area Networks: Project802 – IEEE 802, LLC, MAC, PDU– Ethernet – Access method: CSMA/CD, Addressing, Electrical specifications, Frame format, Implementation -Other Ethernet Networks – Switched Ethernet, Fast Ethernet, Gigabit Ethernet – Token Bus – Token Ring – Access method: Token passing,Addressing,	4	Black Board
	Electrical specifications, Frame format, Implementation - FDDI – Access method: Token passing, Addressing, Electrical specifications, Frame format, Implementation - Comparison. Metropolitan Area Networks: IEEE 802.6 (DQDB) –Access method: Dual Bus, Distributed Queues – Ring Configuration – Operation, and Implementation.	4	Black Board

UNIT III			
	Networking and Internetworking Devices: Repeaters – Bridges – Routers – Gateways – Other Devices – Multiprotocol Routers, Brouters, Switches, Routing Switches.	4	ICT – Net materials NPTEL notes
UNIT V			
	Network Security: Security Attacks - Security Services – A model for network security	4	Black Board
	Symmetric encryption principles –Symmetric block encryption algorithms –	4	PPT
	Public-Key cryptography Principles – Public-Key cryptography algorithms – X.509 certificates.	4	Black Board

Course Outcomes (Cos)	Programme Outcomes (Pos)					Programme Specific Outcomes (PSOs)							Mean scores of Cos
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	
CO1	4	4	4	4	2	5	4	2	5	3	4	1	3.26
CO2	5	5	5	5	2	4	5	2	4	5	4	2	3.66
CO3	4	5	4	4	2	4	5	3	4	5	4	1	3.53
CO4	4	3	5	5	2	5	4	2	5	4	5	2	3.6
CO5	4	5	5	5	2	5	5	3	5	4	4	2	3.8
Mean Overall Score													3.57

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score ofCOs = Total of ValueTotal No. of Pos&PSOs

Mean Overall Score of COs = Total of Mean Score
Total No. of Cos

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
KNOWLEDGE	50%	50%
UNDERSTANDING	30%	30%
APPLY	20%	20%

CourseDesigner: Department of Computer Applications .

Programme: M.C.A **Part III: Core**
Semester : II **Hours : 5 P/W 60 Hrs P/S**
Sub.Code : P22CC7 **Credits : 5**

TITLE OF THE PAPER : FINANCIAL MANAGEMENT AND ACCOUNTINTG

OBJECTIVES

The coverage of the topics in this paper should endeavor to develop a working knowledge of accounting so as to enable the students to apply these in software development.

UNIT - I

Principles of Accounting-Need for Accounting-purpose and advantages of accounting-Branches of Accounting-Important terms used in accounting-Accounting concepts-Methods of Accounting: Single entry, double entry system of book keeping-Types of Accounts: Personal account, Impersonal Accounting- Journal-Ledger- Trial Balance.

UNIT - II

Final Account: Trading Account, Profit and loss account, Balance sheet-Accounting for material-Meaning for material control- Objective for material control-Essential of material control-Re-ordering level-Economic Ordering Quantity –Minimum level or safety stock level-Maximum level-Danger level-Store Records Difference between Bin card and Store ledger-ABC Analysis

UNIT - III

Financial statements--Nature-Importance of financial statement – limitations-Process of financial statement analysis and interpretation-Types of Analysis-Techniques and tools of financial statement analysis.

UNIT - IV

Standard for control-variable/Fixed Costs-Contribution-Break Even Analysis-Standard/Actual cost-Material Price/Usage variance-Labour cost/time variance-sales price/quantity variance.

UNIT - V

Budgeting and forecasting-Objectives-Sales, Production, Purchase Labour, Capital Expenditure and Cash budgets.

TEXT BOOKS

1. Maheswari S N,Financial and Management Accounting, Sultan Chand & Sons,2003.
2. Pandey I M, Financial Management, 7th Edition, vikas Publications.
3.Reddy T.S Hari Prasad Reddy Y.Margham Publication ,2008.
4.Jain S.P,Narang K.L Cost Acounting,Kalyani Publishers,2009.

REF. BOOKS:

1. S. Nagarathnam, Management Accounting Financial Management and Holding Company Accounts, S. Chand Company Ltd., 1989.
2. Jain S.P,Narang K.L Financial Acounting, Kalyani Publishers,2009.
3. Gupta R.L ,Advanced Accountancy,Sulann chand & sons ,1981

Programme: M.C.A Part III: Elective

Semester : II **Hours : 4 P/W 60 Hrs.P/S**

Sub.Code : P22DSC2A **Credits: 4**

TITLE OF THE PAPER: CLOUD COMPUTING

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	5	3	-	1	1

PREAMBLE:

This gives an idea of cloud computing and its services available today which may led to the design and development of simple cloud service and focused on some key challenging issues around cloudcomputing.

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
UNIT 1 CO1: Compare the strengths and limitations of cloud computing	1	12
UNIT 2 CO2: Analyze and Identify the architecture, infrastructure and delivery models of cloud computing.	2	12
UNIT 3 CO3: Effectivelymanage the challenges and facilitate user authentications.	3	12
UNIT 4 CO4: Address the core issues of cloud computing such as security, privacy and interoperability.	4	12
UNIT5CO5: Design Cloud Services and Set a private cloud And apply suitable virtualizationconcept.	5	12

SYLLABUS

UNIT-I:

Introduction to Cloud computing: Definition –Cloud Deployment models – Private Vs Public clouds – Business drivers for Cloud Computing – Cloud Technologies –Technology Challenges.

UNIT-II:

Infrastructure as a Service (IaaS): Storage as a service : Amazon storage service – Compute as a service: Amazon Elastic compute cloud – Hp cloud system matrix

Platform as a service (PaaS): Google App Engine – PaaS Storage Aspects – Software as a Service (**SaaS):** Social computing service – case study : Face book, Twitter, Picasa**.**

UNIT-III:

Cloud challenges: Scaling computation: Scale out Vs Scale up – Amdahl's Law- Scaling storage – CAP theorem – Multi tenancy levels – Tenants and users – Authentication- Availability – Failure Detection – Application Recovery**.**

UNIT-IV:

Designing cloud Security: Introduction – Cloud security requirements: Physical Security – Virtual Security- Risk Management: Concepts – Process- Security Design Patterns- Selecting a cloud service provider: Listing the Risks – security criteria for selecting a cloud service provider.

UNIT-V:

Cloud Management: Managing IaaS : Management of cloud system Matrix-Managing PaaS : Management of windows Azure- Managing SaaS: Monitoring Force.com : NetCharts.

TEXT BOOKS:

1. DinkarSitaram , GeethaManjunath ," Syngress Moving to the cloud" Elsevier2012
2. GautamShroff, "Enterprise Cloud Computing Technology Architecture Applications", Cambridge University Press; First Edition,2010.

REF. BOOKS:

1. Dimitris N. Chorafas, "Cloud Computing Strategies" CRC Press; First Edition2010.
2. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach" McGraw-Hill Osborne Media; FirstEdition

E-LEARNING RESOURCES:

1. **https://nptel.ac.in/courses/106/105/106105167/**

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT 1			
	Introduction to Cloud computing: Definition –Cloud Deployment models –	4	Black Board
	Private Vs Public clouds – Business drivers for Cloud Computing –	4	Black Board
	Cloud Technologies –Technology Challenges	4	ICT – web materials
UNIT 11			
	Infrastructure as a Service (IaaS): Storage as a service :	4	Black Board

	Amazon storage service – Compute as a service: Amazon Elastic compute cloud – Hp cloud system matrix		
	Platform as a service (PaaS): Google App Engine – PaaS Storage Aspects –	4	PPT
	Software as a Service (**SaaS):** Social computing service – case study : Face book, Twitter, Picasa**.**	4	ICT – Web Materials
UNIT III			
	Cloud challenges: Scaling computation: Scale out Vs Scale up – Amdahl's Law- Scaling storage	4	Black Board
	CAP theorem – Multi tenancy levels – Tenants and users –	4	Black Board
	Authentication- Availability – Failure Detection – Application Recovery**.**	4	Black Board
UNIT IV			
	Designing cloud Security: Introduction – Cloud security requirements: Physical Security – Virtual Security	4	Black Board
	Risk Management: Concepts – Process- Security Design Patterns-	4	PPT
	Selecting a cloud service provider: Listing the Risks – security criteria for selecting a cloud serviceprovider.	4	Black Board
UNIT V			
	Cloud Management: Managing IaaS : Management of cloud system Matrix-Managing	4	Black Board

	PaaS : Management of windows Azure-	4	PPT
	Managing SaaS: Monitoring Force.com :NetCharts.	4	PPT

Course Outcomes (Cos)	Programme Outcomes (Pos)					Programme Specific Outcomes (PSOs)							Mean scores of Cos
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	
CO1	5	4	4	4	2	5	4	2	5	3	4	2	3.5
CO2	5	5	5	4	1	5	5	3	4	5	4	2	3.8
CO3	4	4	4	5	2	4	4	2	4	5	4	2	3.4
CO4	5	3	5	5	1	4	4	2	5	4	5	1	3.5
CO5	4	5	5	5	2	5	4	3	5	4	4	1	3.6
Mean Overall Score													3.5

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score ofCOs = Total of ValueTotal No. of Pos&PSOs

Mean Overall Score of COs = Total of Mean Score
Total No. of COs

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
KNOWLEDGE	50%	50%
UNDERSTANDING	30%	30%
APPLY	20%	20%

CourseDesigner: Department of Computer Applications.

Programme: M.C.A **PartIII: Elective**
Semester : II **Hours : 4 P/W 60 HrsP/S**
Sub.Code: P22DSC2B **Credits :4**

TITLE OF THE PAPER: INTERNET OF THING

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	5	4	-	1	-

PREAMBLE:

To understand the concept of M2M (Machine to Machine) with necessary protocols and applications of IoT**.**

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
UNIT 1 CO1: Analyze various protocols for IoT	1	12
UNIT 2 CO2: Develop web services to access/control IoT devices.	2	12
UNIT 3 CO3: Design a portable IoT using Rasperry Pi	3	12
UNIT 4 CO4: Deploy an IoT application and connect to the cloud.	4	12
UNIT 5 CO5: Analyze applications of IoT in real time scenario	5	12

SYLLABUS

UNIT-I:

Introduction to Internet of Things: Introduction – Physical Design of IoT – Logical Design of IoT – IoT Enabling Technologies – IoT Levels and Deployment Templates – Domain Specific IoTs: Home Automation – Cities – Environment – Energy – Retail – Agriculture – Health and Lifestyle.

UNIT-II:

IOT and M2M: Introduction to M2M – Difference between IoT and M2M – Need for IoT Systems Management – SNMP – Network Operator Requirements – IoT Platforms Design Methodology : Introduction – IoT Design Methodology.

UNIT-III:

IoT Physical Devices and Endpoints :IoT Device – Examplary Device: Raspberry Pi, About the board. Linux on Raspberry Pi, Raspberry Interfaces – other IoT Devices.

UNIT-IV:

IoT Physical Servers and Cloud Offerings: Introduction to Cloud Storage Models and Communication APIs – WAMP – AutoBahn for IoT – Xively Cloud for IoT – Amazon Web Services for IoT.

UNIT-V:

Case Studies of IoT Design: Home Automation – Cities – Environment – Agriculture – Productivity Applications. An IoT Tool: Chief - Chief Case Studies.

TEXT BOOKS

ArshdeepBahga, Vijay Madisetti, "Internet of Things - A Hands on Approach" Universities Press 2015.

REFERENCE BOOKS:

1. HonboZhou , "The Internet of Things in the Cloud" A Middleware Perspective" CRC Press 2012. Dieter Uckelmann,Mark Harrison, Florian Michahelles "Architecture the Internet of Things" Springer 2011.

E-LEARNING RESOURCES:

1. https://nptel.ac.in/courses/106/105/106105166/
2. www.pubnub.com/blog/2015-05-27-internet-of-things-101-getting-started-w-raspberry-pi/
3. www.theinternetofthings.eu/what-is-the-internet-of-things
4. www.ibm.com/blogs/bluemix/2015/04/tutorial-using-a-raspberry-pi-python-iot-twilio-

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT 1			
	Introduction to Internet of Things: Introduction – Physical Design of IoT – Logical Design of IoT	4	Black Board
	IoT Enabling Technologies – IoT Levels and Deployment Templates – Domain Specific IoTs: Home Automation – Cities	4	Black Board
	Environment – Energy – Retail– Agriculture – Health and Lifestyle.	4	PPT
UNIT 11			
	IOT and M2M: Introduction to M2M – Difference between IoT and M2M – Need for IoT	4	Black Board
	Systems Management – SNMP – Network Operator Requirements	4	Black Board
	IoT Platforms Design Methodology : Introduction –IoT Design Methodology.	4	PPT
UNIT III			
	IoT Physical Devices and Endpoints : IoT Device	4	Black Board
	Examplary Device: Raspberry Pi, About the board.	4	PPT
	Linux on Raspberry Pi, Raspberry Interfaces – other IoT Devices	4	Black Board
UNIT IV			
	IoT Physical Servers and Cloud Offerings: Introduction to Cloud Storage Models and Communication APIs	4	Black Board
	WAMP – AutoBahn for IoT – Xively Cloud for IoT	4	Black Board
	Amazon Web Services for IoT	4	Black Board
UNIT V			
	Case Studies of IoT Design: Home Automation –Cities	4	Black Board

	Environment Agriculture ProductivityApplications.	4	PPT
	An IoT Tool: Chief - Chief Case Studies.	4	Black Board

Course Outcomes (Cos)	Programme Outcomes (Pos)					Programme Specific Outcomes (PSOs)							Mean scores of Cos
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	
CO1	4	4	4	4	2	5	4	2	5	3	4	1	3.33
CO2	5	5	5	4	2	4	5	2	4	5	4	2	3.66
CO3	4	5	4	5	2	5	4	3	4	4	4	1	3.53
CO4	4	4	5	4	2	4	4	2	5	5	5	2	3.6
CO5	4	5	5	5	2	5	4	3	5	4	4	2	3.66
Mean Overall Score													3.56

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score ofCOs = Total of ValueTotal No. of Pos&PSOs

Mean Overall Score of COs = Total of Mean Score Total No. of COs

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
KNOWLEDGE	50%	50%
UNDERSTANDING	30%	30%
APPLY	20%	20%

CourseDesigner: Department of ComputerApplications.

Programme: M.C.A **PartIII: Elective**
Semester : II **Hours : 4 P/W 60 Hrs.P/S**
Sub.Code : P22DSC2C **Credits:4**

TITLE OF THE PAPER: DIGITAL PRINCIPLES AND COMPUTER ORGANISATION

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	5	4	-	1	-

PREAMBLE:

Todevelopknowledgeindigitallogic,combinationallogiccircuit,flip-flops, registers, basic structure of computer, I/O system, memory system, and processing unit.

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
UNIT 1 CO1: Understand the concept of Gates and its circuit designs.	1	12
UNIT 2 CO2: Understand the design principles of Flip Flop s and counters.	2	12
UNIT 3 CO3: Comprehend basic input/output functioning including program controlled I/O and interrupt I/O and design Instruction formats .	3	12
UNIT 4 CO4: Understand the design and functioning of a machines central processing unit (CPU).	4	12
UNIT 5 CO5: Be through with organization of memory hierarchies including Cache and Virtual Memory.	5	12

SYLLABUS

UNIT - I

Describing logic circuits: Boolean constants and variables, Truth tables, OR operations with OR Gates, AND operations with AND Gates, NOT operation, Describing logic circuit algebraically, Evaluating logic circuit operations, Implementing circuits from Boolean expressions, NOR Gates and NAND Gates, Boolean Theorems, Demorgan's Theorems, Universality of NAND Gates and NOR Gates. **Combinational logic circuits :** Sum of Products form, Simplifying logic circuits, Algebraic simplification, Designing combinational logic circuits, Karnaugh map method, Exclusive OR and Exclusive NOR circuits.

UNIT - II

Flip-Flops and their Applications: Clock Signals and clocked Flip-Flops, Clocked S-R Flip-Flop, Clocked J-K Flip-Flops, Clocked D Flip-Flops, D Latch, Master/Slave Flip-Flops, Asynchronous (Ripple) Counter, Asynchronous Down Counter, Synchronous (Parallel)

counters, Integrated circuit registers: Parallel – in / Parallel –out, Serial – in / Serial – out, Parallel – in / Serial – out, Serial – in / Parallel – out.

UNIT - III

Instruction Codes – Computer Registers – Computer Instruction – Timing and control – Instruction Cycle – Memory reference Instruction – Input – Output and Interrupt – Programming the Basic Computer – Assembly Language – The Assember – Program loops – subroutines.

UNIT - IV

Central Processing Unit – General Register Organization – Stack Organization – Instruction formals – Addressing mode – Data Transfer and manipulation – Program Control.

UNIT - V

Input-Output organization – Input-Output Interface – Priority Interrupt – DMA – IOP. – Memory Organisation – Memory Hierarchy – Associative memory – Cache memory – Virtual memory.

TEXT BOOK(S)

1. Computer System Architecture by M.Morris Mano, III-Edn, 1998. UNIT III, IV &V
2. Digital Systems Principles and Applications by Ronald J. Tocci, Neal S. Widmer, Gregory L.Moss, Pearson Prentice Hall, Sixth Edition. UNIT I &II

UNIT I: Chapters 3.1 – 3.12, 4.1 – 4.6 UNIT II: Chapters: 5.4 – 5.8, 5.13, 7.1,7.4, 7.6, 7.18 – 7.22 UNIT III: Chapter 5.1 – 5.7, 6.3 – 6.5, 6.7 UNIT IV: Chapter: 8.2 – 8.7 UNIT V: Chapter 11.2,11.5 – 11.7,12.1, 12.4 – 12.6.

REFERENCE BOOK(S)

1. Digital Principles And Applications by D.P. Leach and A.P. Malvino, Tata McGrawHill, New Delhi, 6th Edition,2006.
2. Computure Organization by Carl Hamacher, ZvonkoVranesic, SafwatZaky, TataMcGraw Hill, 5th Edition, 2002.

E-LEARNING RESOURCES:

1. http://nptel.ac.in/courses/117106086/1
2. https://swayam.gov.in/courses/1392-digital-circuits-and-systems
3. https://nptel.ac.in/courses/117/105/117105078/
4. https://www.tutorialspoint.com/computer_organization/index.asp
5. https://www.studytonight.com/computer-architecture/

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT 1			
	Describing logic circuits: Boolean constants and variables, Truth tables, OR operations with OR Gates, AND operations with AND Gates, NOT operation, Describing logic circuit	4	Black Board
	algebraically, Evaluating logic circuit operations,		
	Implementing circuits from Boolean expressions, NOR Gates and NAND Gates, Boolean Theorems, Demorgan's Theorems, Universality of NAND Gates and NOR Gates.	4	Black Board
	Combinational logic circuits : Sum of Products form, Simplifying logic circuits, Algebraic simplification, Designing combinational logic circuits, Karnaugh map method, Exclusive OR and Exclusive NORcircuits.	4	Black Board
UNIT 11			
	Flip-Flops and their Applications: Clock Signals and clocked Flip-Flops, Clocked S-R Flip-Flop, Clocked J-K Flip-Flops, Clocked D Flip-Flops, D Latch, Master/Slave Flip-Flops,	4	PPT
	Asynchronous (Ripple) Counter, Asynchronous Down Counter, Synchronous (Parallel) counters,	4	Black Board
	Integrated circuit registers: Parallel – in / Parallel –out, Serial – in / Serial – out, Parallel – in / Serial – out, Serial – in / Parallel – out.	4	Black Board
UNIT III			
	Instruction Codes – Computer Registers – Computer Instruction – Timing and control –	4	Black Board
	Instruction Cycle – Memory reference Instruction – Input – Output and Interrupt –	4	PPT

	Programming the Basic Computer – Assembly Language – The Assembler – Program loops – subroutines.	4	Black Board
UNIT IV			
	Central Processing Unit – General Register Organization –Addressing mode – Data Transfer and manipulation –	4	Black Board
	Program Control.		
	Stack Organization – Instruction formals –	4	Black Board
	Addressing mode – Data Transfer and manipulation – Program Control.	4	Black Board
UNIT V			
	Input-Output organization – Input-Output Interface – Priority Interrupt–	4	Black Board
	DMA – IOP. – Memory Organisation –	4	PPT
	Memory Hierarchy – Associative memory – Cache memory –Virtual memory.	4	Black Board

Course Outcomes (Cos)	Programme Outcomes (Pos)					Programme Specific Outcomes (PSOs)							Mean scores of Cos
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	
CO1	4	4	4	4	2	5	4	2	5	3	4	1	3.3
CO2	5	5	5	4	2	4	5	3	4	5	4	2	3.7
CO3	4	5	4	5	2	4	4	2	4	5	4	1	3.5
CO4	4	3	5	5	2	5	4	2	5	4	5	2	3.6
CO5	4	5	5	5	2	5	4	3	5	4	4	2	3.7
Mean Overall Score													3.36

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score ofCOs = Total of Value Total No. of Pos&PSOs

Mean Overall Score of COs = Total of Mean Score / Total No. of COs

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
KNOWLEDGE	50%	50%
UNDERSTANDING	30%	30%
APPLY	20%	20%

CourseDesigner: Department of Computer Applications .

Programme: M.C.A **PartIII: Practical**
Semester : II **Hours : 5 P/W 75 Hrs.P/S**
Sub.Code : P22CC9P **Credits: 3**

TITLE OF THE PAPER: CLIENT SERVER LAB

Pedagogy	Hours	PracticalLab	TUTORIAL	ICT
	5	4 -	1	-

PREAMBLE:

- To promote programming knowledge on the Client Server Concepts (VB as frontend, ORACLE asbackend).
- To develop applications to suit real time requirement withreports.

COURSE OUTCOME At the end of the Semester, the Students will be able to		
CO1 : able to develop a client server applications		
CO 2 : Able to develop a system functions		
CO 3 : understand to develop a front end and back end applications.		

LAB CYCLE:

1. Library Management System (3tables).
2. Inventory Control System (3tables).
3. Gas Booking and Delivery System (2tables).
4. Banking System (2tables).
5. Electricity Billing System (2tables).
6. Student Mark Processing System (2tables).
7. Airline – ticket Reservation System (2tables).

Programme: M.C.A **PartIII: Practical**

Semester : II **Hours : 3 P/W 75 HrsP/S**

Sub.Code : P22SEC2P(SEC II) **Credits : 2**

TITLE OF THE PAPER: NETWORKING AND SECURITY Theory and LAB

Pedagogy	Hours	PracticalLab	TUTORIAL	ICT
	5	4 -	1	-

PREAMBLE:

To develop programming skills on RMI, Networking (TCP/IP, UDP), COM and, Security Concepts.

COURSE OUTCOME At the end of the Semester, the Students will be able to		
CO1 : understand the concepts of RMI with client and server machine		
CO 2 : able to code program with COM technologies		
CO3 : Able to develop an application with TCP and UDP protocols		
CO4 : able to develop an application with Database connectivity		

LAB CYCLE:

1. Write a RMI program to print Fibonacciseries.
2. Write a RMI program to check the PrimeNumber.
3. Write a RMI program to print arithmeticoperations.
4. Write a RMI program to find the factorial value of the givennumber.
5. Write a COM coding for basic ArithmeticOperations.
6. Write a COM Coding to handle PrimeNumber.
7. Write a COM program to check Odd or EvenNumber.
8. Find the IP Address of LocalHost.
9. Send and receive a packet usingTCP.
10. Send and receive a packet usingUDP.
11. Factorial Calculation using TCP /UDP.
12. Prime Number Checking using TCP /UDP.
13. Implement the lowercase to uppercaseconversion.
14. Send the password as a packet from client and receive the related data from theserver.
15. Send the filename from the client and receive a content of the file from the server usingURL.
16. Send the filename from the client and receive a content of the file from the server using FileInputStream.
17. Implement Chatting.
18. Date and Time display usingTCP.
19. Implement JDBC (BackEnd – Oracle).
20. Implement JDBC (BackEnd – Oracle) – DDLCommand.
21. Implement JDBC (BackEnd – Oracle) – DMLCommand.

22. Implement Basic Ceaser Cipher Encryption and Decryptionalgorithm.
23. Implement Key based Ceaser Cipher Encryption and Decryptionalgorithm.
24. Implement Transposition based encryption and Decryptionalgorithm.
25. Implement Symmetric key based Encryption and Decryptionalgorithm.
26. Implement the following: Check the Status of Notepad, Connect with Google Server, Test for Host Reachability.
27. Implement PlayFair Algorithm for encryption andDecryption.

Programme: M.C.A **PartIII : Core**
Semester : III **Hours : 5 P/W 60 Hrs P/S**
Sub.Code : P22CC10 **Credits : 4**

TITLE OF THE PAPER: ENTERPRISE WEB APPLICATIONS

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	5	4	-	1	-

PREAMBLE:

- To focus Web Database Applications with PHP andMYSQL.
- To learn the validating and state management support of ASP.NET in websitecreation
- To learn about the various data binding concepts (including XML) ofASP.NET
- To create the web services using ASP.NET and using it at clientside

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
`UNIT1CO1:` Understand the development of a server-side n-tierenterprise web system including its capabilities andlimitations.	1	12
UNIT 2 CO2: Knowledge over arrays , abstraction, inheritance and polymorphism exception handling and the benefit of developing reusable business objectclasses.	2	12
UNIT 3 CO3: Usage of RDBMS functionality to protect the data in the database. And also SQL functions.	3	12
UNIT 4 CO4: Understand XML and describe its role in an n-tier database-driven application.	4	12
UNIT 5 CO5: Identify which parts of an application project utilize XML markup and edit existing XML and also its protocols.	5	12

SYLLABUS

UNIT - I

Database applications and the Web – The Web – Three tier Architecture – PHP Scripting language – Introducing PHP – Condition and Branches – Loops.

UNIT - II

Functions – Types – User defined functions – Example: Arrays, Strings and Advanced Data Manipulation in PHP – Regular Expression, Dates and Times, Integers and Floats - Introduction to Object Oriented Programming with PHP – Classes and Objects, Inheritance, Throwing and Catching Exceptions.

UNIT - III

SQL and Mysql – Database Basics, MySQL Command Interpreter, Managing Databases and Tables, Inserting, Updating, and Deleting Data, Querying with SQL SELECT, Join Queries – Querying with Databases- Querying a MYSQL Database Using PHP, Processing User Input – Pear – Validation and rich controls. The calendar control – formatting the calendar – restricting

the dates – Validation – the validation controls – the validation process – the validator classes – Understanding regular expressions – literals and metacharacters – State management – The problem of state – Viewstate – Transferring Information – Custom cookies – Session State – Session stateconfiguration.

UNIT-IV

ADO.Net data access – about the ADO.NET examples, SQL Basics - accessing data - creating connection - using a command with data reader - updating data - accessing disconnected data - selecting multiple tables - modifying disconnected data - updating disconnected data. data binding – Introducing data binding – single value data binding – repeated value data binding – data binding with databases. Using XML - XML hidden role in .NET - XML explained - XML classes - XML validation - XML display and transforms - XML inADO.Net.

UNIT-V

Web services architecture - WSDL - SOAP - Web service discovery & UDDI - Creating web services – web service Basics - stock quote web service - documenting web service – Testing - Web services data types - ASP.Net intrinsic objects - other web service options - Using web services –consuming a web service-using a proxy class - example with terra service - windowsclients.

TEXT BOOKS

Web Database Applications with PHP and MySQL.By Hugh. E. Williams & David Lane, II-Edition, SPD-Oreilly.

2. The Complete Reference - ASP.Net, Mathew MacDonald - Tata McGraw Hill, 2008.

UNIT I – Text Book 1 - Chapter 1, 2.1 to 2.3
UNIT II – Text Book 1 – Chapter 2.4 to 2.8, Chapters 3, 4
UNIT–III– Text Book 1 – Chapter 5, 6,7
Text Book 2 - Chapter 9, 10.
UNIT – IV – Text Book 2 - Chapter 13, 14,17.
UNIT –V– Text Book 2 - Chapter 18, 19,20.

REFERENCE BOOKS:

1. ASP.Net VB.Net Web Programming, Matt.J.Crouch - PearsonEducation.
2. ASP.Net for Developers - Michael Amundsen PaulLitwin

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT 1			
	Database applications and the Web –	4	Black Board
	The Web – Three tier	4	Black Board

	Architecture – PHP Scripting language –		
	Introducing PHP – Condition and Branches – Loops.	4	Black Board
UNIT 11			
	Functions – Types – User defined functions – Example: Arrays, Strings and Advanced DataManipulation in PHP –	4	Black Board
	Regular Expression, Dates and Times, Integers and Floats -	4	PPT
	Introduction to Object Oriented Programming with PHP – Classes and Objects, Inheritance, Throwing and Catching Exceptions.	4	Black Board
UNIT III			
	SQL and Mysql – Database Basics, MySQL Command Interpreter, Managing Databases and Tables, Inserting, Updating, and Deleting Data, Querying with SQL SELECT, Join Queries – Querying with Databases-Querying a MYSQL Database Using PHP, Processing User Input –	4	Black Board
	Pear – Validation and rich controls. The calendar control – formatting the calendar – restricting the dates – Validation – the validation controls – the validation process – the validator classes – U	4	Black Board
	Understanding regular expressions – literals and metacharacters – State management – The problem of state – Viewstate – Transferring Information – Custom cookies – Session State – Session state configuration.	4	Black Board
UNIT IV			
	ADO.Net data access – about the ADO.NET examples, SQL	4	Black Board

	Basics - accessing data - creating connection - using a command with data reader - updating data - accessing disconnected data -data binding with databases. Using XML - XML hidden role in .NET - XML explained - XML classes - XMLvalidation - XML display and transforms - XML in ADO.Net.		
	selecting multiple tables - modifying disconnected data - updating disconnected data. data binding – Introducing data binding – single valuedata binding – repeated value data binding –	4	PPT
	data binding with databases. Using XML - XML hidden role in .NET - XML explained - XML classes - XMLvalidation - XML display and transforms - XML in ADO.Net.	4	Black Board
UNIT V			
	Web services architecture - WSDL - SOAP - Web service discovery & UDDI - Creating web services – web service Basics - stock quote web service - documenting web service	4	Black Board
	Testing - Web services data types - ASP.Net intrinsicobjects - other web service options - Using web services–	4	Black Board
	consuming a web service - using a proxy class - example with terra service - windowsclients.	4	PPT

Course Outcomes (Cos)	Programme Outcomes (Pos)					Programme Specific Outcomes (PSOs)							Mean scores of Cos
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	
CO1	4	4	4	4	2	5	4	2	5	3	4	1	3.3
CO2	5	5	5	4	2	4	5	3	4	5	4	2	3.7
CO3	4	5	4	5	2	4	4	2	4	5	4	1	3.4
CO4	4	3	5	5	2	5	4	2	5	4	5	2	3.5
CO5	4	5	5	5	2	5	4	3	5	4	4	2	3.6
Mean Overall Score													3.6

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score ofCOs = Total of Value Total No. of Pos&PSOs

Mean Overall Score of COs = Total of Mean Score / Total No. of COs

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
KNOWLEDGE	50%	50%
UNDERSTANDING	30%	30%
APPLY	20%	20%

CourseDesigner: Department of ComputerApplications.

Programme: M.C.A **PartIII: Core**
Semester : III **Hours : 5 P/W 60 HrsP/S**
Sub.Code : P22CC11 **Credits : 4**

TITLE OF THE PAPER: PYTHON PROGRAMMING

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	5	4	-	1	-

PREAMBLE:

To enable the students to learn the basic functions, principles and concepts of Python Programming.

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
UNIT 1 CO1: To design and develop simple Python programs.	1	12
UNIT 2 CO2: Understand object oriented programming	2	12
UNIT 3 CO3: Understand principles of Python	3	12
UNIT4CO4: learn the concepts of LISTs Understand the pros and cons on scripting languages vs. classical programming languages	4	12
UNIT 5 CO5: using file concepts Understand how Python can be used for application development as well as quick programming	5	12

SYLLABUS

UNIT-I:

Introduction: Getting started with Python –Elementary programming: Writing a simple Program –Reading Input from the Console- Identifiers –Variables, Assignment and Expressions – Simultaneous Assignments –Named Constants –Numeric Data Types and operators – Evaluating Expressions and operator precedence –Type conversions and Rounding.

UNIT-II:

Functions, Strings and objects : Common Python functions –Strings and Characters – Introduction to Objects and strings –**Selections:** Boolean Types ,values and Expressions – If statements –Two way if-else statements –Nested If and Multi-way if-elif-else statements- Logical operators –conditional expressions.

UNIT-III:

Loops: while loop – for loop –nested loop – Minimizing numerical errors –Functions:

Defining function –calling function – functions with/without return values **Objects and Classes :** Defining classes for objects – Immutable objects vs. Mutable objects –Hiding data fields –class abstraction and encapsulation.

UNIT-IV:

Lists: List basics – copying lists – passing Lists to Functions –Returning a List from a function- Inheritance and polymorphism: Super classes and sub classes – overriding methods – object class- polymorphism and dynamic binding.

UNIT-V:

Files and Exception Handling: Text input and output – File Dialogs- Exception Handling.

TEXT BOOKS

Y. Daniel Liang, "Introduction to Programming using Python", PHI Publications 2013.

REF. BOOK(S):

1. David Beazley,Brian K Jones "Python CookBook", O'Reily2013
2. Michael Dawson, "Python programming for the absolute beginners", Cengage Learning 2010.

E-LEARNING RESOURCES:

1. https://nptel.ac.in/courses/106/106/106106145/

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT 1			
	Introduction: Getting started with Python –Elementary programming: Writing a simple Program	4	Black Board
	Reading Input from the Console-Identifiers –Variables, Assignment and Expressions – Simultaneous Assignments – Named Constants –	4	Black Board
	Numeric Data Types and operators –Evaluating Expressions and operator precedence –Type conversions andRounding.	4	PPT
UNIT 11			

	Functions, Strings and objects : Common Python functions – Strings and Characters	4	Black Board
	Introduction to Objects and strings	4	PPT
	Selections: Boolean Types ,values and Expressions – If statements –Two way if-else statements –Nested If and Multi-way if-elif-else statements- Logical operators –conditional expressions.	4	Black Board
UNIT III			
	Loops: while loop – for loop – nested loop – Minimizing numerical errors	4	Black Board
	Functions: Defining function – calling function – functions with/without return values	4	Black Board
	Objects and Classes : Defining classes for objects – Immutable objects vs. Mutable objects – Hiding data fields –class abstraction and encapsulation.	4	PPT
UNIT IV			
	Lists: List basics – copying lists – passing Lists to Functions – Returning a List from a function-	4	Black Board
	Inheritance and polymorphism: Super classes and sub classes	4	Black Board
	-– overriding methods –object class- polymorphism and dynamicbinding.	4	Black Board
UNIT V			
	Files and ExceptionHandling: Text input and output	4	Black Board
	Files and Exception Handling:– File Dialogs	4	Black Board
	Files and ExceptionHandling: Exception Handling.	4	Black Board

Course Outcomes (Cos)	Programme Outcomes (Pos)					Programme Specific Outcomes (PSOs)							Mean scores of Cos
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	
CO1	4	4	5	4	2	4	4	2	5	3	4	1	3.3
CO2	5	5	5	4	2	4	5	3	4	5	5	2	3.8
CO3	4	5	4	5	2	4	4	3	4	5	4	1	3.5
CO4	4	3	4	4	2	5	4	2	4	4	4	2	3.3
CO5	4	5	5	5	2	5	4	2	5	4	4	2	3.6
Mean Overall Score													3.52

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score ofCOs = Total of Value Total No. of Pos&PSOs

Mean Overall Score of COs = Total of Mean Score / Total No. of COs

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
KNOWLEDGE	50%	50%
UNDERSTANDING	30%	30%
APPLY	20%	20%

CourseDesigner: Department of Computer Applications

Programme: M.C.A **PartIII: Core**
Semester : III **Hours : 5 P/W 60 HrsP/S**
Sub. Code : P22CC12 **Credits : 4**

TITLE OF THE PAPER: DIGITAL IMAGE PROCESSING

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	5	4	-	1	-

PREAMBLE:

- . To learn the image formation model and various representations of animage.
- To inculcate the processing techniques on the image and featureextraction.
- To learn the image segmentation and various analysismethodologies.

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
UNIT 1 CO1: Review the fundamental concepts of a digital image processing system.	1	12
UNIT 2 CO2: Analyze images in the frequency domain using various transforms.	2	12
UNIT 3 CO3: Evaluate the techniques for image enhancement and image restoration in color image processing.	3	12
UNIT 4 CO4: Understand the wavelet and Morphological operations and its applications	4	12
UNIT 5 CO5: Image segmentation and pattern class identifications for high level processing.	5	12

SYLLABUS

UNIT-I Introduction:

Digital Image Processing- Simple image formation - Image Sampling and Quantization- Basic relationships between pixels - Histogram processing.

UNIT-II Filtering, Restoration and Reconstruction:

Sampling and the Fourier transform of sampled functions: Sampling- Fourier transform of sampled functions. Filtering in the frequency domain - Image Smoothing and Image Sharpening using frequency domain filters – Restoration in Noise – Spatial Filtering - Image Reconstruction from projections.

UNIT-III Color Image Processing:

Color fundamentals - Color models - Pseudo color image processing - Full color image processing - Color transformations - Smoothing and Sharpening- Image Segmentation based on Color.

UNIT-IV Wavelets and Morphological Image Processing:

Wavelet transforms in one dimension and two dimensions - The Fast Wavelet Transform - Erosion and Dilation - Opening and Closing - Hit or Miss transformation - Basic Morphological algorithm - Gray ScaleMorphology.

UNIT-V Segmentation and Object Recognition:

Fundamentals - Point, Line and Edge detection – Thresholding - Region based Segmentation - Segmentation using Morphological Watersheds- Motion in Segmentation -

Patterns and Pattern classes - Recognition based on decision theoretic methods.

TEXT BOOKS

Rafael C.Gonzalez, Richard E.Woods, "Digital Image Processing", Prentice Hall 3rd Edition, 2008.
UNIT 1: 1.1, 2.3.4, 2.4, 2.5, 3.3
UNIT 2: 4.3: 4.3.1, 4.3.2, 4.7.3, 4.8, 4.9, 5.3, 5.11
UNIT 3: 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7
UNIT 4: 7.3, 7.4, 7.5, 9.2, 9.3, 9.4, 9.5, 9.6
UNIT 5: 10.1, 10.2, 10.3, 10.4, 10.5, 10.6, 12.1, 12.2

REFERENCES BOOK(S):

1. Rafael C.Gonzalez, Richard E.Woods, Steven L.Eddins, "Digital Image ProcessingUsing MATLAB", Prentice Hall, 2004.
2. Bernd Jahne, "Digital Image Processing", Springer, 5threvisededition.
3. JayaramanS,VeerakumarT,Esakkirajan S, DIGITAL IMAGE PROCESSING,McGrawHill, 2009.
4. PoonamYadav,AbhishekYadav, Digital Image Processing, University Science Press,2010.
5. Wilhelm Burger, Mark J Burge, Digital Image Processing, Springer,2008.

E-LEARNING RESOURCES:

1. https://nptel.ac.in/courses/106/105/106105032/

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT 1			
	Digital Image Processing- Simple image formation - Image Sampling and Quantization- - Histogram processing.	4	Black Board
	Basic relationships between pixels	4	Black Board
	Histogram processing.	4	PPT
UNIT 11			
	Sampling and the Fourier transform of sampled functions: Sampling- Fourier transform of sampled functions. Filtering in the frequency domain -	4	Black Board
	Image Smoothing and Image Sharpening using frequency domain filters –	4	Black Board
	Restoration in Noise – Spatial Filtering - Image Reconstruction from projections.	4	PPT

UNIT III			
	Color fundamentals - Color models - Pseudo color image processing	4	Black Board
	Full color image processing - Color transformations - Smoothing and Sharpening	4	PPT
	Image Segmentation based on Color.	4	Black Board
UNIT IV			
	Wavelet transforms in one dimension and two dimensions - The Fast Wavelet Transform - Basic Morphological algorithm - Gray Scale Morphology.	4	Black Board
	Erosion and Dilation - Opening and Closing - Hit or Miss transformation -	4	PPT
	Basic Morphological algorithm - Gray Scale Morphology.	4	Black Board
UNIT V			
	Fundamentals - Point, Line and Edge detection – Thresholding - Region based Segmentation -	4	Black Board
	Segmentation using Morphological Watersheds - Motion in Segmentation -	4	Black Board
	Patterns and Pattern classes - Recognition based on decision theoretic methods.	4	PPT web materials

Course Outcomes (Cos)	Programme Outcomes (Pos)					Programme Specific Outcomes (PSOs)							Mean scores of Cos
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	
CO1	4	4	4	4	3	5	4	2	5	3	4	2	3.5
CO2	5	5	5	4	2	4	5	3	4	5	4	2	3.7
CO3	4	5	4	5	2	4	4	2	5	5	4	3	3.8
CO4	4	3	5	5	2	5	4	2	5	4	5	2	3.6
CO5	4	5	5	5	2	5	4	3	5	4	4	2	3.7
Mean Overall Score													3.7

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score ofCOs = Total of ValueTotal No. of Pos&PSOs	Mean Overall Score of COs = Total of Mean Score Total No. of COs

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
KNOWLEDGE	50%	50%
UNDERSTANDING	30%	30%
APPLY	20%	20%

CourseDesigner: Department of Computer Applications .

Programme: M.C.A **Part III: Core**
Semester : IV **Hours : 5 P/W 60 Hrs P/S**
Sub.Code : P22CC16 **Credits : 4**

TITLE OF THE PAPER: DATA WAREHOUSING AND MINING

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	5	4	-	1	-

PREAMBLE:

To enable the students to understand the essence of data warehousing and mining and explore the various underlying techniques.

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
UNIT 1 CO1: Understand the functionality of the various data mining and data warehousing component Knowledge	1	12
UNIT 2 CO2: Identify the scope and necessity of **Data Mining** &**Warehousing** for the society and real time problems.	2	12
UNIT 3 CO3: To develop ability to design various algorithms based on **data mining** tools.	3	12
UNIT 4 CO4: able to describe different methodologies used in data mining and data ware housing pattern and classifications.	4	12
UNIT 5 CO5: Learn and apply different methods of cluster analysis.	5	12

SYLLABUS

UNIT I

Introduction: What Is Data Mining? – What Kind of Data can be mined? - What Kind of Patterns can be mined? – Which Technologies are used? – Major Issues in Data Mining. Getting to know your data: Data Objects and Attribute Types – Basic Statistical Description of Data.

UNIT II

Data Preprocessing: An Overview – Data Cleaning – Data Integration – Data Reduction – Data Transformation and Data Discretization.

Data Warehousing and Online Analytical Processing: Basic Concepts – Data Warehouse Modeling: Data Cube and OLAP - Data Warehouse Implementation – Data Generalization by Attribute-Oriented Induction.

Data Cube Technology: Data Cube Computation: Preliminary Concepts – Data Cube Computation Methods.

UNIT III

Mining Frequent Patterns, Associations, and Correlations: Basic Concepts and methods: Basic Concepts – Frequent Item set Mining Methods – Which Patterns Are Interesting? – Pattern EvaluationMethods.

Advanced Pattern Mining: Pattern Mining: A Road Map – Pattern Mining in Multilevel, Multidimensional Space – Constraint-Based Frequent Pattern Mining.

UNIT IV

Classification: Basic Concepts – Decision Tree Induction – Bayes Classification Methods – Rule-Based Classification – Model Evaluation and Selection – Techniques to Improve Classification Accuracy.

Classification: Advanced Methods: Bayesian Belief Networks – Classification by Back

Propagation – Support Vector Machines – Classification Using Frequent Patterns – Lazy Learners (or Learning From Your Neighbors) – Other Classification Methods – Additional Topics Regarding Classification.

UNIT V

Cluster Analysis: Basic Concepts and Methods: Cluster Analysis – Partioning Methods – Hierarchical Methods – Density-Based Methods – Grid-Based Methods – Evaluation of Clustering.

Outlier Detection: Outliers And Outlier Analysis – Outlier Detection Methods – Statistical Approaches – Proximity-Based Approaches – Clustering Based Approaches – Classification Based Approaches.

TEXT BOOKS

1. Data Mining Concepts and Techniques – Jiawei Han, MichelineKamber& Jain Pei, Morgan Kaufmann Publishers, Third edition 2012.
   Chapters: 1.2 – 1.7, 2.1, 2.2, 3.1- 3.5, 4.1, 4.2, 4.4, 4.5, 5.1, 5.2, 6.1 – 6.3, 7.1 – 7.3, 8.1 – 8.6, 9.1 – 9.7, 10.1 – 10.6, 12.1 – 12.6.

REFERENCE BOOKS:

1. Usama M. Farrad, GeogoryPiatetsky – Shapiro, padhrai Smyth and RamasamyUthurusamy, "Advances in Knowledge Discovery and Data Mining", The M.I.T.press.
2. Ralph Kimball, "The Data Warehouse Life Cycle Toolhit", John Wiley &SonsInc.
3. Sean Kelly, "Data warehousing in Action", John Wiley &SonsInc.
4. K.P. Soman, "ShyamDiwakar, V. Ajay "Insights into data Mining", Theory and Practice, PHI Publications Eastern Economy Edition 6th Printing,2012.

E-LEARNING RESOUCES:

1. https://nptel.ac.in/courses/106/105/106105174/

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT 1			
	Introduction: What Is Data Mining? – What Kind of Data can be mined? - What Kindof Patterns can be mined? –Which Technologies are used?	4	Black Board
	– Major Issues in Data Mining. Getting to know your data: Data Objects and Attribute Types	4	PPT
	Basic Statistical Description of Data.	4	Black Board
UNIT 11			
	Data Preprocessing: AnOverview – Data Cleaning – Data Integration – Data Reduction – Data Transformation and Data Discretization.	4	Black Board

	Data Warehousing and Online Analytical Processing: Basic Concepts – Data Warehouse Modeling: Data Cube and OLAP - DataWarehouseImplementation – Data Generalization by Attribute-Oriented Induction.	4	Black Board
	Data Cube Technology: Data Cube Computation: Preliminary Concepts – Data Cube Computation Methods.	4	Black Board
UNIT III			
	Mining Frequent Patterns, Associations, and Correlations: Basic Concepts and methods: Basic Concepts – Frequent Item set Mining Methods	4	Black Board
	Which Patterns Are Interesting? – Pattern Evaluation Methods.	4	PPT
	Advanced Pattern Mining: Pattern Mining: A Road Map – Pattern Mining in Multilevel, Multidimensional Space – Constraint-Based Frequent Pattern Mining.	4	Black Board
UNIT IV			
	Classification: Basic Concepts – Decision Tree Induction – Bayes Classification Methods – Rule-Based Classification – Model Evaluation and Selection – Techniques to Improve Classification Accuracy.	4	Black Board
	Classification: Advanced Methods: Bayesian Belief Networks – Classificationby Back Propagation – Support Vector Machines	4	Black Board
	Classification Using Frequent Patterns – Lazy Learners (or Learning From Your Neighbors) – Other Classification Methods – Additional Topics Regarding Classification.	4	PPT

UNIT V			
	Cluster Analysis: Basic Concepts and Methods: Cluster Analysis – Partioning Methods – Hierarchical Methods – Density-Based Methods – Grid-Based Methods – Evaluation of Clustering.	4	Black Board
	Outlier Detection: Outliers And Outlier Analysis – Outlier Detection Methods – Statistical Approaches	4	PPT
	– Proximity-Based Approaches – Clustering Based Approaches – Classification Based Approaches.	4	Black Board

Course Outcomes (Cos)	Programme Outcomes (Pos)					Programme Specific Outcomes (PSOs)							Mean scores of Cos
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	
CO1	5	4	5	4	2	5	4	2	5	4	4	1	3.5
CO2	5	5	5	4	2	4	5	2	4	5	4	2	3.6
CO3	4	5	4	5	2	4	4	3	4	5	4	1	3.6
CO4	4	3	5	5	2	5	5	2	5	4	5	2	3.6
CO5	4	5	5	5	2	5	4	3	5	4	4	2	3.6
Mean Overall Score													3.6

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score ofCOs = Total of Value / Total No. of Pos&PSOs

Mean Overall Score of COs = Total of Mean Score / Total No. of COs

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
KNOWLEDGE	50%	50%
UNDERSTANDING	30%	30%
APPLY	20%	20%

CourseDesigner: Department of Computer Applications .

Programme: M.C.A **PartIII: Elective**
Semester : III **Hours : 5 P/W 60 HrsP/S**
Sub.Code : P22DSC3A **Credits: 4**

TITLE OF THE PAPER: HUMAN RESOURCE MANAGEMENT

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	5	4	-	1	-

PREAMBLE:

To develop skills on Human Resource Management Activities.

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
UNIT 1 CO1: Contribute to the development, implementation, and evaluation of employee recruitment, selection, and retention plans and processes.	1	12
UNIT 2 CO2: Manage own professional development and provide leadership to others in the achievement of ongoing competence in human resources professional practice.	2	12
UNIT 3 CO3: Develop, implement, and evaluate employee orientation, training, and development programs.	3	12
UNIT 4 CO4: Develop, implement, and evaluate organizational development strategies aimed at promoting organizational effectiveness.	4	12
UNIT 5 CO5: Manage own professional development and provide leadership to others in the achievement of ongoing competence in human resources professional practice.	5	12

SYLLABUS

UNIT I

Introduction – importance of HRM – functions – qualities of HR manager – evolution and growth of HRM – trends and opportunities – HRM in global environment – legal and ethical context – laws for discrinatory practices – equal opportunity employment.

UNIT II

HR policies – need, type and scope – human resource planning – job analysis – recruiting goals – recruiting sources – global perspective – selection process – pre-employment testing – interviews – job offers – hiring mistakes – key element for successful predicators.

UNIT III

Socialization – new employee orientation, training, development – organizational development – methods – evaluating training – international training and development issues – career development – value for organization and individual – mentoring and coaching – traditional career stages.

UNIT IV

Appraisal process – methods – factors distort appraisal – team appraisal – international

appraisal – rewards – Theories of motivation – compensation administration – job evaluation and a pay structure – special cases of compensation – executive compensation programs – employee benefits.

UNIT V

Occupational safety and health act – issues – stress – assistance program – labor management – employee unions – labor legislation. Promotion, demotion, transfer and separation – employee grievances – redressal methods.

TEXT BOOKS

1. Decenzo and Robbins, Human Resource Management, Wilsey,10th edition,2012.
2. Mamorica C.B. and Mamoria.S., Personnel Management, Himalaya Publishing Company, 1997.

REFERENCE BOOK(S)

1. Mirza S. Saiyadain Human Resource Management, Tata McGraw Hill, 4th edition2009
2. Euence Mckenna and Nic Beach Human Resource Management, Pearson Education Limited,2002.

E-LEARNING RESOUCES:

1. https://nptel.ac.in/courses/122/105/122105020/

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT 1			
	Introduction – importance of HRM – functions – qualities of HR manager – evolution and growth of HRM.	4	Black Board
	– trends and opportunities – HRM in global environment – legal and ethical context	4	Black Board
	laws for discrinatory practices – equal opportunity employment.	4	Black Board
UNIT 11			
	HR policies – need, type and scope – human resource planning – job analysis – recruiting goals – interviews – job offers – hiring mistakes – key element for successful predicators.	4	PPT
	recruiting sources – global perspective – selection process – pre-employment testing –	4	Black Board
	interviews – job offers – hiring	4	Black Board

	mistakes – key element for successful predicators.		
UNIT III			
	Socialization – new employee orientation, training, development – organizational development – methods .	4	Black Board
	evaluating training – international training and development issues – career development	4	PPT
	value for organization and individual – mentoring and coaching – traditional career stages.	4	Black Board
UNIT IV			
	Appraisal process – methods – factors distort appraisal – team appraisal – international appraisal – rewards — special cases of compensation – executive compensation programs – employee benefits.	4	Black Board
	Theories of motivation – compensation administration – job evaluation and a pay structure	4	PPT
	special cases of compensation – executive compensation programs – employee benefits.	4	Black Board
UNIT V			
	Occupational safety and health act – issues – stress – assistance program	4	PPT
	labor management – employee unions – labor legislation. Promotion, demotion, transfer and separation	4	Black Board
	employee grievances – redressal methods.	4	Black Board

Course Outcomes (Cos)	Programme Outcomes (Pos)					Programme Specific Outcomes (PSOs)							Mean scores of Cos
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	
CO1	2	4	2	4	3	5	4	2	2	3	4	4	3.3
CO2	2	5	2	4	4	4	5	3	2	2	4	3	3.4
CO3	2	5	2	5	4	4	4	2	2	3	4	4	3.46
CO4	2	3	2	5	3	5	4	2	2	2	5	5	3.4
CO5	1	5	2	5	4	5	4	3	2	2	4	4	3.46
Mean Overall Score													3.41

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score of COs = Total of Value / Total No. of Pos & PSOs

Mean Overall Score of COs = Total of Mean Score / Total No. of COs

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
KNOWLEDGE	50%	50%
UNDERSTANDING	30%	30%
APPLY	20%	20%

CourseDesigner: Department of Computer Applications

Programme: M.C.A **PartIII: Elective**
Semester : III **Hours : 5 P/W 60 HrsP/S**
Sub.Code : P22DSC3B **Credits: 4**

TITLE OF THE PAPER: ARTIFICIAL INTELLIGENCE

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	4				

PREAMBLE:

To Introduce the basic principles, techniques, and applications of Artificial Intelligence. To address difficulties by utilising Artificial Intelligence technologies. To provide an overview of the ideas of Styles of Learning and Planning.

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
UNIT 1 CO1: Analyze the Fundamentals of Artificial Intelligence		
UNIT 2 CO2: Learns about Predictive Calculus and Knowledge Representation.		
UNIT 3 CO3: Becomes acquainted with Depth searches and Problem Backtracking.		
UNIT 4 CO4: Recognizes the importance of knowledge inference.		
UNIT 5 CO5: Learns the fundamentals of planning and the many styles of learning.		

SYLLABUS

UNIT - I:

Introduction: Introduction to Artificial Intelligence, Intelligence Problems and Al techniques, Solving problems by searching, Problem Formulation. Intelligent Agents: Structure of Intelligent agents, Types of Agents, Agent Environments PEAS representation for an Agent. Un informed Search Techniques: DFS. BFS, Uniform cost search.

UNIT – II:

Depth Limited Search, iterative Deepening, Bidirectional search, Comparing Different Techniques. Informed Search Methods; Heuristic functions, Hill Climbing, Simulated Annealing, Best First Search, A*, IDA*, SMA*, Crypto Anthmetic Problem, Backtracking for CSP, Performance Evaluation. 6 Adversarial Search: Game Playing, Min-Max Search, Alpha Beta Pruning.

UNIT - III:

Knowledge and Reasoning: A Knowledge Based Agent, WUMPUS 08 WORLD Environment, Propositional Logic, First Order Predicate Logic, Forward and Backward Chaining, Resolution. , Introduction to PROLOG.

UNIT - IV:

Planning: Introduction to Planning, Planning with State Space Search, Partial Ordered planning. Hierarchical Planning, Conditional Planning, Planning with Operators. Uncertain Knowledge and Reasoning: Uncertainly, Representing Knowledge in an Uncertain Domain, Conditional Probability, Joint Probability, Bays theorem, Belief Networks, Simple Inference in Belief Networks.

UNIT - V:

Learning: Learning from Observation, General Model of Learning Agents, Inductive Learning, Learning Decision Trees, Rote Learning, Learning by Advice, Learning in Problem Solving, Explanation based Learning. Expert Systems: Representing and using Domain Knowledge, Expert System-shell, Explanation, Knowledge Acquisition.

Reference Books:

1. Elaine Rich, Kevin Knight, Shivshankar B Nair, Artificial Intelligence, McGraw Hill, 3rd Edition.
2. Elaine Rich, Kevin Knight, Artificial intelligence, Tata McGraw Hill, 2nd Edition. University of Mumbai, Information Technology).
3. George Lugar, .Al-Structures and Strategies for Complex Problem. Solving., 4/e, 2002, Pearson Education.
4. Nils J, Nilsson, Principles of Artificial Intelligence, Narosa Publication. Patrick H. Winston, Artificial Intelligence. 3rd edition, Pearson Education,
5. Deepak Khemani, A First Course in Artificial Intelligence, McGraw Hill Publication.

E-RESOURCES

1. https://www.ibm.com/in-en/cloud/learn/what-is-artificial-intelligence
2. https://www.javatpoint.com/artificial-intelligence-tutorial
3. https://www.javatpoint.com/knowledge-representation-in-ai
4. https://www.javatpoint.com/search-algorithms-in-ai
5. https://en.wikipedia.org/wiki/Partial-order_planning
6. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial intelligence-fall-2010/tutorials.

Programme : M.C.A **PartIII: Elective**
Semester : III **Hours : 5 P/W 60 HrsP/S**
Sub.Code : P22DSC3C **Credits: 4**

TITLE OFTHEPAPER: SOFT COMPUTING

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	5	4	-	1	-

PREAMBLE:

- To focus on the major components of soft computing components–Neural Networks, Fuzzy Logic, and Genetic Algorithms.
- Detailed explanation of Soft computing concepts
- To study on various Artificial Neural Network architectures
- Description on Fuzzy Logic techniques and Genetic Algorithms

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
UNIT 1 CO1: Evaluate various techniques of soft computing to defend the best working solutions.	1	12
UNIT 2 CO2: Understand the basic construction of ANN and its different types of network structure.	2	12
UNIT 3 CO3: Apply Soft computing techniques the solve character recognition, pattern classification, regression and similar problems.	3	12
UNIT 4 CO4: Understand the application development in fuzzy systems	4	12
UNIT 5 CO5: Under stand the application development using Genetic Algorithms .	5	12

SYLLABUS

UNIT-I

Neural Networks: Introduction: Neural Networks – Application Scope of Neural Networks - Fuzzy Logic - Genetic Algorithm - Hybrid Systems - Soft Computing.

Artificial Neural Network: An Introduction - Fundamental Concept - Evolution of Neural Networks - Basic Models of Artificial Neural Network - Important Terminologies of ANNs - McCulloch-Pitts Neuron.

UNIT-II

Neural Networks : Supervised Learning Neural Network: Perception networks – Adaline - Back Propagation Network – Radial basis function network - Bidirectional Associative Memory Network, Kohonen Self-Organizing Feature Map

UNIT-III

Fuzzy Logic : Introductions to Fuzzy Logic, Classical Sets, and Fuzzy Sets: Introduction to Fuzzy logic - Classical Sets – Operations on Classical sets, Properties of Classical Sets, Function Mapping of Classical Sets, Fuzzy Sets – Fuzzy Set Operations, Properties of Fuzzy Sets. Classical Relations and Fuzzy Relations: Fuzzy Relations - Tolerance and Equivalence Relations Membership Functions: Introduction -Features of the

Membership Functions –Fuzzification -Methods of Membership Value Assignments.

UNIT-IV

Fuzzy Logic : Defuzzification: Introduction, Lambda-Cuts for Fuzzy Sets (Alpha-Cuts), Lambda-Cuts for Fuzzy Relations, Defuzzification Methods – Max-Membership Principle, Centroid Method, Weighted Average Method, Mean-Max Membership, Center of Sums, Center of Largest Area, First of Maxima (Last of Maxima) Genetic Algorithm: Introduction, Genetic Algorithm and Search Space – Search Space, Genetic Algorithms World, Evolution and Optimization, Evolution and Genetic Algorithms Basic definitions and terminology, Set theoretic operations, Fuzzy sets, Fuzzy relations, tolerance and equivalence relations, membership functions, defuzzification Fuzzy, decision making.

UNIT-V

Genetic Algorithms: Terminologies - General Genetic Algorithm, Operators in Genetic Algorithm –Encoding, Selection, Crossover, Mutation – Stopping Condition for Genetic Algorithm Flow – Hybrid Genetic Algorithms – Genetic Programming – The Production System, The Bucket Brigade Algorithm, Rule Generation, Genetic Programming – Applications of Genetic Algorithm.

TEXT BOOKS

1. Principles of Soft Computing, Second Edition by S. N. Sivanandam, S. N. Deepa, Wiley India Publications,2011.

REFERENCES BOOKS:

1. Godberg, David E., "Genetic Algorithms in Search, Optimization and Machine Learning", Addison-Wesley, NewDelhi.
2. Timothy J Ross, "Fuzzy Logic with Engineering Application" Tata McGraw Hill, New Delhi2006.
   UNIT I : Chapters 1, 2.1,2.3, 2.4, 2.5
   UNIT II: Chapters 3.2, 3.3, 3.5, 3.6, 4.5, 5.3
   UNIT III: Chapters 7, 8.4, 8.5, 9
   UNIT IV: Chapters 10, 15.1, 15.4
   UNIT V: Chapters 15.6, 15.8, 15.9, 15.10, 15.14.3, 15.16, 15.18

E-LEARNING RESOUCES:

1. **https://nptel.ac.in/courses/106/105/106105173/**

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT 1			
	Neural Networks: Introduction: Neural Networks – Application Scope of Neural Networks - Fuzzy Logic – Genetic Algorithm - Hybrid Systems -	4	Black Board

	Soft Computing. Artificial Neural Network: An Introduction - Fundamental Concept - Evolution of Neural Networks	4	Black Board
	Basic Models of Artificial Neural Network - Important Terminologies of ANNs - McCulloch-Pitts Neuron.	4	PPT – Web materials
UNIT 11			
	Neural Networks : Supervised Learning Neural Network: Perception networks – Adaline - Bidirectional Associative Memory Network, KohonenSelf-Organizing FeatureMap	4	Black Board
	Back Propagation Network – Radial basis function network -	4	Black Board
	Bidirectional Associative Memory Network, Kohonen Self-Organizing Feature Map	4	Black Board
UNIT III			
	Fuzzy Logic : Introductions to Fuzzy Logic, Classical Sets, and Fuzzy Sets: Introduction to Fuzzy logic - Classical Sets – Operations on Classical sets, Properties of Classical Sets, Relations Membership Functions: Introduction - Features of the Membership Functions –Fuzzification-Methods of Membership ValueAssignments.	4	Black Board
	Function Mapping of Classical Sets, Fuzzy Sets – Fuzzy Set Operations, Properties of Fuzzy Sets. Classical Relations and Fuzzy Relations: Fuzzy Relations - Tolerance and Equivalence	4	PPT
	Relations Membership Functions: Introduction -	4	Black Board

	Features of the Membership Functions –Fuzzification - Methods of Membership Value Assignments.		
UNIT IV			
	Fuzzy Logic : Defuzzification: Introduction, Lambda-Cuts for Fuzzy Sets (Alpha-Cuts), Lambda-Cuts for Fuzzy Relations, Defuzzification Methods – Max-Membership Principle, Centroid Method, Weighted Average Method, Mean-Max Membership, Center of Sums, Center of Largest Area, First of Maxima (Last ofMaxima) , Fuzzy sets, Fuzzy relations, tolerance and equivalence relations, membership functions, defuzzification Fuzzy, decision making.	4	Black Board
	Genetic Algorithm: Introduction, Genetic Algorithm and Search Space – Search Space, Genetic Algorithms World, Evolution and Optimization, Evolution and Genetic Algorithms Basic definitions and terminology, Set theoretic operations	4	PPT
	, Fuzzy sets, Fuzzy relations, tolerance and equivalence relations, membership functions, defuzzification Fuzzy, decisionmaking.	4	Black Board
UNIT V			
	Genetic Algorithms: Terminologies - General Genetic Algorithm, Operators in Genetic Algorithm –	4	Black Board
	Encoding, Selection, Crossover, Mutation – Stopping Condition for Genetic Algorithm Flow– Hybrid Genetic Algorithms.	4	Black Board

	Genetic Programming – The Production System, The Bucket Brigade Algorithm, Rule Generation, Genetic Programming – Applications of Genetic Algorithm.	4	PPT

Course Outcomes (Cos)	Programme Outcomes (Pos)					Programme Specific Outcomes (PSOs)							Mean scores of Cos
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	
CO1	4	4	4	4	2	5	4	2	5	3	4	1	3.33
CO2	5	5	5	4	2	4	5	3	4	5	4	2	3.7
CO3	4	5	4	5	1	4	4	2	4	5	4	1	3.26
CO4	4	3	5	5	2	5	5	2	5	4	5	2	3.66
CO5	4	5	4	5	1	5	4	3	5	4	4	1	3.46
Mean Overall Score													3.49

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score ofCOs = Total of ValueTotal No. of Pos&PSOs

Mean Overall Score of COs = Total of Mean Score Total No. of COs

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
KNOWLEDGE	50%	50%
UNDERSTANDING	30%	30%
APPLY	20%	20%

Course Designer: Department of Computer Applications .

Programme: M.C.A | **Part III: Practical**
Semester : III | **Hours : 5 P/W 75 HrsP/S**
Sub.Code : P22CC13 | **Credits : 3**

TITLE OF THE PAPER: PYTHON PROGRAMMINGLAB

Pedagogy	Hours	Practical Lab	TUTORIAL	ICT
	5	4	1	-

PREAMBLE:

The basic aim of this paper is to develop the programming skill to the students to solve the problems using Python .

COURSE OUTCOME At the end of the Semester, the Students will be able to		
CO1 : Able to write simple python program with a study of working environment .		
CO2 : understanding the concepts of OOPs Implementations		
CO3 : develop a application using GUI		

LAB CYCLE:

1. Write a program that asks the user to enter a series of positive numbers (The user should enter a negative number to signal the end of the series) and the program should display the numbers in order and their sum.
2. Write a program to find the product of two matrices.
3. Write recursive and non-recursive functions for the following:
    a. To find GCD of two integers.
    b. To find the factorial of positive integer
    c. To print Fibonacci Sequence up to given number n.
4. Write a program that writes a series of random numbers to a file from 1 to n anddisplay.
5. Write a program to reverse a string word byword.
6. Write a program to create file, write the content and display the contents of the file with each line preceded with a line number (start with 1) followed by acolon.
7. Write a program that opens a specified text file and then displays a list of all the unique words found in the file. (Store each word as an element of aset.)
8. Write a program to implement the Inheritance and Dynamic Polymorphism.
9. Write a GUI program that displays your details when a button is clicked.
10. Write a GUI program that converts Celsius temperatures to Fahrenheit temperatures.

E-LEARNING RESOURCES:

1. https://www.studytonight.com/python/
2. http://spoken-tutorial.org/tutorial-search/?search_foss=Python&search_language=English

Programme: M.C.A **PartIII: Practical**
Semester : III **Hours : 5 P/W 75 HrsP/S**
Sub.Code : CL6 **Credits : 3**

TITLE OF THE PAPER: Enterprise WEB APPLICATION LAB

Pedagogy	Hours	Practical Lab	TUTORIAL	ICT
	5	4 -	1	-

PREAMBLE:

- To enrich knowledge about web database applications and programming skills with PHP and MYSQL.
- To validate the form before submitting it to server using validators.
- To maintain the state of a website usingASP.NET.
- To illustrate data binding concepts

(i) connected model
(ii)disconnected model
(iii) repeated data binding of ASP.NET

- To create and manipulate the XML documents.
- To create the web services using ASP.NET and using it at client side

.

COURSE OUTCOME At the end of the Semester, the Students will be able to		
CO1 : understand the concepts of PHP programing		
CO2 : able to develop a web site		

LAB CYCLE

PHP & MYSQL

1. Write a PHP Coding for:
   i. Create a Times Table
   ii. Use Include File Concept

2. Write a PHP Coding to handle:
   i. Global Variable
   ii. Static Variable

3. Write a PHP Coding for:
   i. Pass by Reference
   ii. Handling Default Parameter

4. Write a PHP Coding to handle Array Functions:
   i. Counting number of elements
   ii. Finding Min, and Max
   iii. Explode and Implode
   iv. Sorting
   v. Cm to inch calculation for all array element

5. Write a PHP Coding to handle String Functions:
   i. Padding
   ii. Change Case
   iii. Trimming
   iv. Finding the Positions of Characters
   v. Handling Substring
   vi. Handling String Replace

6. Write a PHP Coding for handlingConstructor.
7. Write a PHP Coding for handlingDestructor
8. Write a PHP Coding for handling Private MemberFunction.
9. Write a PHP Coding for handling Static MemberVariables.
10. Write a PHP Coding for handlingInheritance.
11. Write a PHP Coding for Exceptionhandling.
12. Write a PHP Coding to connect PHP with MYSQL usingPEAR.
13. Write a PHP Coding for database connectivity (PHP &MYSQL).
14. Write a PHP Coding for database connectivity (PHP & MYSQL) with errorhandling.
15. Write a PHP Coding for database connectivity (PHP & MYSQL) and format theoutput.
16. Write a PHP Coding for database connectivity (PHP & MYSQL) using templateconcept.
17. Write a PHP Coding to pass parameter to PHP using HTML forms, Hyperlinks, andBrowser.

ASP.NET LAB CYCLE

WORKING WITH WEB CONTROLS

1. Creation of online shopping website using label, list, combo, text and table webcontrols

WORKING WITH HOT SPOT

2. Creating HOT SPOT in image and linking an image with many webpages

WORKING WITH DATA BASE

3. Student Mark listprocessing
4. Employee Pay rollprocessing
5. Working with disconnected datamodel

DATA BINDING CONCEPT

. Working with repeated data binding concept

WORKING WITH FILES

Working with file & directory supporting concepts

WORKING WITH XML

Creation of XML, Searching for a tag & binding XML data in data grid

WEB SERVICES

1. Arithmetic operations
2. Temperature conversion

WORKING WITH AJAX AND ADROTATOR CONTOL

Illustrate the use of AJAX in showing advertisements in repeated way based on weightage assigned to each advertisement.

WORKING WITH VALIDATOR CONTROLS

Validating values entered by the user in bio-data form

WORKING WITH STATE MANAGEMENT SUPPORT OF .NET

1. Creation and using cookies in banking application
2. Transferring information and preparing ticket in flight reservation system.
3. Creating session for every user and maintains his state information.

Morgan Kaufmann Publishers, Third edition 2012.

Chapters: 1.2 – 1.7, 2.1, 2.2, 3.1- 3.5, 4.1, 4.2, 4.4, 4.5, 5.1, 5.2, 6.1 – 6.3, 7.1 – 7.3, 8.1 – 8.6, 9.1 – 9.7, 10.1 – 10.6, 12.1 – 12.6.

REFERENCE BOOKS:

1. Usama M. Farrad, GeogoryPiatetsky – Shapiro, padhrai Smyth and RamasamyUthurusamy, "Advances in Knowledge Discovery and Data Mining", The M.I.T.press.
2. Ralph Kimball, "The Data Warehouse Life Cycle Toolhit", John Wiley &SonsInc.
3. Sean Kelly, "Data warehousing in Action", John Wiley &SonsInc.
4. K.P. Soman, "ShyamDiwakar, V. Ajay "Insights into data Mining", Theory and Practice, PHI Publications Eastern Economy Edition 6th Printing,2012.

E-LEARNING RESOUCES:

1. https://nptel.ac.in/courses/106/105/106105174/

Programme: M.C.A **PartIII: Elective**
Semester : IV **Hours : 5 P/W 60 HrsP/S**
Sub.Code : ECD1 **Credits : 4**

TITLE OF THE PAPER: MOBILE COMPUTING

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	5	4	-	1	-

PREAMBLE:

To enrich knowledge about Mobile Communications Concepts of:

- Several Media Access Schemes
- Different Wireless CommunicationSystems
- Mobile IP, the extension of the Internet Protocol into Mobile domain, Ad-hoc networks with these requirements for specific routingprotocols.
- Transmission ControlProtocol
- WAP standard that enables Wireless and Mobile devices to use parts of the WWW from today's FixedInternet

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
UNIT 1 CO1: To understand the concept of cellular communication	1	12
UNIT 2 CO2: Knowledge of GSM mobile communication standard, its architecture, logical channels, advantages and limitations.	2	12
UNIT 3 CO3: To understand the basics of universal wireless communication standards .	3	12
UNIT 4 CO4: Understand the mobile network layer with IP addressing	4	12
UNIT 5 CO5: Understand the Mobile communication transport layer structure for application programming.	5	12

SYLLABUS

UNIT - I

INTRODUCTION: Medium access control – Motivation for a specialized MAC, SDMA, FDMA, TDMA, CDMA, Satellite systems – History, Basics – GEO, LEO, MEO – Routing – Localization – Handover –Examples..

UNIT - II

Telecommunication Systems: GSM – Mobile services, System architecture, Radio Interface, Protocols, Localization and calling, Handover, Security, New data services, DECT – System architecture, Protocol architecture, TETRA.

UNIT - III

STANDARDS: Wireless LAN: Infra red Vs radio transmission, Infrastructure and ad-hoc network - IEEE 802.11 – System architecture, Protocol architecture, Physical Layer, Medium

Access Control Layer, MAC management, 802.11b, 802.11a.

UNIT – IV

Mobile Network Layer: Mobile IP – Goals, assumptions and requirements, Entities and terminology, IP packet delivery, Agent Discovery, Registration, Tunneling and Encapsulation, Optimizations, Reverse Tunneling, IPv6, IP micro-mobility support, Dynamic Host Configuration Protocol – Mobile Ad-Hoc networks – Routing, Destination sequence distance vector, Dynamic source routing, alternative metrics, overview of ad-hoc routing protocols.

UNIT - V

Mobile Transport Layer: Traditional TCP – Classical TCP Improvements – Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit / Fast Recovery, Transmission / Time – out freezing, Selective retransmission, Transaction-oriented TCP

Wireless Application Protocol: Architecture, Wireless Datagram Protocol, Wireless transport layer security, Wireless transaction protocol, Wireless session protocol, Wireless application environment.

TEXT BOOKS

1. Jochen Schiller, Mobile Communications, Second Edition, Addison Wesley, 2003 (Eleventh Impression, 2013)

UNITI: Chapters3,5 UNIT II: Chapters 4.1 –4.3
UNIT III: Chapters 7.1 - 7.3 UNIT IV: Chapters 8 UNIT V: Chapters 9.1,9.2, 10.3.1-10.3.6

REF. BOOK

1. William C.Y.Lee, Mobile Communication Design Fundamentals, John Wiley.

E-LEARNING RESOURCES:

1. https://nptel.ac.in/courses/106/106/106106147/

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT 1			
	INTRODUCTION: Medium access control – Motivation for a specialized MAC, SDMA, FDMA, TDMA, CDMA,Satellite systems	4	Black Board
	History, Basics – GEO, LEO, MEO – Routing –	4	Black Board
	Localization – Handover – Examples..	4	PPT
UNIT 11			
	Telecommunication Systems: GSM – Mobile services, System architecture, Radio Interface,	4	Black Board

	Protocols, Localization and calling, Handover, Security, New data services, DECT –	4	Black Board
	System architecture, Protocol architecture, TETRA.	4	Black Board
UNIT III			
	STANDARDS: Wireless LAN: Infra red Vs radio transmission, Infrastructure and ad-hoc network,	4	Black Board
	IEEE 802.11 – System architecture, Protocol architecture, PhysicalLayer,	4	PPT
	Medium Access Control Layer, MAC management, 802.11b, 802.11a.	4	Black Board
UNIT IV			
	Mobile Network Layer: Mobile IP – Goals, assumptions and requirements, Entities and terminology, IP packet delivery, Agent Discovery,Registration,–	4	Black Board
	Tunneling and Encapsulation, Optimizations, Reverse Tunneling, IPv6, IPmicro-mobility support, Dynamic Host Configuration Protocol	4	Black Board
	Mobile Ad-Hoc networks – Routing, Destination sequence distance vector, Dynamic source routing, alternative metrics, overview of ad-hoc routing protocols.	4	Black Board
UNIT V			
	Mobile Transport Layer: Traditional TCP – Classical TCPImprovements – Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit / Fast Recovery, Transmission / Time – out freezing, Selective retransmission,	4	Black Board
	Transaction-oriented TCP Wireless Application Protocol: Architecture, WirelessDatagram	4	Black Board

	Protocol, Wireless transport layer security,		
	Wireless transaction protocol, Wireless session protocol, Wireless application environment.	4	PPT

Course Outcomes (Cos)	Programme Outcomes (Pos)					Programme Specific Outcomes (PSOs)							Mean scores of Cos
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	
CO1	4	4	4	4	2	5	4	2	5	3	4	1	3.3
CO2	5	5	5	4	2	4	5	3	4	5	4	2	3,7
CO3	4	5	4	5	2	4	4	2	4	5	4	1	3.5
CO4	4	3	5	5	2	5	4	2	5	4	5	2	3.6
CO5	4	5	5	5	2	5	4	3	5	4	4	2	3.7
Mean Overall Score													3.6

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score ofCOs = Total of ValueTotal No. of Pos&PSOs

Mean Overall Score of COs = Total of Mean Score
Total No. of Cos

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
KNOWLEDGE	50%	50%
UNDERSTANDING	30%	30%
APPLY	20%	20%

CourseDesigner: Department of Computer

Programme : M.C.A | **Part III: Elective**

Semester : IV | **Hours : 5 P/W 60 Hrs P/S**

Sub. Code : ECD3 | **Credits : 4**

TITLE OF THE PAPER: MACHINE LEARNING

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	5	4	-	-	1

PREAMBLE:

To understand the machine learning theory and build tree and rule based models.

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
UNIT 1 CO 1 Understand various machine learning Techniques.		
UNIT 2 CO2: implement various ways of selecting suitable model parameters for different machine learning techniques	2	12
UNIT 3 CO3: Learn the algorithm and different models used in Machine Learning Process.	3	12
UNIT 4 CO4: Apply the techniques of ANN in Machine learning Process for Real time Applications	4	12
UNIT 5 CO5: Analyse the techniques of Genetic algorithms in Machine learning Process for Real time Applications	5	12

SYLLABUS

UNIT – I :

Introduction: Well-Posed Learning Problems – Designing a Learning System – Choosing the Training Experience – Choosing the Target Function – Choosing a Representation for the Target Function – Choosing a Function Approximation Algorithm
– The Final Design – Perspective and Issues in Machine Learning – Issues in Machine Learning – Concept Learning and the General-to-Specific Ordering –A Concept Learning Task
– Notation – The Inductive Learning Hypothesis – Concept Learning as Search – General-to-Specific Ordering of Hypotheses.

UNIT – II :

Tree Models – Decision Trees – Ranking and Probability Estimation Trees – Tree Learning as Variance Reduction – Rule Models – Learning Ordered Rule Lists – Learning Unordered Rule Sets – Descriptive Rule Learning – First-Order Rule Learning - Linear Models – The Least-Square Method – Support Vector Machines – Obtaining Probabilities from Linear Classifiers – Going Beyond Linearity with Kernel Methods.

UNIT – III :

Distance-based Models – Neighbours and Exemplars – Nearest-Neighbour Classification – Distance-Based Clustering – Hierarchical Clustering – Probabilistic Models – The Normal Distribution and its Geometric Interpretations – Probabilistic Models for Categorical Data – Discriminative Learning by Optimising Conditional likelihood – Probabilistic Models with Hidden Variables.

UNIT – IV :

Artificial Neural Networks – Introduction – Biological Motivation – Neural Network Representations – Appropriate Problems for Neural Network Learning – Perceptrons – Representational Power of Perceptrons – The Perceptron Training Rule – Gradient Descent and the Delta Rule – Remarks – Multilayer Networks and the BACKPROPAGATION Algorithm – A Differentiable Threshold Unit – The BACKPROPAGATION Algorithm – Derivation of the BACKPROPAGATION Rule – Bayesian Learning – Introduction – Bayes Theorem – An Example – Bayes Theorem and Concept Learning – Brute-Force Bayes Concepts Learning – MAP Hypotheses and Consistent Learners – Maximum Likelihood and Least-Squared Error Hypotheses – Maximum Likelihood Hypotheses for Predicting Probabilities.

UNIT – V :

Genetic Algorithms – Motivation – Genetic Algorithms – Representing Hypotheses – Genetic Operators – Fitness Function and Selection – An Illustrative Example – Extensions – Hypothesis Space Search – Population Evolution and the Schema Theorem – Genetic Programming – Representing Programs – Illustrative Example – Remarks on Genetic Programming – Reinforcement Learning – Introduction – The Learning Task – Q-Learning – the Q Function – An Algorithm for Learning Q – An Illustrative Example – Convergence – Experimentation Strategies – Updating Sequence – Nondeterministic Rewards and Actions – Temporal Difference Learning.

TEXT BOOKS

1. P. Flach, "Machine Learning: The art and science of algorithms that make sense of data", Cambridge University Press, 2012.
2. T. M. Mitchell, "Machine Learning", McGraw Hill, 1997.

UNIT	CHAPTERS
I	1.1, 1.2, 1.3, 2.2, 2.3 (TB2)
II	5, 6, 7(TB1)
III	8, 9(TB1)
IV	4.1, 4.2, 4.3, 4.4, 4.5.1, 4.5.2, 4.5.3(TB2)
V	9.1, 9.2, 9.3, 9.4, 9.5, 13.1, 13.2, 13.3, 13.4, 13.5(TB2)

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT 1			
	Introduction: Well-Posed Learning Problems – Designing a Learning System – Choosing the Training Experience – Choosing the Target Function – – Concept Learning and the General-to-Specific Ordering –A Concept Learning Task – Notation – The Inductive Learning Hypothesis – Concept Learning as Search – General-to- Specific Ordering of Hypotheses.	4	Black Board
	Choosing a Representation for the Target Function – Choosing a Function Approximation Algorithm – The Final Design – Perspective and Issues in Machine Learning – Issues in Machine Learning	4	Black Board
	Concept Learning and the General-to-Specific Ordering –A Concept Learning Task – Notation – The Inductive Learning Hypothesis – Concept Learning as Search – General-to- Specific Ordering of Hypotheses.	4	Black Board
UNIT 11			
	Tree Models – Decision Trees – Ranking and Probability Estimation Trees – Tree Learning as Variance Reduction – Linear Models – The Least-Square Method – Support Vector Machines – Obtaining Probabilities from Linear Classifiers – Going Beyond Linearity with Kernel Methods.	4	Black Board
	Rule Models – Learning Ordered Rule Lists – Learning Unordered Rule Sets – Descriptive Rule Learning – First-Order Rule Learning -	4	ICT – WEB NOTES

	Linear Models – The Least- Square Method – Support Vector Machines – Obtaining Probabilities from Linear Classifiers – Going Beyond Linearity with Kernel Methods.	4	Black Board
UNIT III			
	Distance-based Models – Neighbors and Exemplars – Nearest-Neighbor Classification – Distance-Based Clustering – Probabilistic Models for Categorical Data – Discriminative Learning by Optimizing Conditional likelihood – Probabilistic Models with Hidden Variables.	4	Black Board
	Hierarchical Clustering – Probabilistic Models – The Normal Distribution and its Geometric Interpretations –	4	Black Board
	Probabilistic Models for Categorical Data – Discriminative Learning by Optimizing Conditional likelihood – Probabilistic Models with Hidden Variables.	4	Black Board
UNIT IV			
	Artificial Neural Networks – Introduction – Biological Motivation – Neural Network Representations – Appropriate Problems for Neural Network Learning – Perceptron's – Representational Power of Perceptron's – The Perceptron Training Rule –Bayesian Learning – Introduction – Bayes Theorem – An Example – Bayes Theorem and Concept Learning – Brute-Force Bayes Concepts Learning – MAP Hypotheses and Consistent Learners – Maximum Likelihood and Least-Squared Error Hypotheses – Maximum Likelihood Hypotheses for Predicting Probabilities.	4	Black Board

	Gradient Descent and the Delta Rule – Remarks – Multilayer Networks and the BACKPROPAGATION Algorithm – A Differentiable Threshold Unit – The BACKPROPAGATION Algorithm – Derivation of the BACKPROPAGATION Rule –	4	ICT WEB NOTES
	–Bayesian Learning – Introduction – Bayes Theorem – An Example – Bayes Theorem and Concept Learning – Brute- Force Bayes Concepts Learning – MAP Hypotheses and Consistent Learners – Maximum Likelihood and Least-Squared Error Hypotheses – Maximum Likelihood Hypotheses for Predicting Probabilities.	4	Black Board
UNIT V			
	Genetic Algorithms – Motivation – Genetic Algorithms – Representing Hypotheses – Genetic Operators – Fitness Function and Selection – An Illustrative Example – Reinforcement Learning – Introduction – The Learning Task – Q-Learning – the Q Function – An Algorithm for Learning Q – An Illustrative Example – Convergence – Experimentation Strategies – Updating Sequence – Nondeterministic Rewards and Actions – Temporal Difference Learning.	4	Black Board
	Extensions – Hypothesis Space Search – Population Evolution and the Schema Theorem – Genetic Programming – Representing Programs – Illustrative Example – Remarks	4	Black Board

	on Genetic Programming –		
	Reinforcement Learning – Introduction – The Learning Task – Q-Learning – the Q Function – An Algorithm for Learning Q – An Illustrative Example – Convergence – Experimentation Strategies – Updating Sequence – Nondeterministic Rewards and Actions – Temporal Difference Learning.	4	ICT- WEB NOTES

Course Outcomes (Cos)	Programme Outcomes (Pos)							Programme Specific Outcomes (PSOs)								Mean scores of Cos
	PO 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	PSO 6	PSO 7	
CO1	2	3	4	4	5	4	4	2	5	4	2	5	3	4	2	3.4
CO2	2	2	5	5	4	4	5	2	4	5	3	4	5	4	2	3.7
CO3	2	1	4	5	5	5	4	2	4	4	2	4	5	4	1	3.5
CO4	2	2	5	3	4	5	4	2	5	4	2	5	4	5	2	3.6
CO5	1	1	5	5	5	5	4	2	5	4	3	5	4	4	2	3.7
Mean Overall Score																3.6

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score of COs = $\frac{\text{Total of Value}}{\text{Total No. of POs\& PSOs}}$

Mean Overall Score of COs = $\frac{\text{Total of Mean Score}}{\text{Total No. of COs}}$

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
KNOWLEDGE	50%	50%
UNDERSTANDING	30%	30%
APPLY	20%	20%

Course Designer: Department of Computer Applications.

Programme: M.C.A **Part III: Elective**
Semester : IV **Hours : 5 P/W 60 HrsP/S**
Sub.Code : ECD2 **Credits :4**

TITLE OF THE PAPER: PRINCIPLES OF COMPILER DESIGN

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	5	4	-	-	1

PREAMBLE:

- To learn about basics of Translators, and Programming Languageconcepts.
- To understand the concepts of various phases of compilers: Lexical Analysis, Syntax Analysis, Semantic Analysis, Intermediate Code generation, Code Optimization, Code generation, Book keeping and Error detection and correctionmethods.

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
UNIT 1 CO1: To study the The design aspects of a typical Compiler .	1	12
UNIT 2 CO2: Design different types of Finite Automata and Machines as Acceptor, Verifier and Translator.	2	12
UNIT 3 CO3: Understand, design, construct, analyze and interpret Regular languages, Expression and Grammars.	3	12
UNIT 4 CO4: Design different types of Push down Automata as Simple Parser. And Design different types of Turing Machine	4	12
UNIT5CO5: Understand, design, construct, analyze and interpret Regular languages, Expression and Grammars with symboltable.	5	12

SYLLABUS

UNIT - I

Introduction to Compilers: Compilers and Translators – Why do we need translators – The structure of a compiler – Lexical Analysis – Syntax Analysis – Intermediate code generation – Optimization – Code generation – Book keeping – Error handling - Programming Languages: High-level programming languages – definitions of programming languages – The lexical and syntactic structure of a language – Data elements – Data structures – Operators – Assignment – Statements – Program units – Data environments – Parameter transmission – Storage management.

UNIT - II

Finite Automata and Lexical Analysis: The role of the lexical analyzer – A simple approach to the design of lexical analyzers – Regular expressions – Finite automata – From regular expressions to finite automata – Minimizing the number of states of a DFA – A language for specifying lexical analyzers.

UNIT - III

The Syntactic specification of Programming Languages: Context-free grammars – Derivations and parse trees – Capabilities of context-free grammars - Basic Parsing Techniques: Parsers –

Shift-reduce parsing – Operator-precedence parsing – Top-down parsing – Predictive parsers.

UNIT - IV

Syntax-Directed Translation: Syntax-directed translation schemes – Implementation of syntax-directed translators – Intermediate code – Postfix notation – Parse trees and syntax trees – Three-address code, quadruples, and triples – Translation of assignment statements – Boolean expressions – Statements that alter the flow of control – Postfix translations – Translation with top-down parser.

UNIT - V

Symbol Tables: The contents of a symbol table – Data structures for symbol tables – Representing scope information - Introduction to Code Optimization: The principal sources of optimization – Loop optimization – The DAG representation of basic blocks.

TEXT BOOKS

Principles of Compiler Design by Alfred V.Aho Jeffrey D.Ullman, Narosa Publishing House, New Delhi, Reprint 2002.
UNIT-I : Chapters: 1.1 - 1.10, 2.1-2.12 UNIT-II : Chapter 3.1to 3.7 UNIT-III: Chapters: 4.1 - 4.3, 5 UNIT IV : Chapter 7 UNIT-V: Chapters: 9, 12.1, 12.2, 12.3.

REFERENCE BOOKS

1. Compilers: Principles, Techniques and Tools by Alfred V. Aho, Monica S. Lam, RaviSethi, Jeffrey D. Ullman, Pearson, 2nd Edition,2012.
2. Comprehensive Approach to Principles of Compiler Design by A. A. Puntambekar,2012.

E-LEARNING RESOURCES:

1. https://nptel.ac.in/courses/106/105/106105190/

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT 1			
	Introduction to Compilers: Compilers and Translators – Why do we need translators – Thestructure of a compiler – Lexical Analysis – Syntax Analysis	4	Black Board
	Intermediate code generation – Optimization – Code generation – Book keeping – Error handling - Programming Languages: High-level programming languages – definitions of programming languages –	4	Black Board
	The lexical and syntactic structure of a language – Data elements – Data structures – Operators–	4	Black Board

	Assignment – Statements – Program units – Data environments – Parameter transmission – Storage management.		
UNIT 11			
	Finite Automata and Lexical Analysis: The role of the lexical analyzer –Minimizing the number of states of a DFA – A language for specifying lexical analyzers.	4	Black Board
	A simple approach to the design of lexical analyzers – Regular expressions – Finite automata – From regular expressions to finite automata –	4	ICT – Web notes
	Minimizing the number of states of a DFA – A language for specifying lexical analyzers.	4	Black Board
UNIT III			
	The Syntactic specification of Programming Languages: Context-free grammars1`	4	Black Board
	Derivations and parse trees – Capabilities of context-free grammars -	4	Black Board
	Basic Parsing Techniques: Parsers – Shift-reduce parsing – Operator-precedence parsing – Top-down parsing – Predictive parsers.	4	ICT – Web notes
UNIT IV			
	Syntax-Directed Translation: Syntax-directed translation schemes – Implementation of syntax-directed translators –	4	Black Board
	Intermediate code – Postfix notation – Parse trees and syntax trees – Three-address code, quadruples, and triples – Translation of assignment statements – Boolean expressions	4	Black Board

	Statements that alter the flow of control – Postfix translations – Translation with top-down parser.	4	Black Board
UNIT V			
	Symbol Tables: The contents of a symbol table – Data structures for symbol tables	4	Black Board
	Representing scope information – Introduction to Code Optimization:	4	Black Board
	–The principal sources of optimization – Loop optimization – The DAG representation of basic blocks.	4	ICT – Web Notes

Course Outcomes (Cos)	Programme Outcomes (Pos)					Programme Specific Outcomes (PSOs)							Mean scores of Cos
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	
CO1	4	5	4	4	2	5	4	2	5	3	4	1	3.4
CO2	5	4	5	4	2	4	5	3	4	5	5	2	3.73
CO3	4	5	5	5	2	4	5	2	4	5	4	1	3.6
CO4	4	3	5	5	2	5	4	3	5	4	5	2	3.66
CO5	4	5	4	5	2	5	5	2	5	4	4	2	3.6
Mean Overall Score													3.6

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score of COs = Total of Value / Total No. of Pos & PSOs

Mean Overall Score of COs = Total of Mean Score / Total No. of COs

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
KNOWLEDGE	50%	50%
UNDERSTANDING	30%	30%
APPLY	20%	20%

Course Designer: Department of Computer Applications.