



FATIMA COLLEGE

(Autonomous)

Affiliated to Madurai Kamaraj University
Re-Accredited with 'A++' (CGPA 3.61) by NAAC (Cycle - IV)
Mary Land, Madurai - 625018, Tamil Nadu

DEPARTMENT OF MCA

2021 – 2022

COURSE CODE	COURSE TITLE	HRS / WK	CREDIT	CIA Mks	ESE Mks	TOT. MKs
SEMESTER - I						
20MCA101	Mathematical Foundation of Computer Science	4	4	50	50	100
20MCA102	Software Engineering	4	4	50	50	100
20MCA103	Operating Systems	4	4	50	50	100
20MCA104	Programming in Python	4	4	50	50	100
*	Elective I – General	4	4	50	50	100
20MCA105	Lab I – Python Programming	4	2	50	50	100
20MCA106	Lab II – RDBMS	4	2	50	50	100
20MCA107	Skill Based Lab I – Linux	2	1	25	25	50
20MCA108	Soft Skills I – Professional Communication	2	1	25	25	50
SEMESTER - II						
20MCA201	Data Structures and Algorithms	4	4	50	50	100
20MCA202	Web Technologies	4	4	50	50	100
20MCA203	Programming in Java	4	4	50	50	100
*	Elective I – Specialization	4	4	50	50	100
*	Elective II – General	4	4	50	50	100
20MCA204	Lab III – Web Technologies	4	2	50	50	100
20MCA205	Lab IV – Java Programming	4	2	50	50	100
20MCA206	Skill Based Lab II – R Programming	2	1	25	25	50
20MCA207	Soft Skills II – Aptitude Training	2	1	25	25	50



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COURSE CODE	COURSE TITLE	HRS / WK	CREDIT	CIA Mks	ESE Mks	TOT. MKs
SEMESTER - III						
20MCA301	Internship & Mini Project	4	4	50	50	100
20MCA302	Software Quality & Testing	4	4	50	50	100
20MCA303	Mobile Application Development	4	4	50	50	100
20MCA304	Enterprise Application Development	4	4	50	50	100
	Elective II – Specialization	4	4	50	50	100
	Elective III - General	6	3	50	50	100
20MCA305	Lab V - Mobile Application Development	6	3	50	50	100
20MCA306	Lab VI- Enterprise Application Development	2	1	25	25	50
20MCA307	Skill Based Lab III- Computer Aided Software Engineering Tools	2	1	25	25	50
20MCA308	Soft Skills III – Interpersonal Skills for Corporate Readiness	2	1	25	25	50
SEMESTER - IV						
20MCA401	Lab VII – UIX Design Programming	4	2	50	50	100
*	Elective III - Specialization	4	4	50	50	100
20MCA402	Project Viva Voce	-	6	50	50	100
SEMESTER - V						
19MCA501	Software Project Management	4	4	50	50	100
19MCA502	Machine Learning	4	4	50	50	100
19MCA503	Enterprise Application Development	4	4	50	50	100
	Elective VII – Specialization	4	4	50	50	100
	Elective VIII - General	4	4	50	50	100



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19MCA504	Lab IX - Python for Machine Learning	6	3	50	50	100
19MCA505	Lab X - Enterprise Application Development	6	3	50	50	100
19MCA506	Skill Based Lab V –R Programming	2	1	25	25	50
19MCA507	Soft Skills V – Interpersonal Skills for Corporate Readiness	2	1	25	25	50
SEMESTER - VI						
19MCA601	Major Project		12	100	100	200
19MCA602	Internet of Things – Self Learning Course		5	50	50	100
19MCAAL01	Human Computer Interaction (Self - Learning Extra Credit course For Advanced Learners)		4	50	50	100



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ELECTIVES – I& II MCA

SPECIALIZATION ELECTIVE - DATAANALYTICS

S.NO	SEMESTER	COURSECODE	COURSE TITLE	HRS /WK	CREDIT	CIA Mks	ESE Mks	TOT MKs
1.	II	20MCADA01	Data Mining Techniques	4	4	50	50	100
2.	II	20MCADA02	Data Analytics and Visualization Using Spreadsheets	4	4	50	50	100
3.	III	20MCADA03	Big Data Analytics	4	4	50	50	100
4.	III	20MCADA04	Data Analytics Tools & Techniques	4	4	50	50	100
5.	IV	20MCADA05	Business Analytics Using R	4	4	50	50	100
6.	IV	20MCADA06	Big Data Security	4	4	50	50	100



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SPECIALIZATION ELECTIVE – DISTRIBUTED SYSTEM SECURITY

S.NO	SEMESTER	COURSECODE	COURSE TITLE	HRS /WK	CREDIT	CIA Mks	ESE Mks	TOT. MKs
1.	II	20MCADS01	Data Communication & Networking	4	4	50	50	100
2.	II	20MCADS02	Wireless Communication & Security	4	4	50	50	100
3.	III	20MCADS03	Cryptography & Network Security	4	4	50	50	100
4.	III	20MCADS04	Cyber Forensics	4	4	50	50	100
5.	IV	20MCADS05	Cloud Security	4	4	50	50	100
6.	IV	20MCADS06	High Speed Networks	4	4	50	50	100



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S

SPPECIALIZATION ELECTIVE – AI & MACHINE LEARNING

S.NO	SEMESTER	COURSECODE	COURSE TITLE	HRS /WK	CREDIT	CIA Mks	ESE Mks	TOT. MKs
1.	II	20MCAAM01	Artificial Intelligence & Expert System	4	4	50	50	100
2.	II	20MCAAM02	Soft Computing	4	4	50	50	100
3.	III	20MCAAM03	Machine Learning	4	4	50	50	100
4.	III	20MCAAM04	Neural Networks	4	4	50	50	100
5.	IV	20MCAAM05	Human Computer Interaction	4	4	50	50	100
6.	IV	20MCAAM06	Deep Learning	4	4	50	50	100



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GENERALELECTIVES

S.NO	COURSECODE	COURSE TITLE	HRS /WK	CREDIT	CIA Mks	ESE Mks	TOT. MKs
1.	20MCAGE01	OfficeAutomationTools	4	4	50	50	100
2.	20MCAGE02	FinancialManagement AndAccounting	4	4	50	50	100
3.	20MCAGE03	Organizational Behaviour	4	4	50	50	100
4.	20MCAGE04	E-Commerce	4	4	50	50	100
5.	20MCAGE05	EthicsinComputing	4	4	50	50	100
6.	20MCAGE06	ResourceManagement Techniques	4	4	50	50	100
7.	20MCAGE07	Entrepreneurship Development	4	4	50	50	100
8.	20MCAGE08	WirelessSensor Networks	4	4	50	50	100
9.	20MCAGE09	ResearchMethodology	4	4	50	50	100
10.	20MCAGE10	DigitalImageProcessing	4	4	50	50	100
11.	20MCAGE11	CloudComputing	4	4	50	50	100
12.	20MCAGE12	AgileSoftware Engineering	4	4	50	50	100



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ELECTIVES – III YEAR

SPECIALIZATION ELECTIVE – DATA SCIENCE

S.NO	SEMESTER	SUBJECT CODE	SUBJECT TITLE
3	V	19MCADS03	Data Analytics Using Pig & Hive

SPECIALIZATION ELECTIVE – NETWORKING

S.NO	SEMESTER	SUBJECT CODE	SUBJECT TITLE
3	V	19MCANW03	High Speed Networks

SPECIALIZATION ELECTIVE – APPLICATION DEVELOPMENT

S.NO	SEMESTER	SUBJECT CODE	SUBJECT TITLE
3	V	19MCAAD03	Software Development Frameworks



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GENERAL ELECTIVES

S.NO	SUBJECT CODE	SUBJECT TITLE
E-BUSINESS PROCESS		
1	19MCAGE01	Resource Management Techniques
2	19MCAGE02	Financial Management & Accounting
3	19MCAGE03	Management Information Systems
4	19MCAGE04	E-Commerce
5	19MCAGE05	Cyber Forensics
6	19MCAGE06	Ethics in Computing
7	19MCAGE07	Entrepreneurship Development
RESEARCH DOMAIN		
8	19MCAGE21	Research Methodology
9	19MCAGE22	Data Mining & Data warehousing
10	19MCAGE23	Digital Image Processing
11	19MCAGE24	Artificial Intelligence&Expert Systems
12	19MCAGE25	Soft Computing
13	19MCAGE26	Cloud Computing
14	19MCAGE27	Advanced DBMS Techniques



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SKILL DEVELOPMENT-100%

I MCA

SEMESTER – I

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
MCA	20MCA101	MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE	MAJOR CORE	4	4

COURSE DESCRIPTION

This course provides the logical, analytical and mathematical concepts that are fundamental for Computer Science

COURSE OBJECTIVE

- ❖ To impart the basic Foundation of mathematics for Computer Science.
- ❖ To introduce the concept of propositional and predicate logic and their applications.
- ❖ To inculcate logical thinking and promote arithmetic knowledge

UNIT- I MATHEMATICAL LOGIC

(12 Hours)

Introduction – Propositional calculus – Propositional variables and constants – Logical connectives and compound proposition – Basic Logical Operations – Conjunction – Disjunction – Negation – Derived Connectives – Statements



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generated by a set – Conditional Statements – Converse, Inverse and Contra-positive Statements – Converse Statements – Inverse Statements – Contra-positive Statements – Bi conditional statements – Negation of Bi Conditional Statements
SELF STUDY: Bi conditional statements – Negation of Bi Conditional Statements

UNIT- II

(12 Hours)

THE SOLUTION OF NUMERICAL ALGEBRAIC AND TRANSCENDENTAL EQUATIONS

Introduction – The Bisection method – Iteration method – The method of False Position (No derivations)

SELF STUDY: The method of False Position

UNIT – III STATISTICS

(12 Hours)

Measures of Central Tendency – Mean – Median-Mode – Karl Pearsons's coefficient – Derivations are taken from assumed mean – Correlation of Bi-variate grouped Data – Rank Correlation Coefficient

SELF STUDY: Median-Mode

UNIT – IV SET THEORY

(12 Hours)

Introduction – Set and its elements – Standard Sets and Symbols – Set Description – Cardinal number of a set – Types of Sets – Venn – Euler diagram – Set Operations and Laws of Set Theory – Union of Sets – Intersection of Sets – Disjoint Sets – Difference of Two Sets – Complement of a Set – Distributive Laws – De Morgan's Laws

MATRICES

Introduction – Algebra of Matrices – Types of Matrices – Rank of a Matrix – Inverse of Matrix – Cayley Hamilton – Eigen Values and Eigen Vectors (Only Problems)



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SELF STUDY: Standard Sets and Symbols – Set Description – Rank of a Matrix

UNIT V GRAPH THEORY

Basic concepts of Graphs, Sub Graphs, Matrix Representation of Graphs, Isomorphic graphs, Paths and Circuits – Eulerian Graphs – Hamiltonian Graphs – Planar Graphs – Euler's Formula – Regular & Bipartite Graphs – Graph Coloring – covering and Chromatic Numbers

SELF STUDY: Regular & Bipartite Graphs

REFERENCES:

1. J.K. Sharma, "Discrete Mathematics", MacMillan Publications, 3rd Edition , 2011.
2. Dr.M.K.Venkataraman, "Numerical Methods in Science and Engineering", The National Publishing Company, 5th Edition ,2001
3. Dr.S.P.Gupta&M.P.Gupta, "Business Statistics", Sultan Chand & Sons, 18th edition, 2014
4. Dr.S.Arumugam, A.T.Isaac, "Modern Algebra", SciTech Publications India Pvt. Ltd, 2016
5. Dr.S.P.Gupta&M.P.Gupta, "Business Statistics", Sultan Chand& Sons , 15th Edition, 2008.
6. J.P. Tremblay & R. Manohar, "Discrete Mathematical Structures with applications to Computer Science", Tata McGraw – Hill publishing, New Delhi, Reprint 2015.
7. Dr.S.Arumugam, A.T.Isaac, "Numerical Methods", SciTech Publications India Pvt. Ltd, 2nd Edition, 2015.
8. Narsingh Deo, "Graph Theory ". Prentice Hall of India,



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WEB REFERENCES:

1. www.britannica.com/science/set-theory
2. <https://www.khanacademy.org/math/precalculus/precalc-matrices>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 Mathematical Logic				
1.1	Introduction – Propositional calculus - Propositional variables and constants	1	Lecture	Black Board
1.2	Logical connectives and compound proposition – Basic Logical Operations - Conjunction – Disjunction – Negation	2	Chalk & Talk	White board
1.3	Statements generated by a set – Conditional Statements	1	Chalk & Talk	Black Board
1.4	Converse, Inverse and Contra-positive Statements	2	Chalk & Talk	Black Board
1.5	Converse Statements – Inverse Statements	2	Chalk & Talk	Black Board
1.6	Contra-positive Statements	2	Chalk & Talk	White board
1.7	Bi conditional statements - Negation of Bi Conditional Statements	2	Chalk & Talk	White board
UNIT 2 - The Solution of Numerical Algebraic and Transcendental Equations				
2.1	Introduction	1	Chalk & Talk	Black Board
2.2	The Bisection method	4	Chalk & Talk	Black Board
2.3	Iteration method	4	Chalk & Talk	Black Board
2.4	The method of False Position	3	Chalk & Talk	Black Board
UNIT 3 – Statistics				



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3.1	Measures of Central Tendency	2	Lecture	White board
3.2	Mean, Median, Mode	3	Chalk & Talk	Black Board
3.3	Karl Pearsons's coefficient	2	Chalk & Talk	Black Board
3.4	Derivations from assumed mean	1	Chalk & Talk	Black Board
3.5	Correlation of Bi-variate grouped Data	2	Chalk & Talk	Black Board
3.6	Rank Correlation Coefficient	2	Chalk & Talk	Black Board
UNIT 4 -Set Theory & Matrices				
4.1	Introduction – Set and its elements - Standard Sets and Symbols Set Description	1	Lecture	PPT
4.2	Cardinal number of a set – Types of Sets - Venn – Euler diagram	1	Lecture	Black Board
4.3	Set Operations and Laws of Set Theory – Union of Sets – Intersection of Sets - Disjoint Sets – Difference of Two Sets – Complement of a Set	2	Chalk & Talk	Black Board
4.4	Distributive Laws – De Morgan's Laws	2	Chalk & Talk	Black Board
4.5	Matrices - Introduction – Algebra of Matrices – Types of Matrices- Rank of a Matrix	2	Chalk & Talk	Black Board
4.6	Inverse of Matrix – Cayley Hamilton	2	Chalk & Talk	Black Board
4.7	Eigen Values and Eigen Vectors	2	Chalk & Talk	Black Board
UNIT -5 Graph Theory				
5.1	Basic concepts of Graphs, Sub Graphs	2	Chalk & Talk	Black Board



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5.2	Matrix Representation of Graphs, Isomorphic graphs	2	Chalk & Talk	Black Board
5.3	Paths and Circuits – Eularian Graphs	2	Chalk & Talk	Black Board
5.4	Hamiltonian Graphs – Planar Graphs	2	Chalk & Talk	Black Board
5.5	Euler's Formula – Regular & Bipartite Graphs	2	Chalk & Talk	Black Board
5.6	Graph Coloring – covering and Chromatic Numbers	2	Chalk & Talk	Black Board



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- CIA Components**

Nos

C1	-	Test (CIA 1)	2*	-	10 Mks
C2	-	Test (CIA 2)	1	-	15 Mks
C3	-	Assignment / Open Book Test	2	-	10 Mks
C4	-	Seminar	1	-	10 Mks
C5	-	Attendance	1	-	5 Mks

- The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Perform Logical operations and predicate calculus needed for computing skill.	K2, K4	PSO1 & PSO2
CO 2	Analyze and Compare the various techniques for solving numerical equations	K2, K3, K4	PSO1 & PSO2
CO 3	Apply the techniques of statistics and numerical methods to unravel problems by computers.	K2 , K4	PSO1 & PSO3
CO 4	Explain the set theory logic & the Knowledge of matrices for designing and solving problems	K2, K3,K4 & K5	PSO1 & PSO4
CO 5	Apply the techniques of graph theory to solve real life applications	K2,K3,K4 & K5	PSO4 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	1	1
CO2	2	3	1	1	1
CO3	3	1	3	1	1
CO4	3	1	1	2	1
CO5	1	1	1	3	2

Mapping of COs with POs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	2	1	2	1	1	2	2	1	1	1
CO2	3	2	3	2	1	1	1	1	2	2	2	2
CO3	3	2	3	1	2	2	1	1	2	2	1	1
CO4	3	2	3	1	2	2	1	1	2	2	1	2
CO5	3	1	3	2	1	1	2	1	2	1	1	2

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

♦ Weakly Correlated -1

COURSE DESIGNER

Forwarded By

Staff Name – B. USHA

HOD'S Signature


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-60%

EMPLOYABILITY-40%

I MCA

SEMESTER – I

(For those who joined in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCA102	SOFTWARE ENGINEERING	MAJOR CORE	4	4

COURSE DESCRIPTION

This course provides the fundamental perception of Software Engineering which includes system requirements, finding the effective methods to analyze, design, code, test and implement the full application with appropriate tools

COURSE OBJECTIVES

- ❖ To provide an insight into software life cycle and various software process models.
- ❖ To understand the methodologies for constructing software with high quality and reliability.
- ❖ To be familiar with estimation and scheduling of projects.



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UNIT – I PROCESS AND PROCESS MODELS **20%** **(12 Hours)**

Software Engineering a Layered Technology- Process Framework – The Capability Maturity Model Integration (CMMI) - Process Models - Prescriptive Models – The Waterfall Model – Incremental Process Models – Evolutionary Process Models The Agile Process Model – Extreme Programming – Scrum

SELF STUDY:Unified Process Model

UNIT – II **20%** **(12 Hours)**

SOFTWARE COST AND SCHEDULE ESTIMATION

Estimation –Project Planning Process - Software Scope and Feasibility – Resources – Human – Reusable – Environmental –Cost Estimation Techniques – COCOMO Models – Basic-Intermediate-Advanced-COCOMO II -Schedule Estimation Techniques – LOC Based – FP Based- Gantt Chart – Timeline Charts

SELF STUDY:COCOMO II Mode

UNIT - III **20%** **(12 Hours)**

SOFTWARE REQUIREMENTS ANALYSIS

Building the Analysis Model - Requirement Analysis – Structured Analysis and Design Models - Data Flow Oriented Modeling - Object Oriented Analysis and Design Models - Scenario Based Modeling — Class-based Modeling – Creating a Behavioral Model.

SELF STUDY: Class based modeling

UNIT- IV **20%** **(12 Hours)**

SOFTWARE DESIGN

Design Model –Software Architecture – Data Design – Data Dictionary - ER Diagram - Object Oriented Design Patterns– Creational – Behavioral – Structural - Frameworks

SELF STUDY:Data Design Concepts.



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UNIT – V 20%

(12 Hours)

SOFTWARE IMPLEMENTATION

Component – Views - Class-Based Components – Principles – Guidelines – Cohesion – Coupling - Levels of Testing – Unit Testing – Integration Testing – System Testing – SQA Activities - Software Configuration Management – Change Control

SELF STUDY: Software Configuration Management.

REFERENCES:

1. Roger S.Pressman, “Software Engineering (A Practitioner's Approach)”, Tata McGraw-Hill Publishers, 6th Edition, 2014.
2. Bob Hughes and Mike Cotterell, Software Project Management, Fifth Edition, Tata McGraw-Hill Edition 2015
3. D. Jeya Mala, S. Geetha, “Object Oriented Analysis and Design Using UML”, Tata McGraw-Hill Publishers, 2013.
4. Muthuramachandran, Zaigham,. Mohammed, “Software Engineering in the Era of Cloud Computing, Springer Publishers, 2019.
5. PankajJalote, “An Integrated approach to Software Engineering”, 3rd Edition, Narosa Publications, 2011.
6. Stephen Schach, “Software Engineering”, McGraw publication, 7th Edition, 2012.
7. Ali Behforroz, Frederick J.Hudson, “Software Engineering Fundamentals”, Oxford Indian Reprint, 2012.
8. Sommerville, “Software Engineering”, 10th Edition, Pearson, 2015.

WEB REFERENCES:

1. https://www.tutorialspoint.com/software_engineering/
2. <https://www.geeksforgeeks.org/software-engineering/>



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Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 PROCESS AND PROCESS MODELS				
1.1	Software Engineering a Layered Technology- Process Framework	1	Chalk & Talk	Black Board
1.2	The Capability Maturity Model Integration (CMMI)	1	Chalk & Talk	LCD
1.3	Process Models	1	Lecture	PPT
1.4	Prescriptive Models	1	Lecture	PPT
1.5	Process Overview – Process Scheduling	1	Lecture	PPT
1.6	The Waterfall Model	1	Discussion	LMS tool
1.7	Incremental Process Models - Evolutionary Process Models	2	Lecture	Black Board
1.8	Agile Process Models – Extreme Programming – SCRUM	3	Lecture	Black Board
1.9	The Unified Process.	1	Peer Instruction	Black Board
UNIT -2 SOFTWARE COST AND SCHEDULE ESTIMATION				
2.1	Estimation –Project Planning Process - Software Scope and Feasibility	2	Lecture	PPT



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2.2	Resources – Human – Reusable – Environmental	2	Group Discussion	Black Board
2.3	Cost Estimation Techniques – COCOMO Models – Basic-Intermediate-Advanced-COCOMO II -	4	Lecture	PPT
2.4	Schedule Estimation Techniques – LOC Based – FP Based- Gantt Chart – Timeline Charts	4	Lecture	PPT
UNIT –3 SOFTWARE REQUIREMENTS ANALYSIS				
2.1	Building the Analysis Model	1	Chalk & Talk	Black Board
2.2	Requirement Analysis	1	Chalk & Talk	LCD
2.3	Structured Analysis – Data Flow oriented Modeling	2	Lecture	PPT
2.4	Object Oriented Analysis and Design Models	1	Lecture	Smart Board
2.5	Scenario Based Modeling	2	Lecture	PPT
2.6	Class-based Modeling	2	Lecture	PPT
2.7	Creating a Behavioural Model.	3	Lecture	PPT
UNIT – 4 SOFTWARE DESIGN				
3.1	Design Model	1	Chalk & Talk	Black Board
3.2	Software Architecture	1	Chalk & Talk	LCD
3.3	Data Design – Data Dictionary - ER	3	Lecture	PPT &



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	Diagram			White board
3.4	Object Oriented Design Patterns– Creational – Behavioural Structural	6	Lecture	PPT
3.5	Frameworks	1	Lecture	Black Board
UNIT –5 SOFTWARE IMPLEMENTATION				
4.1	Component – Views	1	Chalk & Talk	Black Board
4.2	Class-Based Components	1	Chalk & Talk	LCD
4.3	Principles – Guidelines	1	Lecture	PPT
4.4	Cohesion – Coupling	3	Lecture	Smart Board
4.5	Levels of Testing – Unit Testing – Integration Testing – System Testing	2	Lecture	Black Board
4.6	SQA Activities	1	Discussion	Google classroom
4.7	Software Configuration Management – Change Control	3	Lecture	Black Board



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :
K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- **CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Compare the different domains and process models.	K2, K4	PSO1 & PSO2
CO 2	Estimate the cost and time estimations to develop a project	K2, K3, K4	PSO1 & PSO2
CO 3	Identify the different types of requirements analysis techniques	K2 , K4	PSO2
CO 4	Analyse the design oriented concepts	K2, K3,K4 & K5	PSO3& PSO5
CO 5	Investigate the software implementation metrics and configuration management activities	K2,K3,K4 & K5	PSO3& PSO4



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	1	1	1
CO2	2	2	1	1	1
CO3	1	3	1	1	1
CO4	1	1	3	1	2
CO5	1	1	3	2	1

Mapping of COs with POs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	2	1	2	1	1	2	2	1	1	1
CO2	1	2	3	2	1	1	1	1	2	2	2	2
CO3	1	3	3	1	2	2	1	1	2	2	2	1
CO4	1	2	2	1	2	2	1	1	2	2	1	2
CO5	1	3	2	2	1	1	2	1	2	1	1	2

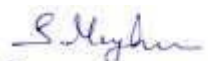
Note: ♦ Strongly Correlated – 3 ♦ Moderately Correlated – 2
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name - Dr.D.Jeya Mala

Forwarded By

HOD'S Signature & Name


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SKILL DEVELOPMENT-100%

I MCA

SEMESTER –I

(For those who joined in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCA103	OPERATING SYSTEMS	MAJOR CORE	4	4

COURSE DESCRIPTION

This course provides knowledge on the concepts of abstraction, scheduling mechanisms, implementations and manages a computer's resources, especially the allocation of those resources among other programmes.

COURSE OBJECTIVES

- ❖ To be aware of the evolution and fundamental principles of operating system.
- ❖ To understand the various operating system components like process management, memory management, file management.
- ❖ To be familiar with storage management.

UNIT –I INTRODUCTION

(12 Hours)

What is Operating System? – System Organization – System Architecture – System Structure – Protection and Security – Distributed Systems – Special Purpose



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Systems – Process Overview – Process Scheduling – Process Operations – Inter process Communication.

SELF STUDY: Inter process Communication

UNIT – II PROCESS CO-ORDINATION

(12 Hours)

CPU Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Synchronization - Background – Critical Section Problem – Peterson's Solution - Synchronization Hardware – Semaphore Problems – Monitors Deadlock – System Model – Deadlock Characterization – Methods for Handling – Prevention – Avoidance –Detection – Recovery from Deadlock.

SELF STUDY:Monitors

UNIT – III MEMORY MANAGEMENT

(12 Hours)

Memory Management - Background – Swapping – Contiguous Memory Allocation – Paging – Structure of Page Table – Segmentation -Virtual Memory - Copy-on-Write - Page Replacement algorithms – Basic – FIFO – Optimal – LRU – LRU Approximation – Counting Based – Page Buffering.

SELF STUDY:Demand Paging.

UNIT - IV FILE SYSTEM MANAGEMENT

(12 Hours)

File Concept – Access Methods – Directory and Disk Structure – File system mounting – File sharing - File System Structure – File System Implementation – Directory Implementation - Allocation Methods – Free Space Management.

SELF STUDY:Free Space Management



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UNIT – V STORAGE MANAGEMENT

(12 Hours)

Disk Structure – Disk Attachment - Disk Scheduling – Disk Management – Swap-space Management – RAID Structure – I/O Systems - I/O Hardware – I/O interface – I/O Subsystem - I/O Request to hardware operations.

SELF STUDY: Swap-space Management

REFERENCES:

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, “Operating System Principles”, 7th Edition, Wiley Publication, 2013.
2. William Stallings, “Operating Systems: Internals and Design Principles”, 7th Edition, Prentice Hall, 2011.
3. Madnick & J. Donovan, "Operating Systems", McGraw, 2nd Edition, Hill Publication, 2013.
4. H.M. Deitel, "Operating systems", 3rd Edition, Addison Wesley Publication, 2013.
5. William Stallings, "Operating Systems ", 7th Edition, Prentice Hall Publication, 2014.

WEB REFERENCES:

1. <http://Williamstallings.com/os/animations>
2. https://www.tutorial.com/operating_system/



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 Introduction				
1.1	System Organization	1	Chalk & Talk	Black Board
1.2	System Architecture	1	Chalk & Talk	LCD
1.3	System Structure	4	Lecture	PPT & White board
1.4	Protection and Security – Distributed Systems	1	Lecture	Smart Board
1.5	Process Overview – Process Scheduling	1	Lecture	Black Board
1.6	Process Operations	2	Discussion	Google classroom
1.7	Inter process Communication	2	Lecture	PPT & White board
UNIT -2 Process Co-ordination				
2.1	CPU Basic Concepts	1	Lecture	Green Board Charts
2.2	Scheduling Criteria – Algorithms	2	Chalk & Talk	Green Board
2.3	Synchronization - Background	1	Lecture	Smart Board
2.4	Critical Section Problem – Peterson's Solution	1	Lecture	Black Board
2.5	Synchronization Hardware – Semaphores	2	Discussion	Google classroom



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2.6	Problems – Monitors - Deadlock	1	Lecture	Green Board Charts
2.7	Deadlock Characterization – Methods for Handling	2	Chalk & Talk	Green Board
2.8	Avoidance – Deadlock Detection	1	Lecture	Smart Board
2.9	Recovery from Deadlock	1	Lecture	Black Board
UNIT –3 Memory Management				
3.1	Memory Management – Background	1	Chalk & Talk	Black Board
3.2	Swapping – Contiguous Memory Allocation	1	Chalk & Talk	LCD
3.3	Paging – Structure of Page Table	3	Lecture	PPT & White board
3.4	Segmentation	1	Lecture	Smart Board
3.5	Virtual Memory	1	Lecture	Black Board
3.6	Demand Paging – Copy-on-Write	1	Discussion	Google classroom
3.7	Page Replacement algorithms	2	Lecture	PPT & White board
3.8	FIFO – Optimal – LRU – LRU Approximation	1	Discussion	Black Board
3.9	Counting Based – Page Buffering.	1	Lecture	Black Board
UNIT –4 File System Management				
4.1	File Concept – Access Methods	1	Chalk & Talk	Black Board
4.2	Directory and Disk Structure	1	Chalk & Talk	LCD



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4.3	File system mounting	3	Lecture	PPT & White board
4.4	File sharing	1	Lecture	Smart Board
4.5	File System Structure	1	Lecture	Black Board
4.6	File System Implementation	1	Discussion	Google classroom
4.7	Directory Implementation	2	Lecture	PPT & White board
4.8	Allocation Methods	1	Discussion	Black Board
4.9	Free Space Management	1	Lecture	Black Board
UNIT -5 Storage Management				
5.1	Disk Structure & Attachment	2	Chalk & Talk	Black Board
5.2	Disk Scheduling	2	Chalk & Talk	LCD
5.3	Disk Management	1	Lecture	PPT & White board
5.4	RAID Structure	2	Lecture	Smart Board
5.5	I/O Systems	1	Lecture	Black Board
5.6	I/O Hardware	1	Discussion	Google classroom
5.7	I/O interface	1	Lecture	PPT & White board
5.8	I/O Subsystem	1	Discussion	Black Board
5.9	I/O Request to hardware operations	1	Lecture	Black Board



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- **CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Identify the components and processes.	K2, K4	PSO1 & PSO2
CO 2	Analyse on scheduling algorithms and deadlocks.	K2, K3, K4	PSO1 & PSO2
CO 3	Demonstrate the mapping between the physical memory and virtual memory	K2 , K4	PSO1 & PSO4
CO 4	Identify the secondary memory management techniques	K2, K3,K4 & K5	PSO1 & PSO3
CO 5	Analyse on the I/O systems	K2,K3,K4 & K5	PSO1 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	1	1	1
CO2	3	2	1	1	1
CO3	2	1	1	3	1
CO4	2	1	3	1	1
CO5	2	1	1	1	3

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	3	1	1	2	1	1	1	1	1	2	1
CO2	1	2	1	1	2	1	2	1	1	1	3	1
CO3	1	2	1	1	2	3	1	1	1	1	3	1
CO4	1	3	1	1	3	1	2	1	1	1	2	1
CO5	3	2	1	1	2	2	3	1	1	1	2	1

Note: ♦ Strongly Correlated – 3

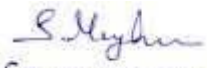
♦ Moderately Correlated – 2

♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name –S. JEBAPRIYA

**Forwarded By
HOD'S Signature & Name**


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EMPLOYABILITY-100%

I MCA

SEMESTER – I

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCA104	PROGRAMMING IN PYTHON	MAJOR CORE	4	4

COURSE DESCRIPTION

This course provides the basics of writing and running Python scripts to more advanced features such as file operations, regular expressions, working with OOPs concept and using the extensive functionality of Python modules. Extra emphasis is placed on features unique to Python, such as tuples, array slices, and output formatting.

COURSE OBJECTIVE

- ❖ To differentiate syntax of Python from other programming languages.
- ❖ To get familiar in writing simple programs using Python language.
- ❖ To understand various data structures provided by Python library including string, List.
- ❖ To build real-world applications using OOPs, Files and Exception handling.

UNIT – I INTRODUCTION

(12 Hours)

Context of Software Development - Learning Programming with Python - Writing a Python Program - Values and Variables – Identifiers - Floating-point types – Control Codes within Strings – User Input – Eval Function – Controlling Print



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Function - Expressions & Arithmetic – Operator Precedence and Associativity – Comments – Errors - Syntax, Run-time, Logic Errors –Conditional Execution – Boolean Expressions – If Statement – If/Else Statement – Nested Conditionals – Multi-way Decision Statements.

SELF STUDY :Arithmetic Operators

UNIT - II FUNCTIONS

(12 Hours)

Iteration – While – For – Nested loop – Abnormal Loop Termination - Infinite loop Using Functions – Time Functions – Random Numbers – Importing Issues – Writing Functions – Basics – Main Function - Parameter Passing – Function Examples – Custom Functions - More on Functions – Global Variables – Default Parameters – Recursion – Documenting Functions and Modules – Functions as Data.

SELF STUDY :Standard Mathematical Functions

UNIT - III LIST PROCESSING AND EXCEPTION HANDLING

(12 Hours)

List Assignment and Equivalence – List bounds - Slicing – List and Functions- List Processing – Sorting – Flexible Sorting – Searching – Linear Search – Binary Search – List Permutations – Reversing List – Handling Exceptions – Using Exceptions – Custom Exceptions.

SELF STUDY :Exception Handling

UNIT - IV TUPLES AND FILE HANDLING

(12 Hours)

Strings and text files - manipulating files and directories - OS and sys modules - Text files: reading/writing text and numbers from/to a file - Creating & Reading a formatted file - String manipulations: subscript operator – indexing - slicing a string – strings and number system: Converting strings to numbers – Binary - octal, hexadecimal numbers – Tuples and dictionaries - Dictionary literals –



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Adding and removing keys - Accessing and replacing values - Traversing dictionaries.

SELF STUDY : String manipulations, Dictionary literals.

UNIT -V OBJECT ORIENTED FEATURES

(12 Hours)

Classes and OOP - Classes, objects, attributes and methods - Defining classes - Design with classes - Data modeling - Persistent storage of objects - Inheritance, polymorphism, operator overloading - Abstract classes - Exception handling - Try block.

REFERENCES:

1. Richard L. Halterman, "Learning To Program with Python", 2013.
2. Allen B. Downey, "Python for Software Design", 2018.
3. ReemaThareja, "Python Programming Using Probable Solving Approach", Oxford University Press, 2017
4. Bill Lubanovic, "Introducing Python", O'Reilly Media Publications, 2015

WEB REFERENCES:

- 1.<http://spoken-tutorial.org/tutorial-search/python>
- 2.<https://docs.python.org>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT - 1 INTRODUCTION				
1.1	Introduction about Python	1	Chalk & Talk	Black Board
1.2	Learning & Writing a Python Program	1	Chalk & Talk	Black Board
1.3	Values and Variables	1	Discussion	Google classroom
1.4	Control Codes within Strings	2	Chalk & Talk	Black Board
1.5	Controlling Print Function	1	Discussion	Black Board
1.6	Operator precedence and Associativity	1	Lecture	White board
1.7	Errors	2	Lecture	PPT
1.8	Conditional Execution	2	Lecture	White board
1.9	Multi-way Decision Statements	1	Chalk & Talk	Black Board
UNIT - 2 ARITHMETIC OPERATORS				
2.1	While, For, Nested loop	2	Lecture	PPT
2.2	Abnormal Loop Termination - Infinite loop	2	Chalk & Talk	Black Board
2.3	Using Functions	1	Lecture	PPT
2.4	Standard Mathematical Function	2	Lecture	White board
2.5	Parameter Passing, Custom Functions	2	Discussion	Black Board



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2.6	Default Parameters, Recursion	1	Chalk & Talk	Black Board
2.7	Documenting Functions and Modules	1	Chalk & Talk	Black Board
2.8	Using Functions as Data	1	Lecture	White board
UNIT – 3 LIST PROCESSING AND EXCEPTION HANDLING				
3.1	List Assignment and Equivalence	1	Lecture	White board
3.2	List Slicing	1	Chalk & Talk	Black Board
3.3	List and Functions	2	Lecture	PPT
3.4	Sorting	2	Lecture	White board
3.5	Searching	2	Lecture	PPT
3.6	List Permutations & Reverse	1	Discussion	Google classroom
3.7	Handling Exceptions	2	Chalk & Talk	Black Board
3.8	Custom Exceptions	1	Lecture	PPT
UNIT - 4 TUPLES AND FILE HANDLING				
4.1	String Traversal & Slicing	1	Lecture	PPT
4.2	OS and sys modules	1	Lecture	PPT
4.3	String manipulations	1	Chalk & Talk	Black Board
4.4	Lists and Tuples	2	Chalk & Talk	Black Board
4.5	Tuples and dictionaries	2	Discussion	Black Board
4.6	Adding and removing keys	2	Lecture	PPT
4.7	Creating & reading a formatted file	1	Chalk & Talk	Black Board
4.8	Accessing and replacing values	1	Discussion	Google classroom



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4.9	Traversing dictionaries	1	Discussion	Black Board
UNIT – 5 OBJECT ORIENTED FEATURES				
5.1	Classes and OOP	1	Chalk & Talk	Black Board
5.2	defining classes	1	Lecture	PPT
5.3	Data modelling	1	Lecture	PPT
5.4	Persistent storage of objects	2	Lecture	White board
5.5	Polymorphism	1	Lecture	White board
5.6	Operator overloading	1	Lecture	White board
5.7	Abstract classes	2	Lecture	White board
5.8	Exception handling	1	Discussion	Google classroom
5.9	Inheritance	1	Chalk & Talk	Black Board
5.10	Try block	1	Chalk & Talk	Black Board



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Predict the basics of Python programming.	K2, K4	PSO1& PSO2
CO 2	Solve problems requiring the writing of well-documented programs in the Python language, including use of the logical constructs of that language.	K2, K3, K4	PSO2& PSO3
CO 3	Use and manipulate Lists and python exception handling model to develop robust programs.	K2 , K4	PSO3&PSO4
CO 4	Formulate solutions for String, tuples and File operations.	K2, K3,K4 & K5	PSO1&PSO4
CO 5	Apply object-oriented programming concepts to develop dynamic interactive Python applications.	K2,K3,K4 & K5	PSO4&PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	1	1
CO2	1	3	2	1	1
CO3	1	1	3	2	1
CO4	3	1	1	2	1
CO5	1	1	1	3	2

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1	2	2	2	3	1	2	1	2
CO2	3	2	2	1	1	2	2	3	1	2	1	2
CO3	3	2	3	2	2	2	2	3	2	2	1	3
CO4	3	2	3	2	3	3	2	3	3	3	1	3
CO5	3	3	3	3	3	2	3	3	2	3	3	3

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

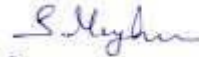
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – S. Mary Helan Felista

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

GENERAL ELECTIVE – MCA

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCAGE01	OFFICE AUTOMATION TOOLS	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course enable the students in crafting professional word documents, excel spread sheets, power point presentations using the Microsoft suite of office tools and also preparation of documents and presentations with office automation tools.

COURSE OBJECTIVE

- ❖ Learn the various types of documentation using Word Processing S/w.
- ❖ Understand the design and create excellent programming types of process using function and having huge statistical report with charts and other process.
- ❖ Develop presentational Skills by Power Point and it's processto perform documentation



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UNIT – I WORKING WITH DOCUMENTS

(12 Hours)

Introduction: Opening & Saving files, Editing text documents, Inserting, Deleting, Cut, Copy, Paste, Undo, Redo, Find, Search, Replace, Formatting page & setting Margins, Converting files to different formats, Importing & Exporting documents, Sending files to others, Using Tool bars, Ruler, Using Icons, using help.

Formatting Documents: Setting Font styles, Font selection- style, size, colour etc,

Type face: Bold, Italic, Underline, Case settings, Highlighting, Special symbols, Setting Paragraph style, Alignments, Indents, Line Space, Margins, Bullets & Numbering.

Setting Page style: Formatting Page, Page tab, Margins, Layout settings, Paper tray, Border & Shading, Columns, Header & footer, Setting Footnotes & end notes, Shortcut Keys, Inserting manual page break, Column break and line break, Creating sections & frames, Anchoring & Wrapping, Setting Document styles, Table of Contents, Index, Page Numbering, date & Time, Author etc., Creating Master Documents, Web page.

Creating Tables: Table settings, Borders, Alignments, Insertion, deletion, Merging, Splitting, Sorting, and Formula,

Drawing: Inserting ClipArts, Pictures/Files etc.,

Tools: Word Completion, Spell Checks, Mail merge, Templates, Creating contents for books, Creating Letter/Faxes, Creating Web pages, Using Wizards, Tracking Changes, Security, Digital Signature, Printing Documents, Shortcut keys.

UNIT – II SPREADSHEET

(12 Hours)

Introduction: Spread Sheet & its Applications, Opening Spreadsheet

Menus: main menu, Formula Editing, Formatting, Toolbars, Using Icons, Using help, Shortcuts, Spreadsheet types.

Working with Spreadsheets: opening, Saving files, setting Margins, Converting files to different formats, importing, exporting, sending files to others.



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Spread sheet addressing: Rows, Columns & Cells, Referring Cells & Selecting Cells – Shortcut Keys.

Entering & Deleting Data: Entering data, Cut, Copy, Paste, Undo, Redo, Filling Continuous rows, columns, Highlighting values, Find, Search & replace, Inserting Data, Insert Cells, Column, rows & sheets, Symbols, Data from external files, Frames, Clipart, Pictures, Files etc, Inserting Functions, Manual breaks.

UNIT – III Advanced SPREADSHEET

(12 Hours)

Setting Formula: finding total in a column or row, Mathematical operations, Using other Formulae.

Formatting Spreadsheets: Labelling columns & rows, Formatting- Cell, row, column & Sheet

Category – Alignment: Font, Border & Shading, Hiding/ Locking Cells, Anchoring objects, Formatting layout for Graphics, Clipart etc., Worksheet Row & Column Headers, Sheet Name, Row height & Column width,

Visibility: Row, Column, Sheet, Security, Sheet Formatting & style, Sheet background, Colour etc, Borders & Shading – Shortcut keys.

Calculations: Sorting, Filtering, Validation, Consolidation, and Subtotal, Creating Charts - Drawing. Printing, Error checking, Spell Checks, Formula Auditing, Creating & Using Templates, Pivot Tables, Tracking Changes, Security, Customization.

UNIT – IV DATABASE AND REPORTS

(12 Hours)

Introduction: Planning a Database, Starting Access, Access Screen

Database: Creating a New Database, Creating Tables, Working with Forms, Creating queries, Finding Information in Databases

Reports: Creating Reports, Types of Reports, Printing & Print Preview, Importing data from other databases.



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UNIT – V PRESENTATION

(12 Hours)

Introduction: Opening new presentation, Different presentation templates, Setting backgrounds, Selecting presentation layouts, Creating a presentation, Setting Presentation style, Adding text to the Presentation.

Formatting a Presentation: Adding style, Colour, gradient fills, Arranging objects, Adding Header & Footer, Slide Background, Slide layout.

Adding Graphics: Inserting pictures, movies, tables etc into presentation, Drawing Pictures using Draw.

Adding Effects: Setting Animation & transition effects, Printing Handouts, Generating Standalone Presentation viewer.

REFERENCES:

1. Vikas Gupta, "Comdex Information Technology course tool kit", WILEY Dreamtech, 2008
2. Schmidt Cheryl A, "The Complete Computer upgrade and repair book", 3rd edition, WILEY Dreamtech
3. Archana Kumar, "Computer Basics with Office Automation", I.K. International Publishing House Pvt. Limited, 2010.
4. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.

WEB REFERENCES:

1. <https://khpditweebly.weebly.com/office-automation>
2. <https://books.google.co.in/books?id=iLRHDwAAQBAJ&printsec=frontcover&dq=Introduction+to+Information+Technology>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 DOCUMENT				
1.1	Introduction, Opening & Saving files, Editing text documents, Inserting, Deleting, Cut, Copy, Paste, Undo, Redo, Find, Search, Replace, Formatting page & setting Margins	2	Chalk & Talk	Black Board
1.2	Converting files to different formats, Importing & Exporting documents, Sending files to others, Using Tool bars, Ruler, Using Icons, using help	1	Lecture	PPT & White board
1.3	Formatting documents, Setting Font styles, Font selection, style, size, colour etc	1	Discussion	Google classroom
1.4	Type face, Bold, Italic, Underline, Case settings, Highlighting, Special symbols, Setting Paragraph style, Alignments, Indents, Line Space, Margins, Bullets & Numbering	1	Chalk & Talk	Black Board
1.5	Setting page style, Formatting Page, Page tab, Margins, Layout settings, Paper tray, Border & Shading, Columns, Header & footer, Setting Footnotes & end notes, Shortcut Keys	1	Discussion	Black Board
1.6	Inserting manual page break, Column break and line break, Creating sections & frames,	1	Lecture	PPT & White board



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	Anchoring & Wrapping, Setting Document styles			
1.7	Table of Contents, Index, Page Numbering, date & Time, Author etc., Creating Master Documents, Web page	1	Lecture	PPT
1.8	Creating tables, Table settings, Borders, Alignments, Insertion, deletion, Merging, Splitting, Sorting, and Formula	1	Lecture	White board
1.9	Drawing, Inserting ClipArts, Pictures/Files etc	1	Demonstration	LCD
1.10	Tools, Word Completion, Spell Checks, Mail merge, Templates, Creating contents for books, Creating Letter/Faxes	1	Demonstration	LCD
1.11	Creating Web pages, Using Wizards, Tracking Changes, Security, Digital Signature, Printing Documents, Shortcut keys	1	Demonstration	LCD
UNIT - 2 SPREADSHEET				
2.1	Introduction, Spread Sheet & its Applications, Opening Spreadsheet	1	Lecture	PPT
2.2	Menus, main menu, Formula Editing, Formatting, Toolbars	1	Chalk & Talk	Black Board
2.3	Using Icons, Using help, Shortcuts, Spreadsheet types	1	Lecture	PPT
2.4	Working with Spreadsheets ,opening, Saving files, setting Margins	1	Lecture	White board
2.5	Converting files to different formats, importing, exporting,	1	Demonstration	LCD



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	sending files to others			
2.6	Spread sheet addressing, Rows, Columns & Cells, Referring Cells & Selecting Cells – Shortcut Keys	1	Chalk & Talk	Black Board
2.7	Entering & Deleting data, Entering data, Cut, Copy, Paste, Undo, Redo	1	Discussion	Google Class Room
2.8	Filling Continuous rows, columns, Highlighting values	1	Demonstration	LCD
2.9	Find, Search & replace, Inserting Data, Insert Cells	1	Demonstration	LCD
2.10	Column, rows & sheets, Symbols, Data from external files	1	Demonstration	LCD
2.11	Frames, Clipart, Pictures, Files etc	1	Demonstration	LCD
2.12	Inserting Functions, Manual breaks	1	Demonstration	LCD
UNIT – 3 ADVANCED SPREADSHEET				
3.1	Setting formula, finding total in a column or row, Mathematical operations	1	Lecture	White board
3.2	Using other Formulae, Formatting Spreadsheets , Labelling columns & rows	1	Demonstration	LCD
3.3	Formatting- Cell, row, column & Sheet	1	Lecture	PPT
3.4	Category, Alignment, Font, Border & Shading, Hiding/ Locking Cells	1	Demonstration	LCD
3.5	Anchoring objects, Formatting layout for Graphics, Clipart etc	1	Lecture	PPT
3.6	Worksheet Row & Column Headers, Sheet Name, Row height	1	Discussion	Google classroom



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	& Column width			
3.7	Visibility, Row, Column, Sheet, Security, Sheet Formatting & style	1	Chalk & Talk	Black Board
3.8	Sheet background, Colour etc, Borders & Shading, Shortcut keys	1	Demonstration	LCD
3.9	Calculations, Sorting, Filtering, Validation, Consolidation and Subtotal	1	Lecture	PPT
3.10	Creating Charts – Drawing, Printing, Error checking	1	Demonstration	LCD
3.11	Spell Checks, Formula Auditing, Creating & Using Templates	1	Demonstration	LCD
3.12	Pivot Tables, Tracking Changes, Security, Customization	1	Demonstration	LCD
UNIT – 4 DATABASE AND REPORTS				
4.1	Introduction, Planning a Database	1	Lecture	PPT
4.2	Starting Access	1	Discussion	Google classroom
4.3	Access Screen	1	Chalk & Talk	Black Board
4.4	Database, Creating a New Database	1	Lecture	PPT
4.5	Creating Tables	1	Demonstration	LCD
4.6	Working with Forms	1	Lecture	PPT
4.7	Creating queries	1	Chalk & Talk	Black Board
4.8	Finding Information in Databases	1	Demonstration	LCD
4.9	Reports, Creating Reports	1	Demonstration	LCD
4.10	Types of Reports	1	Demonstration	LCD



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4.11	Printing & Print Preview	1	Demonstration	LCD
4.12	Importing data from other databases	1	Demonstration	LCD
UNIT – 5 PRESENTATION				
5.1	Introduction, Opening new presentation, Different presentation templates	2	Chalk & Talk	Black Board
5.2	Setting backgrounds, Selecting presentation layouts	2	Lecture	PPT
5.3	Creating a presentation, Setting Presentation style	1	Discussion	Google classroom
5.4	Adding text to the Presentation	1	Demonstration	LCD
5.5	Formatting a presentations, Adding style, Colour, gradient fills, Arranging objects	1	Demonstration	LCD
5.6	Adding Header & Footer, Slide Background, Slide layout	1	Lecture	PPT
5.7	Adding graphics, Inserting pictures, movies, tables etc into presentation	1	Lecture	PPT
5.8	Drawing Pictures using Draw	1	Discussion	Google classroom
5.9	Adding effects, Setting Animation & transition effects	1	Demonstration	LCD
5.10	Printing Handouts, Generating Standalone Presentation viewer	1	Demonstration	LCD



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- **CIA Components**

				Nos			
C1	–	Test (CIA 1)		2*	–	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Identify current and emerging word processing technologies to produce organizational documents	K2, K4	PSO1 & PSO2
CO 2	Develop, open and explore the Microsoft Office Excel environment	K2, K3, K4	PSO2 & PSO3
CO 3	Design and edit charts and graphs with the use of functions and formulas.	K2 , K4	PSO1 & PSO3
CO 4	Implement and query a database using different methods	K2, K3,K4 & K5	PSO4 & PSO5
CO 5	Generate slide presentations that include text, graphics, animation, and transitions.	K2,K3,K4 & K5	PSO4 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	1	1
CO2	1	3	2	1	1
CO3	2	1	3	1	1
CO4	1	1	1	2	3
CO5	1	1	1	3	2

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	3	1	1	1	1	1	1	2	1	1	1
CO2	1	1	1	3	1	1	2	1	1	1	1	1
CO3	1	1	3	1	1	1	1	2	1	1	1	1
CO4	1	3	1	1	1	1	1	1	1	2	1	1
CO5	3	1	1	1	2	1	1	1	1	1	1	1

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

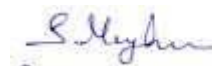
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – R. SMEETA MARY

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

GENERAL ELECTIVE - MCA

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCAGE02	FINANCIAL MANAGEMENT AND ACCOUNTING	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides an overview of financial concepts, process and operations from a managerial perspective.

COURSE OBJECTIVE

- ❖ To define the set of accounting method and disclosure practices from which firms select when providing information to external parties.
- ❖ The primary emphasis is to assist in developing the skills required to interpret, analyze and evaluate information contained in published financial statements.

UNIT I ACCOUNTING

(12 Hours)

Principles, Basic accounting concepts and conventions, journal, ledger – final accounts.

SELF STUDY: Ledger



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UNIT IICOSTING

(12 Hours)

Introduction to costing - cost elements - Classification of costing- Materials - Stock levels – FIFO, LIFO, Simple Average Method, Weighted Average Method (simple problem only)

SELF STUDY: Classification of costing

UNIT IIFUND FLOW AND CASH FLOW STATEMENT

(12 Hours)

Meaning –objective- preparation of fund flow statement and cash flow statements.

SELF STUDY: Objective

UNIT IV

(12 Hours)

BUDGET AND BUDGETARY CONTROL:

Nature and scope, Importance.

MARGINAL COSTING:

Nature, scope and importance, Break-even analysis, Uses and limitations.

SELF STUDY: Uses and limitations

UNIT VTALLY

(12 Hours)

Introduction to tally – Accounting Information – Vouchers – Inventory – Purchase/Sales Orders – Invoices – Reports – Important Features of Tally.

SELF STUDY: Invoices



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REFERENCES :

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2. T.S.Reddy&Y.Hari Prasad Reddy, "Cost Accounting" ,Margham Publications, Fourth Revised Edition, 2015.
3. T.S Reddy &Y.Hari Prasad Reddy, "Management Accounting", Margham Publications Third Revised Edition- 2014.
4. S. Palanivel,"Tally 9: Accounting Software", Margham Publications, 2015.
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6. R.L.Gupta&M.Radhaswamy, "Advanced accountancy", Sultan chand& co, 2014.
7. S.N.Maheswari "Principles of Management accounting", Sultan Chand & co, 2014.
8. R.S.N.Pillai& B.Bagavathi,"Cost accounting", Sultan Chand & co, 2014.

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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 - Accounting				
1.1	Principles	2	Lecture	Black Board
1.2	Basic accounting concepts and conventions	3	Lecture	White board
1.3	journal	3	Lecture	Black Board
1.4	Ledger	1	Self Study	PPT
1.5	Final accounts.	3	Lecture	Black Board
UNIT 2 - Costing				
2.1	Introduction to costing - cost elements	2	Lecture	PPT
2.2	Classification of costing	1	Self Study	Black Board
2.3	Materials	2	Chalk & Talk	PPT
2.4	Stock levels	2	Lecture	White board
2.5	FIFO, LIFO	2	Chalk & Talk	Black Board
2.6	Simple Average Method	1	Chalk & Talk	Black Board
2.7	Weighted Average Method (simple problem only)	2	Chalk & Talk	Black Board
UNIT 3 - Fund flow and cash flow statement				
3.1	Meaning	3	Lecture	White board
3.2	objective	2	Self Study	Black Board



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3.3	preparation of fund flow statement	3	Chalk & Talk	PPT
3.4	cash flow statements	4	Lecture	White board
UNIT 4 -Budget and budgetary control				
4.1	Nature and scope	2	Chalk & Talk	Black Board
4.2	Importance	3	Lecture	PPT
4.3	Nature, scope and importance	2	Chalk & Talk	Black Board
4.4	Break-even analysis	3	Chalk & Talk	PPT
4.5	Uses and limitations.	2	Self Study	Black Board
UNIT -5-Tally				
5.1	Introduction to tally	2	Lecture	Black Board
5.2	Accounting Information	2	Chalk & Talk	Black Board
5.3	Vouchers	2	Lecture	Black Board
5.4	Inventory – Purchase/Sales Orders	2	Chalk & Talk	Black Board
5.5	Invoices	2	Chalk & Talk	Black Board
5.6	Important Features of Tally	2	Chalk & Talk	Black Board



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- **CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Preparation and analysis of balance sheet.	K2, K4	PSO1 & PSO2
CO 2	Predict the Classification of Costing.	K2, K3, K4	PSO1 & PSO2
CO 3	Decide the budget preparation and control of a company.	K2 , K4	PSO1 & PSO2
CO 4	Analyze the flow of funds.	K2, K3,K4 & K5	PSO1 , PS02 & PSO4
CO 5	Use Tally to implement the needs of financial accounting.	K2,K3,K4 & K5	PSO1, PS03 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	2	1	1
CO2	2	3	1	1	1
CO3	3	3	1	1	1
CO4	3	3	1	2	1
CO5	2	2	1	1	3

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	1	1	1	1	1	1	2	1	1	1
CO2	1	1	1	3	1	1	2	1	1	1	1	1
CO3	1	1	3	1	1	1	1	2	1	1	1	1
CO4	1	2	1	1	1	1	1	1	1	2	1	1
CO5	3	2	2	3	2	2	2	1	1	1	1	1

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

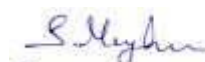
♦ Weakly Correlated -1

COURSE DESIGNER:

Forwarded By

Staff Name – B. USHA

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

GENERAL ELECTIVE – MCA

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
MCA	20MCAGE03	ORGANIZATIONAL BEHAVIOUR	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides solution to learn challenges and opportunities in organizations from a behavioural perspective.

COURSE OBJECTIVE

- ❖ To develop an Organisational Behaviour model for any type of Organization.
- ❖ To develop and improve the quality of Leadership.
- ❖ To evaluate the Common biases and eradication in Decision Making Process.
- ❖ To understand how to manage the Stress during a job.

UNIT I INTRODUCTION

(12 Hours)

Introduction to Organizational Behaviour(OB), Contributing disciplines to OB Field, challenges and opportunities for OB, Developing an OB Model, Foundation of Individual Behaviour, Ability - Learning. Values, Attitudes and Types of Attitudes. Job satisfaction- Measuring Job satisfaction, Effect of Job satisfaction on employee performance.

SELF STUDY: Values, Attitudes



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UNIT II PERSONALITY AND VALUES

(12 Hours)

Personality determinants, Achieving personality fit, Factors Influencing perception, Attribution Theory, Perception / Individual Decision Making: Ethics in Decision Making. Motivation, Management by Objectives, Employee Recognition programs, Employee Involvement programs, Variable Pay Programs.

SELF STUDY: Ethics in Decision Making

UNIT III UNDERSTANDING WORK TEAMS

(12 Hours)

Teams Vs Groups – Types of Teams, Creating Effective Teams – Turning Individuals into Team Players. **Communication:** Functions of Communication, Communication Process – Direction of communication, Interpersonal and Organizational communication, Barriers of effective communication, Current issues in Communication.

SELF STUDY: Communication Process

UNIT IV LEADERSHIP & ORGANIZATIONAL STRUCTURE

(12 Hours)

Leadership – Meaning, Trait Theories – Behavioural Theories, Contingency Theories, Contemporary issues in Leadership, The foundation of leadership. Inspirational approach – Emotional intelligence. Foundations of Organization structure, Meaning of Organizational structure – Common organizational Designs, New Design Options – Organizational Designs and Employee Behaviour

SELF STUDY: Contemporary issues in Leadership

UNIT V

(12 Hours)

ORGANIZATIONAL CULTURE, CHANGE & STRESS MANAGEMENT

Organizational culture: Meaning – Creating and sustaining culture, How employees learn culture, creating an ethical organizational culture, creating a



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customer responsive culture, spirituality and organizational culture. Organizational change and Stress Management: Approaches to Managing organizational change, Creating a Culture, Change in Business, Work stress and its Management.

SELF STUDY: Work stress

REFERENCES :

1. Stephen P. Robbins, "Organisational Behaviour", 11th Edition, Pearson Education, 2009.
2. Uma Sekaran, "Organisational Behaviour", 2nd Edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2010.
3. 2. Sharma, R.A, "Organisational Theory and Behaviour", 2nd Edition, Tata McGraw-Hill Ltd., New Delhi, 2007.

WEB REFERENCES:

1. https://www.tutorialspoint.com/organizational_behavior/index.htm
2. <https://www.geektonight.com/organizational-behavior-tutorial/>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -Introduction				
1.1	Introduction to (OB)Organizational Behaviour	1	Lecture	Black Board
1.2	Contributing disciplines to OB Field	1	Lecture	White board
1.3	Challenges and opportunities for OB	1	Lecture	Black Board
1.4	Developing an OB Model	2	Lecture	Black Board
1.5	Foundation of Individual Behaviour	2	Chalk & Talk	Black Board
1.6	Ability - Learning. Values, Attitudes and Types of Attitudes.	3	Chalk & Talk	Black Board
1.7	Measuring Job satisfaction	1	Chalk & Talk	Black Board
1.8	Effect of Job satisfaction on employee performance	1	Chalk & Talk	Black Board
UNIT 2 - Personality and Values				
2.1	Personality – Personality determinants	2	Lecture	Black Board
2.2	Achieving personality fit	1	Chalk & Talk	Black Board
2.3	Factors Influencing perception	1	Chalk & Talk	Black Board
2.4	Attribution Theory	2	Chalk & Talk	Black Board
2.5	Ethics in Decision Making. Motivation	1	Lecture	Black Board



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2.6	Management by Objectives	1	Lecture	Black Board
2.7	Employee Recognition programs	3	Chalk & Talk	Black Board
2.8	Variable Pay Programs	1	Chalk & Talk	Black Board
UNIT 3 - Understanding work teams				
3.1	Teams Vs Groups – Types of Teams	1	Lecture	White board
3.2	Creating Effective Teams – Turning Individuals into Team	1	Chalk & Talk	Black Board
3.3	Functions of Communication	1	Chalk & Talk	Black Board
3.4	Communication Process – Direction of communication	1	Chalk & Talk	Black Board
3.5	Interpersonal and Organizational communication	4	Chalk & Talk	Black Board
3.6	Barriers of effective communication	1	Chalk & Talk	Black Board
3.7	Current issues in Communication	3	Chalk & Talk	Black Board
UNIT 4 - Leadership & Organizational structure				
4.1	Leadership – Meaning	1	Lecture	White Board
4.2	Trait Theories – Behavioural Theories	2	Chalk & Talk	Black Board
4.3	Contingency Theories	2	Chalk & Talk	Black Board
4.4	Contemporary issues in Leadership	1	Chalk & Talk	Black Board
4.5	The foundation of leadership	1	Chalk & Talk	Black Board
4.6	Inspirational approach – Emotional intelligence, Foundations of Organization structure	2	Chalk & Talk	Black Board
4.7	Meaning of Organizational	1	Lecture	White Board



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	structure – Common organizational Designs			
4.8	New Design Options – Organizational Designs and Employee Behaviour.	2	Chalk & Talk	Black Board
UNIT -5 Organizational culture, change & Stress Management				
5.1	Organizational culture: Meaning – Creating and sustaining culture	1	Lecture	PPT
5.2	How employees learn culture	1	Chalk & Talk	Black Board
5.3	creating an ethical organizational culture	1	Chalk & Talk	Black Board
5.4	creating a customer responsive culture	2	Chalk & Talk	Black Board
5.5	spirituality and organizational culture	2	Chalk & Talk	Black Board
5.6	Organizational change and Stress Management	1		
5.7	Approaches to Managing organizational change	1	Chalk & Talk	Black Board
5.8	Creating a Culture	1	Lecture	PPT
5.9	Change in Business	1	Lecture	PPT
5.10	Work stress and its Management	1	Chalk & Talk	Black Board



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	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- **CIA Components**

				Nos		
C1	-	Test (CIA 1)	2*	-	10	Mks
C2	-	Test (CIA 2)	1	-	15	Mks
C3	-	Assignment / Open Book Test	2	-	10	Mks
C4	-	Seminar	1	-	10	Mks
C5	-	Attendance	1	-	5	Mks

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Develop an Organisational Behaviour model for any type of Organization	K2, K4	PSO1 & PSO2
CO 2	Understand the Ethics in Decision Making	K2, K3, K4	PSO2 & PSO4
CO 3	Develop and improve the quality of Leadership	K2 , K4	PSO1 & PSO3
CO 4	Evaluate the Common biases and eradication in Decision Making Process	K2, K3,K4 & K5	PSO3 & PSO4
CO 5	Understand how to manage the Stress during a job	K2,K3,K4 & K5	PSO2 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	1	1
CO2	1	3	1	2	1
CO3	2	1	3	1	1
CO4	1	1	2	3	1
CO5	1	2	1	1	3

Note: ♦ Strongly Correlated – 3 ♦ Moderately Correlated – 2
♦ Weakly Correlated -1

Mapping of COs with POs

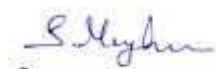
CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	2	2	3	3	1	1	3	1	2
CO2	1	2	2	2	3	2	2	3	1	2	3	2
CO3	1	3	1	2	2	3	3	1	3	3	2	3
CO4	2	2	3	3	1	1	2	1	2	2	2	2
CO5	1	2	3	1	1	3	2	2	2	2	1	2

COURSE DESIGNER:

Staff Name – S. Jebapriya

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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ENTREPRENEURSHIP-100%

GENERAL ELECTIVE – MCA

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCAGE04	E-COMMERCE	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides information on the combination of Internet with E-Commerce, options available for doing business on the Internet, features that helps to build E-Commerce web sites, marketing issues, payment options, security issues and customer service.

COURSE OBJECTIVE

- ❖ To illustrate the management's role and identify strategies involved in an e-commerce model.
- ❖ To provide a fundamental understanding of the different types and key components on business models.
- ❖ To become familiar with state of the art Electronic Model, Payment and Supply Chain Mechanisms..

UNIT – I INTRODUCTION TO ELECTRONIC COMMERCE (12 Hours)

Introduction to electronic commerce - What is electronic commerce?, Benefits of electronic commerce, Impact of electronic commerce, Classification of electronic commerce, Application of electronic commerce technologies.



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SELF STUDY :Benefits of Electronic Commerce

UNIT II ELECTRONIC COMMERCE: BUSINESS MODELS (12 Hours)

What is business models?, Native content based models -Information content model, Information exchange model, Transplanted content model - Subscription model, Advertising model, Affiliate model, Native transaction models - Digital products merchant model, Web hosting and internet services, Metamediary , Transplanted transaction models - Electronic store model, Brokerage model.

SELF STUDY :Electronic store model

UNIT III (12 Hours)

ELECTRONIC COMMERCE: NETWORK INFRASTRUCTURE

Local area network, Topologies, Transmission media, Wireless transmission, Wide area network, Internet, TCP/IP reference model.

SELF STUDY :Local area network

UNIT IV ELECTRONIC PAYMENT SYSTEMS (12Hours)

Online payment systems, Pre-paid electronic payment systems - Ecash, Mondex, Milicent, Netbill, Post-paid electronic systems - Ikp, Cybercash, SET, Netcheque, First Virtual.

SELF STUDY :Milicent

UNITV SECURING NETWORK TRANSACTION (12 Hours)

Transaction security, security services, Cryptology - Introduction to cryptography, Cryptanalysis, Conventional Encryption Model, Public key Cryptosystems, Comparison of conventional and public key encryption systems, Digital signatures, Electronic mail security.

SELF STUDY :Electronic mail security



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REFERENCES:

1. Bharat Bhaskar, "Electronic Commerce – Framework Technologies and Applications", Tata McGraw Hill 4th Edition, 2013.
2. P.T. Joseph, "Ecommerce An Indian Perspective", 6th Edition, PHI Learning Pvt. Ltd, 2019.
3. Saimunur Rahman, Introduction to E-Commerce Technology in Business, GRIN Publishing 2014.
4. Amir Manzoor, Ecommerce An Introduction, Lambert Academic Publishing, 2010.

WEB REFERENCES:

1. <https://en.wikipedia.org/wiki/E-commerce>
2. <https://www.shopify.com/encyclopedia/what-is-ecommerce>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 INTRODUCTION TO ELECTRONIC COMMERCE				
1.1	Introduction to electronic commerce	2	Chalk & Talk	Black Board
1.2	What is electronic commerce?	2	Chalk & Talk	Black Board
1.3	Benefits of electronic commerce	2	Lecture	White board
1.4	Impact of electronic commerce	2	Chalk & Talk	Black Board
1.5	Classification of electronic commerce	2	Discussion	Black Board
1.6	Application of electronic commerce technologies	2	Lecture	White board
UNIT - 2 Electronic Commerce: Business Models				
2.1	What is business models?	1	Lecture	PPT
2.2	Native content based models	1	Chalk & Talk	Black Board
2.3	Information content model	1	Lecture	PPT
2.4	Information exchange model	1	Lecture	White board
2.5	Transplanted content model	1	Discussion	Black Board
2.6	Subscription model, Advertising model	1	Chalk & Talk	Black Board
2.7	Affiliate model, Native transaction	2	Chalk & Talk	Black Board



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	models			
2.8	Digital products merchant model, Web hosting and internet services	2	Lecture	PPT
2.9	Metamediary , Transplanted transaction models	1	Discussion	Black Board
2.10	Electronic store model, Brokerage model	1	Chalk & Talk	Black Board
UNIT – 3 ELECTRONIC COMMERCE: NETWORK INFRASTRUCTURE				
3.1	Local area network	1	Lecture	White board
3.2	Topologies	1	Chalk & Talk	Black Board
3.3	Transmission media	2	Lecture	PPT
3.4	Wireless transmission	2	Lecture	White board
3.5	Wide area network	2	Discussion	Black Board
3.6	Internet	2	Lecture	PPT
3.7	TCP/IP reference model	2	Chalk & Talk	Black Board
UNIT - 4 ELECTRONIC PAYMENT SYSTEMS				
4.1	Online payment systems	1	Lecture	PPT
4.2	Pre-paid electronic payment systems	2	Lecture	PPT
4.3	Ecash	1	Chalk & Talk	Black Board
4.4	Mondex	1	Chalk & Talk	Black Board
4.5	Milicent	1	Discussion	Black Board
4.6	Netbill	1	Lecture	PPT
4.7	Post-paid electronic systems - Ikp	1	Chalk & Talk	Black Board
4.8	Cybercash	1	Lecture	PPT



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4.9	SET	1	Lecture	PPT
4.10	Netchegue	1	Chalk & Talk	Black Board
4.11	First Virtual	1	Chalk & Talk	Black Board
UNIT – 5 SECURING NETWORK TRANSACTION				
5.1	Transaction security	1	Chalk & Talk	Black Board
5.2	security services	1	Lecture	PPT
5.3	Cryptology	1	Lecture	PPT
5.4	Introduction to cryptography	1	Lecture	White board
5.5	Cryptanalysis	1	Lecture	White board
5.6	Conventional Encryption Model	1	Lecture	White board
5.7	Public key Cryptosystems	1	Lecture	White board
5.8	Comparison of conventional and public key encryption systems	2	Chalk & Talk	Black Board
5.9	Digital signatures	2	Chalk & Talk	Black Board
5.10	Electronic mail security	1	Discussion	Black Board



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- **CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Gain a comprehensive understanding of the E-Commerce landscape, current and emerging technology and infrastructure underpinnings of the business.	K2, K4	PSO1 & PSO2
CO 2	Analyze the impact of E-commerce on business models and strategy.	K2, K3, K4	PSO3 & PSO4
CO 3	Develop an understanding on how internet can help business grow/ Describe the infrastructure for E-commerce	K2 , K4	PSO1 & PSO3
CO 4	Assess electronic payment systems	K2, K3,K4 & K5	PSO4
CO 5	Gain an understanding on the importance of security, privacy, and ethical issues as they relate to E-Commerce.	K2,K3,K4 & K5	PSO1 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	1	1
CO2	1	1	3	2	1
CO3	2	1	3	1	1
CO4	1	1	1	3	1
CO5	3	1	1	1	2

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	2	2	3	3	1	1	3	1	2
CO2	3	2	2	2	3	2	2	3	1	2	3	2
CO3	1	3	2	1	2	3	3	1	3	3	2	3
CO4	2	2	3	3	1	1	3	2	1	2	2	2
CO5	1	2	3	1	1	3	2	2	2	2	1	2

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

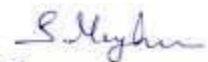
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – P. Nancy Vincentina Mary

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

GENERALECTIVE-MCA

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCAGE05	ETHICS IN COMPUTING	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides the basis for ethical decision-making and the methodology for reaching ethical decisions concerning computing matters.

COURSE OBJECTIVE

- ❖ To construct defensible arguments from an ethical point of view concerning the issue of computer hacking.
- ❖ To have an overview knowledge of protective measures against computer crime.
- ❖ To comprehend relevant legislation and international initiatives for equal rights.
- ❖ To compare knowledge of different existing ethics frameworks and professional ethics standards for computer professionals.

UNIT – I INTRODUCTION

(12 Hours)



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Computer Ethics- an overview- Identifying an ethical issue – Ethics and the law – Ethical theories – Professional Codes of conduct – An ethical dilemma – Framework for ethical decision making - Computer Hacking- Introduction – Definitions – Destructive Programs – Hacker Ethics – Legal constraints – Professional Constraints – Ethical positions on hacking – Ethical Dilemma.

SELF STUDY :Activities: Ethics and the law - Arguments against hacking

UNITII INTERNET CRIME AND IPR

(12 Hours)

Aspects of Internet Crime - Introduction – What is Computer Crime – computer Security Measures – The Computer misuse Act – Professional duties and obligations - Intellectual property rights - Introduction - The nature of intellectual property - Intellectual property legislation - The extent and nature of software piracy - Ethical and professional issues - Free software and open source code - An ethical dilemma.

SELF STUDY :Researching a computer crime case

UNITIII INTERNET TECHNOLOGIES AND PRIVACY

(12 Hours)

Regulating Internet content - Introduction - In defence of freedom of expression - Censorship - Laws upholding free speech - Free speech and the Internet - Ethical and professional issues - An ethical dilemma - Personal privacy and computer technologies Introduction - Valuing privacy – Internet technologies and privacy - Privacy legislation - The Data Protection Act, 1998 -Professional and ethical issues - An ethical dilemma

SELF STUDY :Internet Technologies and free expression



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UNIT IV EMPOWERING COMPUTERS IN THE WORKPLACE (12 Hours)

Computer technologies: accessibility issues - Introduction - Principle of equal access - Obstacles to access for individuals - Legislation - Enabling the disabled - Professional responsibility - An ethical dilemma - Empowering computers in the workplace - Introduction - Computers and employment - Computers and the quality of work - Computerised monitoring in the workplace - Telecommuting.

SELF STUDY : Obstacles to equal access – Monitoring illegal activities

UNIT V TOWARDS THE FUTURE (12 Hours)

The failure of IT projects - Introduction - The problems of producing successful IT projects - How the profession is addressing the problem of IT failure - The relationship between professional codes of conduct and IT projects - An overview of national legislation - Towards the future: some ethical and social questions - Introduction - The database society - Restricting choice: digital rights management - Review of the ethical dilemmas - The pace of change.

SELF STUDY : Inferring personal information.

REFERENCES

1. Penny Duquenoy, Simon Jones, Barry G Blundell , “Ethical, Legal and Professional Issues in Computing”, Middlesex University Press, 2008
2. George Reynolds, “Ethics in Information Technology”, 2nd Edition, Thomson Course Technology.
3. Charles P .Pfleeger, Shari Lawrence Pfleeger, “Security in Computing”, 4th Edition, Pearson Prentice Hall.



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WEB REFERENCES:

1. http://www.infosectoday.com/Articles/Intro_Computer_Ethics.htm
2. http://www.tutorialspoint.com/professional_ethics/



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT - 1 INTRODUCTION				
1.1	Introduction to Computer Ethics	2	Chalk & Talk	Black Board
1.2	Ethics and the law	2	Chalk & Talk	Black Board
1.3	Ethical theories	2	Lecture	PPT
1.4	Framework for ethical decision making	1	Chalk & Talk	Black Board
1.5	Computer Hacking	1	Discussion	Black Board
1.6	Destructive Programs	1	Lecture	White board
1.7	Hacker Ethics	1	Lecture	PPT
1.8	Ethical positions on hacking	2	Lecture	White board
UNIT - 2 INTERNET CRIME AND IPR				
2.1	What is Computer Crime	1	Lecture	PPT
2.2	Computer Security Measures	1	Chalk & Talk	Black Board
2.3	The Computer misuse Act	2	Lecture	PPT
2.4	Professional duties and obligations	2	Lecture	White board



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2.5	Nature of intellectual property	1	Discussion	Black Board
2.6	Intellectual property legislation	1	Chalk & Talk	Black Board
2.7	The extent and nature of software piracy	1	Chalk & Talk	Black Board
2.8	Ethical and professional issues	1	Lecture	White board
2.9	Free software and open source code	2	Discussion	Black Board
UNIT – 3 INTERNET TECHNOLOGIES AND PRIVACY				
3.1	Regulating Internet content	1	Lecture	White board
3.2	Defence of freedom of expression	2	Chalk & Talk	Black Board
3.3	Censorship & Laws upholding free speech	2	Lecture	PPT
3.4	Free speech and the Internet	2	Lecture	White board
3.5	Internet technologies and privacy legislation	2	Lecture	PPT
3.6	The Data Protection Act	2	Discussion	Google classroom
3.7	Professional and ethical issues	1	Chalk & Talk	Black Board
UNIT - 4 EMPOWERING COMPUTERS IN THE WORKPLACE				
4.1	Accessibility Issues In Computer Technologies	2	Lecture	PPT
4.2	Principle of equal access	1	Lecture	PPT
4.3	Obstacles to access for individuals	2	Chalk & Talk	Black Board
4.4	Enabling the disabled	1	Chalk & Talk	Black Board



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4.5	Professional responsibility	1	Discussion	Black Board
4.6	Computers and employment	1	Lecture	PPT
4.7	Computers and the quality of work	1	Chalk & Talk	Black Board
4.8	Computerised monitoring in the workplace	2	Discussion	Google classroom
4.9	Telecommuting	1	Discussion	Google classroom
UNIT – 5 TOWARDS THE FUTURE				
5.1	The failure of IT projects	2	Chalk & Talk	Black Board
5.2	The problems of producing successful IT Projects	2	Lecture	PPT
5.3	Addressing the problem of IT failure	2	Lecture	PPT
5.4	Relationship between professional codes of conduct and IT projects	1	Lecture	White board
5.5	Overview of national legislation	1	Lecture	White board
5.6	Ethical and social questions towards the Future	1	Lecture	White board
5.7	Advanced Hacking	1	Lecture	White board
5.8	The database society	2	Discussion	Black Board



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- **CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Predict the relationship between the law, ethics and computer technology	K2, K4	PSO1 & PSO3
CO 2	Outline the philosophical and ethical debates with the ideas and the nature of intellectual creativity.	K2, K3, K4	PSO2 & PSO4
CO 3	Design the impact of computer technology on free speech.	K2 , K4	PSO1 & PSO3
CO 4	Formulate the ethical and legal issues of the impact that computing technologies had on workplace.	K2, K3,K4 & K5	PSO3 & PSO4
CO 5	Develop a personal standpoint in relation to DataBase society and the usage of biometric data	K2,K3,K4 & K5	PSO2 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	2	1	1
CO2	1	3	1	2	1
CO3	2	1	3	1	1
CO4	1	1	2	3	1
CO5	1	2	1	1	3

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	1	1	2	2	3	2	3	2	3
CO2	3	2	1	2	1	2	3	2	2	1	1	1
CO3	3	2	3	3	2	1	1	1	2	3	2	2
CO4	2	1	2	2	1	1	2	3	2	3	2	3
CO5	1	1	3	2	2	3	3	2	2	1	2	1

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

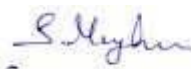
♦ Weakly Correlated -1

COURSE DESIGNER:

Forwarded By

Staff Name – S. JEBAPRIYA

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

GENERAL ELECTIVE – MCA

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCAGE06	RESOURCE MANAGEMENT TECHNIQUES	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides solution to problems in different environment that needs decision making using optimization techniques

COURSE OBJECTIVE

- ❖ To provide the concept and an understanding of basic concepts in Operations Research Techniques for Analysis and Modeling in Computer Applications.
- ❖ To understand, develop and solve mathematical model of linear programming problems.
- ❖ To understand, develop and solve mathematical model of Transport and assignment problems.
- ❖ To understand network modeling for planning and scheduling the project activities



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UNIT I INTRODUCTION

(12 Hours)

Operations Research – An Introduction- Features- Definition- Scientific Method- Models- Methods for solving OR Models- Methodology of OR- Advantages- Applications and Scope- LPP Model formulation – LPP Graphical Solution.

SELF STUDY: Advantages- Applications and Scope

UNIT II LINEAR PROGRAMMING PROBLEM

(12 Hours)

LPP - Standard form – Definition- Reduction of Feasible solution to a basic feasible solution- Simplex algorithm (Maximization Case) - Simplex algorithm (Minimization Case).

SELF STUDY: Reduction of Feasible solution to a basic feasible solution

UNIT III TRANSPORTATION & ASSIGNMENT PROBLEM

(12 Hours)

Transportation Problem – Initial Basic Feasible solution – North West Corner Method- Least Cost method- Vogel's Approximation Method- MODI Method- Unbalanced Transportation Problem. Assignment Problem – Hungarian Assignment Method

SELF STUDY: Unbalanced Transportation Problem

UNIT IV GAME THEORY

(12 Hours)

Game Theory- Two persons zero sum game- Games with saddle point- Games without saddle point- Graphical Method- LP Method- The rule of dominance

SELF STUDY: LP Method



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UNIT VPERT & CPM

(12 Hours)

Project Management: PERT and CPM – Difference between PERT and CPM- Critical Path analysis- Problems in PERT analysis- Project , Time, Cost Trade off- Resource allocation.

SELF STUDY: Difference between PERT and CPM

REFERENCES :

1. J.K. Sharma , “Operations Research- Problems and Solutions”,Macmillan Publishers India Ltd,3 rd Edition, 2009.
2. KantiSwarup ,P.K.Gupta, Manmohan ,“Operations Research”, 13 th Edition, 2008.
3. S. Kalavathy ,“Operations Research”,Vikas publishing house private Ltd, 4th Edition,2013.
4. R. Paneerselvam, “Operations Research”, PHI learning Pvt Ltd, 2nd Edition, 2012.

WEB REFERENCES:

1. <https://lecturenotes.in/subject/573/operations-research-or>
2. <http://www.cs.toronto.edu/~stacho/public/IEOR4004-notes1.pdf>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
Unit -1 INTRODUCTION				
1.1	Operations Research – An Introduction	1	Lecture	Black Board
1.2	Features- Definition- Scientific Method-	1	Lecture	White board
1.3	Models- Methods for solving OR Models	1	Lecture	Black Board
1.4	Methodology of OR- Advantages- Applications and Scope	1	Lecture	Black Board
1.5	LPP Model formulation	4	Chalk & Talk	Black Board
1.6	LPP Graphical Solution.	4	Chalk & Talk	Black Board
UNIT 2 - LINEAR PROGRAMMING PROBLEM				
2.1	LPP - Standard form	2	Lecture	Black Board
2.2	Definition- Reduction of Feasible solution to a basic feasible solution	2	Chalk & Talk	Black Board
2.3	Simplex algorithm (Maximization Case)	4	Chalk & Talk	Black Board
2.4	Simplex algorithm (Minimization Case).	4	Chalk & Talk	Black Board
UNIT 3 – TRANSPORTATION & ASSIGNMENT PROBLEM				
3.1	Transportation Problem	1	Lecture	White board
3.2	Initial Basic Feasible solution –	1	Chalk & Talk	Black Board



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	North West Corner Method			
3.3	Least Cost method	1	Chalk & Talk	Black Board
3.4	Vogel's Approximation Method	1	Chalk & Talk	Black Board
3.5	MODI Method	4	Chalk & Talk	Black Board
3.6	Unbalanced Transportation Problem	1	Chalk & Talk	Black Board
3.7	Hungarian Assignment Method	3	Chalk & Talk	Black Board
UNIT 4 - GAME THEORY				
4.1	Game Theory- Two persons zero sum game	1	Lecture	White Board
4.2	Games with saddle point	2	Chalk & Talk	Black Board
4.3	Games without saddle point	2	Chalk & Talk	Black Board
4.4	Graphical Method	2	Chalk & Talk	Black Board
4.5	LP Method	3	Chalk & Talk	Black Board
4.6	The rule of dominance	2	Chalk & Talk	Black Board
UNIT 5 - PERT & CPM				
5.1	Project Management: PERT and CPM	1	Lecture	PPT
5.2	Difference between PERT and CPM	1	Chalk & Talk	Black Board
5.3	Critical Path analysis-	2	Chalk & Talk	Black Board
5.4	Problems in PERT analysis-	3	Chalk & Talk	Black Board
5.5	Project , Time, Cost Trade off	3	Chalk & Talk	Black Board
5.6	Resource allocation	2	Chalk & Talk	Black Board



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K1	-	-	-	-	-		-	-
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K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
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K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
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- **CIA Components**

				Nos			
C1	–	Test (CIA 1)		2*	–	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Identify the applications of Operations Research and methods to solve business problems	K2, K4	PSO1 & PSO2
CO 2	Apply linear programming to solve operational problem with constraints	K2, K3, K4	PSO1, PSO2 & PSO4
CO 3	Apply transportation and assignment models to find optimal solution in warehousing and Travelling,	K2, K4	PSO2 & PSO4
CO 4	Prepare project scheduling using PERT and CPM	K2, K3, K4 & K5	PSO1, PSO2 & PSO3
CO 5	Use optimization concepts in real world problems	K2, K3, K4 & K5	PSO1, PSO2 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	1	1
CO2	2	3	1	3	1
CO3	1	2	1	3	1
CO4	2	3	1	3	1
CO5	2	2	1	1	3

Note: ♦ Strongly Correlated – 3 ♦ Moderately Correlated – 2
♦ Weakly Correlated -1

Mapping COs with Pos

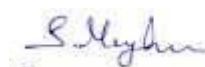
CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	3	1	1	1	1	1	1	2	1	1	1
CO2	1	1	1	3	1	1	2	1	1	1	1	1
CO3	1	1	3	1	1	1	1	2	1	1	1	1
CO4	1	3	1	1	1	1	1	1	1	2	1	1
CO5	3	1	1	1	2	1	1	1	1	1	1	1

COURSE DESIGNER:

Staff Name – B. USHA

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HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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ENTREPRENEURSHIP-100%

GENERAL ELECTIVE – MCA

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCAGE07	ENTREPRENEURSHIP DEVELOPMENT	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides the skills necessary to succeed as an entrepreneur. It includes the fundamentals of starting and operating a business, developing a business plan, obtaining financing, marketing a product or service and developing an effective accounting system

COURSE OBJECTIVE

- ❖ Understand the need of entrepreneurial discipline.
- ❖ To let the entrepreneur set or reset the objectives of his business and work individually and along with his group.
- ❖ Analyze the environment set up relating to small industry and business.

UNIT – I ENTREPRENEUR

(12 Hours)

Introduction – Evolution of the Concept of Entrepreneur – Characteristics of Successful Entrepreneurs – The Charms of Becoming an Entrepreneur – The Entrepreneurial Decision Process – Functions of Entrepreneur – Need for an



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Entrepreneur- Types of Entrepreneurs- Distinction between an Entrepreneur and a manager –Entrepreneur – Social Entrepreneur.

SELF STUDY :Social Entrepreneur

UNIT II ENTREPRENEURIAL COMPETENCIES

(12 Hours)

Meaning of Entrepreneurial Competency – Major Entrepreneurial Competencies – Developing Entrepreneurial Competencies - Factors Affecting Entrepreneurship Growth: Factors Affecting Entrepreneurship- Economic Factors – Non- economic Factors – Government Actions.

SELF STUDY :Government Actions.

UNIT III WOMEN ENTREPRENEURSHIP

(12 Hours)

Concept of Women Entrepreneur – Functions of Women Entrepreneurs – Growth of Women Entrepreneurship in India – Problems of Women Entrepreneurs – Developing Women Entrepreneurship.

SELF STUDY :Problems of Women Entrepreneurs

UNIT IV EDPs, INSTITUTIONAL FINANCE TO ENTREPRENEURS(12 Hours)

Meaning of EDP – Need for EDPs – Objectives of EDPs – Entrepreneurship Development Programmes (EDPs) in India: A Historical Perspective – Course Contents and Curriculum of EDPs – Phases of EDP- Evaluation of EDPs – Problems of EDPs - Need for Institutional Finance – Institutional Finance- Commercial Banks – Other Financial Institutions.

SELF STUDY :Other Financial Institutions

UNIT V

(12 Hours)

PROJECT APPRAISAL ,FORMULATION OF BUSINESS PLANS

Concept of Project Appraisal – Methods of Project Appraisal – Economic Analysis – Financial Analysis – Market Analysis – Technical Feasibility – Managerial



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Competence – Environmental Clearance for SMEs – Environmental Restrictions for SSI Sector – The Environmental clearance Process - Meaning of Business Plan- Contents of Business Plan – Significance of Business Plan – Formulation of Business Plan – Planning Commission’s Guidelines for Formulating Project Report – Network Analysis – Business Plan Formulation.

SELF STUDY : The Environmental clearance Process

REFERENCES:

1. S S Khanka , “Entrepreneurial Development”, S. Chand Publishing Revised edition ,2020
2. S Anil Kumar, “Entrepreneurship Development” new age international publishers edition, 2003
3. Janakiram B, “Entrepreneurship Development: Text and Cases” Excel Books India, 2011

WEB REFERENCES:

1. https://www.tutorialspoint.com/entrepreneurship_development/entrepreneurship_development_tutorial.pdf
2. https://www.macmillanihe.com/resources/sample-chapters/9781137430359_sample.pdf



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT - 1 ENTREPRENEUR				
1.1	Introduction , Evolution of the Concept of Entrepreneur	1	Chalk & Talk	Black Board
1.2	Characteristics of Successful Entrepreneurs	2	Chalk & Talk	Black Board
1.3	The Charms of Becoming an Entrepreneur	1	Lecture	White board
1.4	The Entrepreneurial Decision Process , Functions of Entrepreneur	1	Chalk & Talk	Black Board
1.5	Need for an Entrepreneur	2	Discussion	Black Board
1.6	Types of Entrepreneurs	2	Lecture	White board
1.7	Distinction between an Entrepreneur and a manager	1	Lecture	White board
1.8	Entrepreneur , Social Entrepreneur	2	Discussion	Google classroom
UNIT - 2 ENTREPRENEURIAL COMPETENCIES				
2.1	Meaning of Entrepreneurial Competency	2	Lecture	PPT
2.2	Major Entrepreneurial Competencies	2	Chalk & Talk	Black Board



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2.3	Developing Entrepreneurial Competencies	2	Lecture	PPT
2.4	Factors Affecting Entrepreneurship Growth, Factors Affecting Entrepreneurship	2	Lecture	White board
2.5	Economic Factors	2	Discussion	Black Board
2.6	Non- economic Factors	1	Chalk & Talk	Black Board
2.7	Government Actions	1	Chalk & Talk	Black Board
UNIT – 3 WOMEN ENTREPRENEURSHIP				
3.1	Concept of Women Entrepreneur	2	Lecture	White board
3.2	Functions of Women Entrepreneurs	2	Chalk & Talk	Black Board
3.3	Growth of Women Entrepreneurship in India	3	Lecture	PPT
3.4	Problems of Women Entrepreneurs	3	Lecture	White board
3.5	Developing Women Entrepreneurship	2	Discussion	Black Board
UNIT - 4 EDPs, INSTITUTIONAL FINANCE TO ENTREPRENEURS				
4.1	Meaning of EDP , Need for EDPs	2	Lecture	PPT
4.2	Objectives of EDPs	2	Lecture	PPT
4.3	Entrepreneurship Development Programmes (EDPs) in India: A Historical Perspective	2	Chalk & Talk	Black Board



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4.4	Course Contents and Curriculum of EDPs , Phases of EDP	3	Chalk & Talk	Black Board
4.5	Evaluation of EDPs , Problems of EDPs	1	Discussion	Black Board
4.6	Need for Institutional Finance , Institutional Finance	1	Lecture	PPT
4.7	Commercial Banks , Other Financial Institutions	1	Chalk & Talk	Black Board
UNIT – 5 PROJECT APPRAISAL , FORMULATION OF BUSINESS PLANS				
5.1	Concept of Project Appraisal , Methods of Project Appraisal	1	Chalk & Talk	Black Board
5.2	Economic Analysis , Financial Analysis	1	Lecture	PPT
5.3	Market Analysis , Technical Feasibility	1	Lecture	PPT
5.4	Managerial Competence , Environmental Clearance for SMEs	1	Lecture	White board
5.5	Environmental Restrictions for SSI Sector	1	Lecture	White board
5.6	The Environmental clearance Process	1	Lecture	White board
5.7	Meaning of Business Plan, Contents of Business Plan	1	Lecture	White board
5.8	Significance of Business Plan	1	Chalk & Talk	Black Board
5.9	Formulation of Business Plan	1	Chalk & Talk	Black Board
5.10	Planning Commission's Guidelines for Formulating Project Report	1	Discussion	Black Board
5.11	Network Analysis	1	Chalk & Talk	Black Board
5.12	Business Plan Formulation	1	Discussion	Black Board



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- **CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Highlight the salient characteristics of successful entrepreneur	K2, K4	PSO1& PSO2
CO 2	Enumerate the competencies relevant for Entrepreneurial development.	K2, K3, K4	PSO2 & PS03
CO 3	Delineate the growth of women Entrepreneurship in India.	K2 , K4	PSO1 & PS04
CO 4	Identify the major problems faced in conducting EDPs.	K2, K3,K4 & K5	PS03 & PS05
CO 5	Discuss the methods of project appraisal used for small scale enterprises.	K2,K3,K4 & K5	PS04 &PS05



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	1	1
CO2	1	3	2	1	1
CO3	2	1	1	3	1
CO4	1	1	3	1	2
CO5	1	1	1	2	3

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

♦ Weakly Correlated -1

Mapping of COs with POs

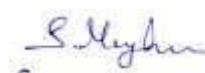
CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	3	1	1	1	1	1	2	1	1	1
CO2	1	2	1	1	3	1	1	1	1	1	1	1
CO3	1	3	1	1	1	2	1	1	1	1	1	1
CO4	1	1	1	2	1	1	3	1	1	1	1	1
CO5	3	1	1	1	1	1	1	1	1	2	1	1

COURSE DESIGNER:

Staff Name – R. SMEETA MARY

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HOD'S Signature & Name


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SKILL DEVELOPMENT-100%

GENERAL ELECTIVE – MCA

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCAGE08	WIRELESS SENSOR NETWORKS	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides knowledge on the architectures, functions and performances of wireless sensor systems and platforms. It also describes and analyze the specific requirements for applications in wireless sensor networks regarding energy supply, memory, processing and transmission capacity.

COURSE OBJECTIVE

- ❖ To understand the fundamental architecture of wireless and sensor networks
- ❖ To analyse the role of physical and data link layer and its protocol.
- ❖ To understand the impact of time synchronization, localization and positioning in WSN.
- ❖ To learn the rules of routing protocols in WSN.



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UNIT I

(12 Hours)

INTRODUCTION - Challenges for Wireless Sensor Networks – Mobile ad hoc networks and wireless Sensor Networks – field buses and Wireless Sensor Networks – enabling Technologies for wireless sensor networks.

ARCHITECTURES – Single Node Architecture - Hardware Components – Energy Consumption of sensor nodes – Operating systems and execution environments - Examples of sensor nodes

NETWORK ARCHITECTURE – Sensor network scenarios – Optimization Goals and figures of merit – Design principles of WSN

SELF STUDY: Enabling Technologies for wireless sensor networks, Examples of sensor nodes

UNIT II

(12 Hours)

MAC PROTOCOLS – fundamentals of MAC protocols - Low duty cycle protocols and wakeup concepts- contention based protocols – schedule based protocols – the IEEE 802.15.4 MAC protocol

LINK LAYER PROTOCOLS – Fundamentals - Error control - Framing – Link management

SELF STUDY: Link management

UNIT III

(12 Hours)

TIME SYNCHRONIZATION - Introduction – Protocols

LOCALIZATION AND POSITIONING – Properties of localization and positioning procedures – Mathematical basics for the lateration problem – single hop localization – Positioning in multi hop environment – Impact of anchor placement.



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TOPOLOGY CONTROL – Motivation and basic ideas – Controlling topology in flat networks – power control – Hierarchical networks by dominating sets – hierarchical networks by clustering

SELF STUDY: Properties of localization and positioning procedures

UNIT IV

(12 Hours)

ROUTING PROTOCOLS – Gossiping and agent based uni cast forwarding – energy efficient unicast – broadcast and multicast – Geographic routing – Mobile nodes – Data centric and content based networking – Introduction – Data centric routing – data aggregation – data centric storage

SELF STUDY: Geographic routing – Mobile nodes

UNIT V

(12 Hours)

TRANSPORT LAYER AND QUALITY OF SERVICE - Transport layer and QoS in wireless sensor networks – Congestion control and rate control

ADVANCED APPLICATION SUPPORT – advanced network processing – Security – Application specific support

SELF STUDY: Congestion control and rate control

REFERENCES :

1. Holger Karl & Andreas Willig, “Protocols and Architectures for Wireless Sensor Networks” , John Wiley, 2006
2. Carlos De MoraesCordeiro, Dharma Prakash Agrawal, “Ad Hoc and Sensor Networks: Theory and Applications”, 2nd Edition, World Scientific Publishing, 2011.
3. WaltenegusDargie, Christian Poellabauer, “Fundamentals of Wireless Sensor Networks Theory and Practice”, John Wiley and Sons, 2010.



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4. Feng Zhao & Leonidas J. Guibas, “Wireless Sensor Networks- An Information Processing Approach”, Elsevier, 2007.

WEB REFERENCES:

1. <https://www.elprocus.com/architecture-of-wireless-sensor-network-and-applications/>
2. https://en.wikipedia.org/wiki/wireless_sensor_network



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 Introduction & Architecture				
1.1	Introduction – Challenges, Mobile ad hoc networks and wireless Sensor Networks	2	Chalk & Talk	Black Board
1.2	Field buses and Wireless Sensor Networks – enabling Technologies for wireless sensor networks.	2	Lecture	PPT & White board
1.3	Architectures – Single Node Architecture - Hardware Components	2	Lecture	PPT & White board
1.4	Energy Consumption of sensor nodes – Operating systems and execution environments - Examples of sensor nodes	2	Lecture	PPT & White board
1.5	Network Architecture – Sensor network scenarios – Optimization	2	Lecture	PPT
1.6	Goals and figures of merit – Design principles of WSN	2	Lecture	PPT
UNIT 2 - MAC & Link Layer protocols				
2.1	MAC protocols – fundamentals of MAC protocols	2	Discussion	Black Board
2.2	Low duty cycle protocols and wakeup concepts	3	Lecture	Google classroom
2.3	contention based protocols, schedule based protocols	2	Lecture	PPT & White board



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2.4	The IEEE 802.15.4 MAC protocol	2	Lecture	Smart Board
2.5	Link Layer Protocols – Fundamentals - Error control	2	Lecture	Black Board
2.6	Framing – Link management	1	Lecture	PPT & Black board
UNIT 3 – Time Synchronization & Localization and Positioning				
3.1	Time Synchronization - Introduction – Protocols	1	Discussion	Black Board
3.2	Localization and Positioning – Properties of localization and positioning procedures	2	Lecture	PPT
3.3	Mathematical basics for the lateration problem	2	Lecture	PPT & White board
3.4	Single hop localization– Positioning in multi hop environment, Impact of anchor placement	3	Lecture	Smart Board
3.5	Topology control – Motivation and basic ideas – Controlling topology in flat networks – power control	2	Lecture	Black Board
3.6	Hierarchical networks by dominating sets – hierarchical networks by clustering	2	Lecture	PPT
UNIT 4 – Routing protocols				
4.1	Routing protocols – Gossiping and agent based uni cast forwarding	3	Lecture	PPT
4.2	Energy efficient unicast – broadcast and multicast – Geographic routing – Mobile nodes	3	Lecture	PPT



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4.3	Data centric and content based networking – Introduction – Data centric routing	3	Lecture	PPT
4.4	Data aggregation – data centric storage	3	Lecture	PPT
UNIT -5 – Transport Layer and Quality of Service				
5.1	Transport Layer and Quality of Service - Transport layer and QoS in wireless sensor networks	3	Lecture	PPT
5.2	Congestion control and rate control	3	Lecture	PPT
5.3	Advanced application support – advanced network processing –	2	Lecture	PPT
5.4	Security	2	Lecture	PPT
5.5	Application specific support	2	Lecture	PPT



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- **CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explore the impact of WSN and its hardware components.	K2, K4	PSO1 & PSO2
CO 2	Analyze the different protocols in MAC and Link layer	K2, K3, K4	PSO1 & PSO2
CO 3	Apply the concepts of localization, time synchronization and positioning in WSN	K2 , K4	PSO1 & PSO3
CO 4	Perform data routing and data aggregation	K2, K3,K4 & K5	PSO1,PSO2 & PSO4
CO 5	Design simple applications using sensor nodes incorporating security features.	K2,K3,K4 & K5	PSO1,PSO2 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	1	1
CO2	2	3	1	1	1
CO3	3	1	2	1	1
CO4	3	2	1	3	1
CO5	2	2	1	1	3

Mapping COs Consistency with PSOs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	2	2	3	3	2	1	2	1	2
CO2	1	2	3	2	3	2	2	3	1	2	1	2
CO3	1	3	1	2	2	3	3	1	3	3	2	3
CO4	2	2	3	3	1	1	2	2	2	2	2	2
CO5	1	2	3	1	1	3	2	2	2	2	1	2

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

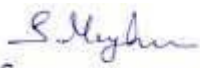
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – B. USHA

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

GENERAL ELECTIVE – MCA

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCAGE09	RESEARCH METHODOLOGY	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides an overview of various methods employed in quantitative and qualitative research.

COURSE OBJECTIVE

- ❖ Understand the basic concepts of research and its methodologies.
- ❖ Identify a research problem stated in a study.
- ❖ Prepare a conventional research report / thesis.

UNIT INTRODUCTION

(12 Hours)

An Introduction: – Meaning of research – Objective of research – Motivation in research – Types of research – Research approaches – Significance of research – Research methods versus Methodology – Research and scientific method –



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Importance of knowing how research is done – Research process – Criteria of good research – Problems encountered by researchers in India

SELF STUDY: Types of research

UNIT I DEFINING THE RESEARCH PROBLEM

(12 Hours)

Defining the research problem: What is research problem? – Selecting the problem – Necessity of defining the problem - Research Design: Meaning of research design – Need for research design – Features of a good design – Important concepts relating to research design – Different research designs – Basic principles of experimental designs.

SELF STUDY: Research problem

UNIT II MEASUREMENT AND SCALING TECHNIQUES

(12 Hours)

Measurement and scaling techniques: Measurement in research – Measurement scales – Sources of error in measurement – Tests of sound measurement – Technique of developing measurement tools – scaling – Meaning of scaling – Scale classification bases- Important scaling techniques – Scale construction techniques - Methods of Data Collection: Collection of primary data – Observation method – Interview method – Collection of data through schedules – Difference between Questionnaires and schedules – Some other methods of data collection – Collection of secondary data – Selection of appropriate method for data collection – Case study method

SELF STUDY: Case study method

UNIT III PROCESSING AND ANALYSIS OF DATA

(12 Hours)

Processing and Analysis of Data: Processing operations – Some problems in processing – Elements/Types of Analysis- Statistics in research – Measures of central tendency – Measures of dispersion – Measures of Asymmetry – Measures of



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relationship – Simple regression analysis – Multiple correlation and regression – Partial correlation – Association in case of attributes

UNIT V TESTING OF HYPOTHESES

(12 Hours)

What is a Hypothesis? – Basic concepts concerning testing of Hypotheses – Procedure for Hypothesis testing – Measuring the power of a Hypothesis testing – Tests of Hypotheses- Important parametric tests – Hypothesis testing of means – Hypothesis testing for differences between means - Interpretation and report writing: Meaning of interpretation – Why interpretation? – Technique of interpretation – Precaution in interpretation – Significance of report writing – Different steps in writing report – Layout of the research report – Types of reports – Oral Presentation – Mechanics of writing a research report – Precautions for writing research reports

SELF STUDY: Types of reports

REFERENCES :

1. Kothari, C.R (2013), “Research Methodology – Methods and Techniques”, 2ND Edition. Wiley Eastern Limited
2. R. Panneerselvam, “Research Methodology”, 4th Edition. Prentice Hall India Learning Private Limited, 2014
3. Ranjit Kumar, “Research Methodology – A step- by-step guide for beginners”, 3rd Edition. Pearson Education, 2011
4. Deepak Chawla and Neena Sondh, “Research Methodology, Concepts and Cases”, Vikas Publishing House Pvt. Ltd., 2011

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2. <https://csus.libguides.com/>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1		INTRODUCTION		
1.1	Introduction	1	Lecture	PPT
1.2	Meaning of research	1	Lecture	PPT
1.3	Objective of research	1	Lecture	PPT
1.4	Motivation in research	1	Lecture	PPT
1.5	Types of research	1	Lecture	PPT
1.6	Research approaches	1	Lecture	PPT
1.7	Significance of research	1	Lecture	PPT
1.8	Research methods versus Methodology	1	Chalk & Talk	Black Board
1.9	Importance of knowing how research is done	1	Chalk & Talk	Black Board
1.10	Research process	1	Lecture	White board
1.11	Criteria of good research	1	Chalk & Talk	Black Board



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1.12	Problems encountered by researchers in India	1	Lecture	White board
UNIT - 2 RESEARCH DESIGN				
2.1	Defining the research problem	1	Lecture	PPT
2.2	What is research problem?	2	Chalk & Talk	Black Board
2.3	Selecting the problem	2	Lecture	PPT
2.4	Necessity of defining the problem.	2	Lecture	White board
2.5	Meaning of research design, Need for research design	1	Discussion	Black Board
2.6	Features of a good design, Important concepts relating to research design	1	Chalk & Talk	Black Board
2.7	Different research designs	1	Chalk & Talk	Black Board
2.8	Basic principles of experimental designs	2	Lecture	PPT
UNIT - 3 MEASUREMENT AND SCALING TECHNIQUES				
3.1	Measurement in research – Measurement scales – Sources of error in measurement	1	Lecture	White board
3.2	Tests of sound measurement – Technique of developing	1	Chalk & Talk	Black Board



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	measurement tools			
3.3	Scaling – Meaning of scaling – Scale classification bases	1	Lecture	PPT
3.4	Important scaling techniques – Scale construction techniques	2	Lecture	White board
3.5	Methods of Data Collection: Collection of primary data – Observation method –	1	Discussion	Black Board
3.6	Interview method – Collection of data through schedules	2	Lecture	PPT
3.7	Difference between Questionnaires and schedules – Some other methods of data collection	1	Chalk & Talk	Black Board
3.8	Collection of secondary data – Selection of appropriate method for data collection	1	Chalk & Talk	Black Board
3.9	Case study method	2	Chalk & Talk	Black Board
UNIT - 4 PROCESSING AND ANALYSIS OF DATA				
4.1	Processing operations – Some problems in processing	2	Lecture	PPT
4.2	Elements/Types of Analysis- Statistics in research	2	Lecture	White board
4.3	Measures of central tendency –	2	Discussion	Black Board



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	Measures of dispersion			
4.4	Measures of Asymmetry – Measures of relationship	2	Chalk & Talk	Black Board
4.5	Simple regression analysis – Multiple correlation and regression	2	Discussion	Black Board
4.6	Partial correlation – Association in case of attributes	2	Lecture	PPT
UNIT – 5 TESTING OF HYPOTHESES				
5.1	What is a Hypothesis? – Basic concepts concerning testing of Hypotheses – Procedure for Hypothesis testing	2	Chalk & Talk	Black Board
5.2	Measuring the power of a Hypothesis testing – Tests of Hypotheses- Important parametric tests	2	Lecture	PPT
5.3	Hypothesis testing of means – Hypothesis testing for differences between means	2	Lecture	PPT
5.4	Interpretation and report writing: Meaning of interpretation – Why interpretation? – Technique of interpretation	2	Lecture	White board
5.5	Precaution in interpretation –	2	Lecture	White board



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	Significance of report writing – Different steps in writing report			
5.6	Layout of the research report – Types of reports – Oral Presentation	1	Lecture	White board
5.7	Mechanics & Precautions for writing research reports	1	Lecture	White board



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Predict the different stages of research process.	K2, K4	PSO4
CO 2	Apply methods to collect best data.	K2, K3, K4	PSO1 & PSO2
CO 3	Assess the suitable research design & work.	K2 , K4	PSO4 & PSO3
CO 4	Compare categorical and continuous measures.	K2, K3,K4 & K5	PSO3
CO 5	Analyze the process of various reports writing.	K2,K3,K4 & K5	PSO3 & PSO4



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	3	1
CO2	3	2	1	1	1
CO3	1	1	2	3	1
CO4	3	1	3	1	1
CO5	1	1	3	2	1

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	2	2	3	3	2	1	2	1	2
CO2	1	2	3	2	3	2	2	3	1	2	1	2
CO3	1	3	1	2	2	3	3	1	3	3	2	3
CO4	2	2	3	3	1	1	2	2	2	2	2	2
CO5	1	2	3	1	1	3	2	2	2	2	1	2

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

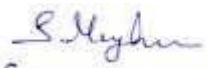
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – P.NANCY VINCENTINA MARY

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

GENERAL ELECTIVE – MCA

(For those who joined in 2020 onwards)

PROGRAMM E CODE	COURSE CODE	COURSE TITLE	CATEGOR Y	HRS/WE K	CREDITS
MCA	20MCAGE10	DIGITAL IMAGE PROCESSING	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides an introduction to the basic concepts, methodologies and algorithms of digital image processing focusing image enhancement, image analysis and object recognition.

COURSE OBJECTIVES

- ❖ To study the image fundamental principles and mathematical transforms necessary for image processing.
- ❖ To learn the image enhancement, restoration techniques used in digital image processing.
- ❖ To understand about color images and compression techniques

UNIT I

(12 Hours)

INTRODUCTION AND DIP FUNDAMENTALS

DIP Definition - Origin of DIP- Fundamental steps in DIP - Elements of Visual Perception- Image sampling and Quantization



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SELF STUDY: Some basic Relationships between pixels

UNIT II

(12 Hours)

INTENSITY TRANSFORMATION AND SPATIAL FILTERING

Background- Smoothing spatial filters- Sharpening spatial filters.

SELFSTUDY: basic intensity transformation

UNIT III

(12 Hours)

IMAGE RESTORATION AND RECONSTRUCTION

Model - Restoration in the process of noise only Spatial filtering - mean filters- Order statistic filters- Adaptive filters - Periodic noise reduction by Frequency domain filtering- Band Reject filters - Band pass filter - Notch Filter- Optimum Notch Filtering.

SELFSTUDY : Noise Models

UNIT IV

(12 Hours)

COLOR IMAGE PROCESSING

Color Fundamentals - Color Models - Pseudo color image processing- Basis of full color image processing- Color Transformations - Smoothing and Sharpening Image segmentation based on Color - Noise in color images - Color image compression.

SELF STUDY: Color components

UNIT V

(12 Hours)

IMAGE COMPRESSION

Huffmann Coding- LZW coding- Run Length coding- Digital Image Watermarking.

SELFSTUDY: Arithmetic Coding.



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1. Rafael C. Gonzalez, Richard E., "Digital Image Processing", 3rd Edition- Woods Pearson India Education Pvt. Ltd.- 2016
2. Scott Umbaugh, "Computer Vision and Image Processing- a practical approach using CVIP tools"
3. Anil K.Jain, "Fundamentals of Digital Image Processing", Person Education, 2003.

WEB REFERENCES

1. <https://imagej.net/Welcome>
2. <https://imagej.nih.gov/ij/docs/examples/index.html>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 Introduction and DIP Fundamentals				
1.1	DIP Definition - Origin of DIP	2	Chalk & Talk	Black Board
1.2	Fundamental steps in DIP	2	Chalk & Talk	LCD
1.3	Elements of Visual Perception	4	Lecture	PPT & White board
1.4	Image sampling and Quantization	2	Lecture	Smart Board
1.5	Some basic Relationships between pixels	2	Lecture	Black Board
UNIT -2 Intensity Transformation and spatial filtering				
2.1	Background	2	Chalk & Talk	Black Board
2.2	some basic intensity transformation Functions	2	Chalk & Talk	LCD
2.3	Smoothing spatial filters	4	Lecture	PPT & White board
2.4	Sharpening spatial filters	1	Lecture	Smart Board
2.8	Cell Fundamentals – Frequency Reuse	1	Discussion	Black Board
2.9	Signal to Interference Ratio	2	Lecture	Black



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	Calculation.			Board
UNIT –3 Image Restoration and Reconstruction				
3.1	Model – Noise Models	1	Chalk & Talk	Black Board
3.2	Restoration in the process of noise only Spatial filtering	1	Chalk & Talk	LCD
3.3	mean filters- Order statistic filters	4	Lecture	PPT & White board
3.4	Adaptive filters	1	Lecture	Smart Board
3.5	Periodic noise reduction by Frequency domain filtering	1	Lecture	Black Board
3.6	Band Reject filters - Band pass filter	1	Discussion	Google classroom
3.7	Notch Filter	2	Specimen	Microscope
3.8	Optimum Notch Filtering	1	Discussion	Black Board
UNIT –4 Color Image Processing				
4.1	Color Fundamentals	1	Chalk & Talk	Black Board
4.2	Color Models	1	Chalk & Talk	LCD
4.3	Pseudo color image processing	4	Lecture	PPT & White board
4.4	Basis of full color image processing	1	Lecture	Smart Board
4.5	Color Transformations	1	Lecture	Black



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				Board
4.6	Smoothing and Sharpening Image segmentation based on ColorCellular Systems	1	Discussion	Google classroom
4.7	Noise in color images	2	Specimen	Microscope
4.8	Color image compression.	1	Discussion	Black Board
UNIT -5 Image Compression				
5.1	Huffmann Coding	2	Chalk & Talk	Black Board
5.2	Arithmetic Coding	2	Chalk & Talk	LCD
5.3	LZW coding	4	Lecture	PPT & White board
5.4	Run Length coding	2	Lecture	Smart Board
5.5	Digital Image Watermarking.	2	Lecture	Black Board



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K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	To review the fundamental concepts of a digital image processing system.	K2, K4	PSO1 & PSO2
CO 2	To examine various types of images, their intensity transformations and spatial filtering.	K2, K3, K4	PSO1 & PSO3
CO 3	To analyze the different types of noises and the filters used to restore and reconstruct the images.	K2, K4	PSO3 & PSO4
CO 4	To create color images and pseudo images with smoothening and sharpening techniques.	K2, K3, K4 & K5	PSO2 & PSO4
CO 5	To compare the various lossy and lossless compression mechanisms.	K2, K3, K4 & K5	PSO1 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	1	1
CO2	3	1	2	1	1
CO3	1	1	3	2	1
CO4	1	3	1	2	1
CO5	3	1	1	1	2

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1	2	2	2	2	2	1	1	1	2
CO2	2	2	1	2	2	2	2	2	2	2	1	2
CO3	2	2	2	3	2	2	2	2	1	2	1	2
CO4	2	2	2	3	1	3	2	3	1	2	2	2
CO5	3	2	3	3	2	3	3	3	3	3	3	3

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

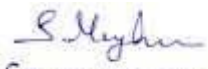
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – S. SELVARANI

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

GENERAL ELECTIVE - MCA

For those who joined in 2020 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCAGE11	CLOUD COMPUTING	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides a comprehensive study of cloud concepts and capabilities across the various Cloud service models including Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS), and Identity as a Service (IDaaS).

COURSE OBJECTIVES

- ❖ To introduce the broad perspective of cloud architecture and model
- ❖ To Gain knowledge on the concept of Virtualization and design of cloud Services
- ❖ To understand the issues on cloud storage & security.

UNIT –I

(12 HRS.)

BASICS OF CLOUD COMPUTING AND CLOUD ARCHITECTURE

Defining Cloud Computing - Cloud Types - The NIST model - The Cloud Cube Model Deployment models Service models -Examining the Characteristics of Cloud



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Computing - Paradigm shift Benefits of cloud computing Disadvantages of cloud computing - Assessing the Role of Open Standards

Understanding Cloud Architecture - Exploring the Cloud Computing Stack - Infrastructure - Platforms - Virtual Appliances - Communication Protocols - Applications

SELF STUDY :Connecting to Cloud - The Jolicloud Netbook OS - Chromium OS

UNIT -II CLOUD SERVICES AND APPLICATIONS

(12 HRS.)

Understanding Services and Applications by Type - Defining Infrastructure as a Service (IaaS) - IaaS workloads - Pods, aggregation, and silos - Defining Platform as a Service (PaaS) - Defining Software as a Service (SaaS) - SaaS characteristics - Open SaaS and SOA - Salesforce.com and CRM SaaS

SELF STUDY :Defining Identity as a Service (IDaaS) - IDaaS interoperability - User authentication and Authorization

UNIT -III ABSTRACTION VS. VIRTUALIZATION

(12 HRS.)

Understanding Abstraction and Virtualization - Using Virtualization Technologies - Load Balancing and Virtualization - Advanced load balancing - The Google cloud - Understanding Hypervisors -Virtual machine types - VMware vSphere - Understanding Machine Imaging - Porting Applications - The Simple Cloud API - AppZero Virtual Application Appliance

Using PaaS Application Frameworks - Drupal - Using SaaS Application Frameworks - Google App Engine - Using IaaS Application Frameworks - Amazon Elastic Compute Cloud (EC2) - Windows Azure.

SELF STUDY :Virtualization Practicum



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UNIT -IV CLOUD MANAGEMENT AND CLOUD SECURITY (12 HRS.)

Managing the Cloud - Administrating the Clouds - Management responsibilities - Lifecycle management - Cloud Management Product - Emerging Cloud Management Standards - Cloud Security - Securing the Cloud - The security boundary - Security service boundary - Security mapping - Securing Data - Brokered cloud storage access - Storage location and tenancy - Encryption - Auditing and compliance

SELF STUDY :DMTF cloud management standards - Cloud Commons and SMI

UNIT -V (12 HRS.)

CLOUD BASED STORAGE AND COMMUNICATING WITH CLOUD

Working with Cloud-Based Storage -- Cloud storage in the Digital Universe - Cloud storage definition - Provisioning Cloud Storage - Unmanaged cloud storage - Managed cloud storage - Creating cloud storage systems - Virtual storage containers -Exploring Cloud Backup Solutions - Backup types -Cloud backup features - Cloud attached backup - Cloud Storage Interoperability - Cloud Data Management Interface (CDMI) -Open Cloud Computing Interface (OCCI) - Communicating with the Cloud - Exploring Instant Messaging - Instant messaging clients - Instant messaging interoperability - Micro-blogs or Short Message Services - Exploring Collaboration Technologies

SELF STUDY :Using Social Networks - Features - List of social networking sites - Privacy and security - Interaction and interoperability



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1. Barrie Sosinsky, “Cloud Computing Bible”, Wiley India Pvt. Ltd, 2013.
2. John W.RittingHouse, James F.Ransome, ”Cloud Computing Implementation, Management and Security”, CRC Press, 2013.
3. Kris Jamsa, Jones & Bartlett , “Cloud Computing” , Learning Publishers 2014.
4. Anthony T. Velte, Toby J. Velte, RoberElsenpeter, “Cloud Computing – A Practical Approach” , Mc Graw Hill publications, 2013.
5. Rajkumarbuyya, James Broberg, Andrzej Goscinski, “ Computing Principles & Paradigms”, Wiley India Pvt. Ltd., 2013.

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1. <https://lecturenotes.in/subject/366/cloud-computing-cc>
2. <https://www.guru99.com/cloud-computing-for-beginners.html>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 BASICS OF CLOUD COMPUTING AND CLOUD ARCHITECTURE				
1.1	Defining Cloud Computing and its types	1	Chalk & Talk	Black Board
1.2	The NIST model	1	PPT	LCD
1.3	The Cloud Cube Model	2	Flipped Classroom	LMS tool - Edmodo and LCD
1.4	Characteristics of Cloud Computing	1	PPT	LMS tool - Edmodo and LCD
1.5	Assessing the Role of Open Standards	1	Group Discussion	White Board
1.6	Cloud Architecture	2	Flipped Classroom	LMS tool - Edmodo and LCD
1.7	Cloud Computing Stack	1	PPT	LMS tool - Edmodo and LCD
1.8	Infrastructure - Platforms , Virtual Appliances, Communication Protocols, Applications	2	Brain Storming and Mind mapping	White Board
1.9	Connecting to the Cloud - The Jolicloud Netbook OS - Chromium OS	1	Lecture	Presentation using PPT
UNIT -2 CLOUD SERVICES AND APPLICATIONS				



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2.1	Understanding Services and Applications by Type	2	Flipped Classroom	LMS tool - Edmodo and LCD
2.2	Infrastructure as a Service (IaaS)	2	Flipped Classroom	LMS tool - Edmodo and LCD
2.3	Platform as a Service (PaaS)	2	Flipped Classroom	LMS tool - Edmodo and LCD
2.4	Software as a Service (SaaS)	2	Flipped Classroom	LMS tool - Edmodo and LCD
2.5	Open SaaS and SOA	2	PPT	LMS tool - Edmodo and LCD
2.6	Salesforce.com and CRM SaaS	1	PPT	LMS tool - Edmodo and LCD
2.7	Identity as a Service (IDaaS)	1	Lecture	Presentation using PPT
UNIT -3 ABSTRACTION VS. VIRTUALIZATION				
3.1	Understanding Abstraction and Virtualization	1	Flipped Classroom	LMS tool - Edmodo and LCD
3.2	Using Virtualization Technologies	1	Flipped Classroom	LMS tool - Edmodo and LCD
3.3	Load Balancing and Virtualization - Advanced load balancing	2	PPT	LMS tool - Edmodo and LCD
3.4	The Google cloud	1	PPT	LMS tool - Edmodo and LCD
3.5	Understanding Hypervisors - Virtual machine types - VMware vSphere	1	Chalk and Talk	Blackboard



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3.6	Understanding Machine Imaging - Porting Applications - The Simple Cloud API - AppZero Virtual Application Appliance	2	PPT	LMS tool - Edmodo and LCD
3.7	PaaS Application Frameworks – Drupal	1	Flipped Classroom	LMS tool - Edmodo and LCD
3.8	SaaS Application Frameworks - Google App Engine –	1	Flipped Classroom	LMS tool - Edmodo and LCD
3.9	IaaS Application Frameworks - Amazon Elastic Compute Cloud (EC2) , Windows Azure	1	Flipped Classroom	LMS tool - Edmodo and LCD
3.10	Virtualization Practicum	1	Lecture	Presentation using PPT
UNIT - 4 CLOUD MANAGEMENT AND CLOUD SECURITY				
4.1	Managing the Cloud - Administrating the Clouds	1	Chalk and Talk	Blackboard
4.2	Management responsibilities	1	Chalk and Talk	Blackboard
4.3	Lifecycle management	1	Chalk and Talk	Blackboard
4.4	Cloud Management Product	1	Flipped Classroom	LMS tool - Edmodo and LCD
4.5	Emerging Cloud Management Standards	1	PPT	LMS tool - Edmodo and LCD
4.6	Cloud Security - Securing the Cloud	1	PPT	LMS tool - Edmodo and LCD
4.7	The security boundary - Security service boundary - Security mapping	2	PPT	LMS tool - Edmodo and LCD
4.8	Securing Data	1	Flipped Classroom	LMS tool - Edmodo and



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				LCD
4.9	Brokered cloud storage access - Storage location and tenancy	1	Flipped Classroom	LMS tool - Edmodo and LCD
4.10	Encryption - Auditing and compliance	1	Flipped Classroom	LMS tool - Edmodo and LCD
4.11	DMTF cloud management standards - Cloud Commons and SMI	1	Lecture	Presentation using PPT
UNIT - 5 CLOUD BASED STORAGE AND COMMUNICATING WITH CLOUD				
5.1	Working with Cloud-Based Storage -- Cloud storage in the Digital Universe	1	Flipped Classroom	LMS tool - Edmodo and LCD
5.2	Cloud storage definition - Provisioning Cloud Storage - Unmanaged cloud storage - Managed cloud storage	1	Flipped Classroom	LMS tool - Edmodo and LCD
5.3	Creating cloud storage systems – Virtual storage containers	1	Flipped Classroom	LMS tool - Edmodo and LCD
5.4	Exploring Cloud Backup Solutions - Backup types -Cloud backup features - Cloud attached backup	2	PPT	LMS tool - Edmodo and LCD
5.5	Cloud Storage Interoperability - Cloud Data Management Interface (CDMI) -Open Cloud Computing Interface (OCCI)	2	PPT	LMS tool - Edmodo and LCD
5.6	Communicating with the Cloud - Exploring Instant Messaging - Instant messaging clients	2	PPT	LMS tool - Edmodo and LCD
5.7	Instant messaging interoperability - Micro-blogs or Short Message Services	1	PPT	LMS tool - Edmodo and LCD
5.8	Exploring Collaboration Technologies	1	PPT	LMS tool - Edmodo and LCD



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5.9	Using Social Networks - Features - List of social networking sites - Privacy and security - Interaction and interoperability	1	Lecture	Presentation using PPT

Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assess ment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non- Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50



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- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate

EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- CIA Components

				Nos			
C1	–	Test (CIA 1)		2*	–	10 Mks	
C2	–	Test (CIA 2)		1	–	15 Mks	
C3	–	Assignment / Open Book Test		2	–	10 Mks	
C4	–	Seminar		1	–	10 Mks	
C5	–	Attendance		1	–	5 Mks	

- The Average of two will be taken into account



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Examine the characteristics of Cloud Computing and the architecture	K2, K4	PSO1
CO 2	Define Infrastructure and Identify service models.	K2, K3, K4	PSO2, PSO3
CO 3	Relate abstraction and virtualization and cloud computing frameworks.	K2 , K4	PSO3
CO 4	Manage and administrate cloud.	K2, K3,K4 & K5	PSO4, PSO5
CO 5	Explore cloud based storage and collaboration technologies.	K2,K3,K4 & K5	PSO3, PSO4



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	1
CO2	1	3	3	1	1
CO3	1	1	3	1	1
CO4	1	1	1	2	3
CO5	1	1	2	3	1

Mapping COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	2	2	3	3	2	1	2	1	2
CO2	1	2	3	2	3	2	2	3	1	2	1	2
CO3	1	3	1	2	2	3	3	1	3	3	2	3
CO4	2	2	3	3	1	1	2	2	2	2	2	2
CO5	1	2	3	1	1	3	2	2	2	2	1	2

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – B.USHA

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

GENERAL ELECTIVE – MCA

(For those who join in 2020 onwards)

PROGRAMM E CODE	COURSE CODE	COURSE TITLE	CATEGOR Y	HRS/WEE K	CREDIT S
MCA	20MCAGE1 2	AGILE SOFTWARE ENGINEERIN G	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides an immersive experience in the technical, cultural and social aspects of Agile and DevOps.

COURSE OBJECTIVE

- ❖ To learn the software development process using agile.
- ❖ To comprehend the quality and risk management in software development.
- ❖ To understand the integration between development and operations in software project development.

UNIT I

(12 Hours)

MODERNIZING PROJECT MANAGEMENT

Project management needed a makeover – Introducing Agile Project Management.

APPLYING AGILE MANIFESTOS & PRINCIPLES

Understanding the Agile Manifesto - Outlining the four values of Agile manifesto-
Defining the 12 Agile principles - Agile Benefits.



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AGILE APPROACHES:

Overview of lean- Overview of scrum - Overview of Extreme programming.

SELF STUDY :Agile Benefits

UNIT II

(12 Hours)

AGILE PLANNING AND EXECUTION:

Agile planning – Defining the product vision – Creating a product road map – completing the product backlog.

PLANNING RELEASES AND SPRINTS:

Refining requirements and estimates – Release planning – Sprint planning.

SHOWCASING WORK, INSPECTING AND ADAPTING:

The Sprint review – The sprint retrospective – Preparing for release.

SELF STUDY:Sprint planning

UNIT III

(12 Hours)

MANAGING SCOPE AND PROCUREMENT

Managing Agile scope - Managing Agile procurement

MANAGING TIME AND COST

Managing Agile schedule – Managing Agile budgets

MANAGING AGILE TEAM DYNAMICS& COMMUNICATION

Managing Agile Team Dynamics - Managing Agile communication – Managing Agile quality – Managing Agile risk.

SELF STUDY: Managing Agile communication

UNIT IV FUNDAMENTALS OF DEVOPS

(12 Hours)

The Definition of DevOps – What DevOps is not - Introduction – Traditional Project Setting – Agile Project Setting – Blame Game: Dev vs. Ops – Operations as Bottleneck - DevOps to Rescue – The Essence of DevOps **SELF STUDY:** Quality and testing



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UNIT V

(12 Hours)

BUILDING BLOCKS OF DEVOPS

Measurement and Metrics – Improving flow of features – Improve And Accelerate Delivery

QUALITY AND TESTING

What is Quality – Pattern for Improving Quality.

SELF STUDY: Specification by example

REFERENCES :

1. Mark C.Layton , Steven J.Ostermiller , “Agile Project Management”, Wiley Publication II edition ,2018
2. MachaelHuttermann, “DevOps for developers”, Apress publication, 2012
3. Joseph joyner, “DevOps for Beginners” Speedy publishing LLC 2015
4. Robert Martin, “Agile software development, Principles patterns and practices” person new international edition, 2013
5. Greene Jennifer, “Learning Agile” Orielly series I edition 2014

WEB REFERENCES:

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2. <https://refactoring.com/>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 AGILE APPROACHES AND AGILE BEHAVIOURS				
1.1	Modernizing Project Management	2	Lecture	PPT
1.2	Introduction	2	Lecture	PPT
1.3	Applying the Agile Manifesto and Principles- Values	2	Lecture	PPT
1.4	Principles - Agile Benefits	2	Lecture	PPT
1.5	Overview of lean- Overview of scrum	2	Lecture	PPT
1.6	Overview of Extreme programming.	2	Lecture	PPT
UNIT 2 - AGILE PLANNING AND EXECUTION				
2.1	Agile planning – Defining the product vision	1	Lecture	PPT
2.2	Creating a product road map	2	Chalk & Talk	Black Board
2.3	completing the product backlog.	2	Lecture	PPT
2.4	Refining requirements and estimates	2	Lecture	White board
2.5	Release planning – Sprint planning.	1	Discussion	Black Board
2.6	The Sprint review – The sprint retrospective	2	Chalk & Talk	Black Board
2.7	Preparing for release.	2	Chalk & Talk	Black Board



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UNIT 3 - AGILE MANAGEMENT				
3.1	Managing scope and procurement	2	Lecture	White board
3.2	Managing Agile scope - Managing Agile procurement	2	Chalk & Talk	Black Board
3.3	Managing time and cost – Managing Agile schedule	2	Lecture	PPT
3.4	Managing Agile budgets – Managing Agile team dynamics	2	Lecture	White board
3.5	Managing Agile communication	2	Discussion	Black Board
3.6	Managing Agile quality – Managing Agile risk.	2	Lecture	PPT
UNIT 4 - FUNDAMENTALS OF DEVOPS				
4.1	The Definition of DevOps – What DevOps is not	2	Lecture	PPT
4.2	Introduction – Traditional Project Setting	2	Discussion	Black Board
4.3	Agile Project Setting – Blame Game	2	Lecture	PPT
4.4	Dev vs. Ops – Operations as Bottleneck	2	Lecture	PPT
4.5	DevOps to Rescue	2	Discussion	Black Board
4.6	The Essence of DevOps	2	Lecture	PPT
UNIT 5 - BUILDING BLOCKS OF DEVOPS				
5.1	Building Blocks Of Devop	2	Discussion	Black Board
5.2	Measurement and Metrics	2	Lecture	PPT
5.3	Improving flow of features	2	Lecture	PPT
5.4	Improve And Accelerate Delivery	2	Lecture	PPT



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5.5	Quality And Testing	2	Lecture	PPT
5.6	What is Quality – Pattern for Improving Quality	2	Lecture	PPT

Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

✓ All the course outcomes are to be assessed in the various CIA components.



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- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate

EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- **CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explain the fundamental principles and practices of the agile development methods.	K2, K4	PSO1& PSO2
CO 2	Analyze the planning and execution of the agile manifesto	K2, K3, K4	PSO2 &PSO3
CO 3	Monitor the management to achieve complete product development.	K2 , K4	PSO3 & PSO4
CO 4	Practice the integration of development and operations in software projects.	K2, K3,K4 & K5	PSO3 & PSO4
CO 5	Present the software project by following the principles that best fit the technical and market demands.	K2,K3,K4 & K5	PSO4 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	1	1	1
CO2	1	2	3	1	1
CO3	1	1	2	2	1
CO4	1	1	3	2	1
CO5	1	1	1	2	3

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	1	2	2	2	2	2	2	1	2	2
CO2	1	2	2	2	2	2	2	2	2	2	2	2
CO3	2	2	3	3	2	3	2	2	3	2	2	2
CO4	2	2	2	3	2	3	2	3	2	2	2	2
CO5	3	3	3	3	3	3	3	3	3	3	3	3

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

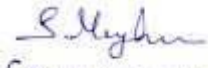
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – S.MARY HELAN FELISTA

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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EMPLOYABILITY-100%

I MCA

SEMESTER – I

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
MCA	20MCA105	LAB I – PYTHON PROGRAMMING	MAJOR LAB	4	2

COURSE DESCRIPTION

This course provides the practical knowledge of implementing Python programs with loops, functions and represent compound data using lists, tuples and dictionaries.

COURSE OBJECTIVES

- ❖ To write, test and debug simple Python programs.
- ❖ To use functions for structuring Python programs.
- ❖ To read and write data from/to files in Python.

LAB LIST

1. Running instructions in Interactive interpreter and a Python Script
2. Write a program to purposefully raise Indentation Error and Correct it.



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3. Write a program `add.py` that takes 2 numbers as command line arguments and prints its sum.
4. Write a program using for loop that loops over a sequence.
5. Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero.
6. Write a program to count the numbers of characters in the string and to use split and join methods in the string.
7. Write a program `combine_lists` that combines these lists into a dictionary
8. Write a function `nearly_equal` to test whether two strings are nearly equal. Two strings `a` and `b` are nearly equal when `a` can be generated by a single mutation on `b`.
9. Write a function `reverse` to reverse a list. Without using the reverse function.
10. Find the most frequent words in a text read from a file.



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Implement Math functions, Strings, List and Tuple in Python programs.	K2	PSO1, PSO2 & PSO3
CO 2	Express different Decision Making statements and Functions.	K2, K3, K4	PSO3 & PSO4
CO 3	Interpret Object oriented programming in Python & File handling operations.	K2, K3 & K5	PSO4 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	3	1	1
CO2	1	1	2	3	1
CO3	1	1	1	2	2

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1	2	2	2	2	1	2	1	2
CO2	3	1	2	1	3	2	2	3	1	2	1	2
CO3	3	2	3	2	2	3	2	3	2	2	1	3

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

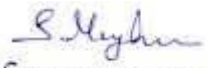
♦ Weakly Correlated -1

COURSE DESIGNER:

Forwarded By

Staff Name – S. Mary Helan Felista

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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Affiliated to Madurai Kamaraj University
Re-Accredited with 'A++' (CGPA 3.61) by NAAC (Cycle - IV)
Mary Land, Madurai - 625018, Tamil Nadu

EMPLOYABILITY-100%

I MCA

SEMESTER – I

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCA106	LAB II – RDBMS	MAJOR LAB	4	2

COURSE DESCRIPTION

This course provides practical knowledge in PL/SQL programming, utilizing the services provided by Oracle database in a stored procedure perspective. This also includes implementation of Subprograms, Triggers, and Cursors concepts in depth.

COURSE OBJECTIVE

- ❖ To give a good formal foundation on the relational model of data
- ❖ To present the techniques relating to query processing by SQL engines.
- ❖ To develop PL/SQL programs with stored procedures, stored functions, cursors and packages.



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LAB LIST

SQL QUERIES

1. SQL queries to implement DDL statements to Create, Alter, Drop, Truncate and rename tables.
2. SQL queries to implement DML statements to perform Select, Insert, Delete, Update on tables.
3. SQL queries to implement DCL statements to access database using Grant and Revoke.
4. SQL queries to implement TCL statements to work on Commit, Rollback and Savepoint.
5. SQL queries to implement Where, Like, Order By, Group By, Having clauses.
6. SQL queries to implement arithmetic, Logical, Concatenation and Quote operators.
7. SQL queries to implement mathematical functions. (count, minimum value, maximum value, sum, average, First and Last)
8. SQL queries to implement scalar functions. (UCASE, LCASE, MID, ROUND)
9. SQL queries to implement Set Operations. (Intersect, Union, Union All, Minus)
10. SQL queries to implement column and table level constraints.(NOT NULL, UNIQUE, PRIMARY KEY, FOREIGN KEY, CHECK and DEFAULT)
11. SQL queries to perform Natural, Inner, Outer, Left, Right and Equi Joins.
12. SQL queries to create sequence using initial, increment and maximum value.
13. SQL queries to implement create, display, update in Views.
14. SQL queries to implement subqueries and nested queries.
15. SQL queries to implement Keywords (AS, Cycle, No Cycle, Force) and DESC Commands.



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PL/SQL

1. PL/SQL Program to Find Factorial of a Number
2. PL/SQL Program for Reverse of a Number
3. PL/SQL Program to Check Number is Odd or Even
4. PL/SQL Program to Reverse a String
5. PL/SQL Program for Palindrome Number
6. PL/SQL Program for Armstrong Number
7. PL/SQL Program for Calculation Of Net Salary
8. PL/SQL Program to apply implicit and explicit cursors.
9. PL/SQL Program to handle errors.
10. PL/SQL Program to include sub programs.
11. PL/SQL Program to trigger an action.
12. PL/SQL Program to create sequence.
13. PL/SQL Program to implement cursors and packages.



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Enhance Programming skills and techniques.	K2	PSO1, PSO2 & PSO3
CO 2	Formulate complex queries using SQL	K2, K3, K4	PSO1 & PSO2
CO 3	Use Cursors, Triggers and PL/SQL code constructs using Procedures & Functions	K2, K3& K5	PSO4 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	1	1
CO2	2	3	1	1	1
CO3	1	1	1	3	2

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1	2	2	2	2	1	2	1	2
CO2	3	1	2	1	3	2	2	3	1	2	1	2
CO3	3	2	3	2	2	3	2	3	2	2	1	3

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

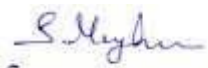
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – B.USHA

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

I MCA

SEMESTER –I

(For those who joined in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCA107	SKILL BASED-LAB I-LINUX	SKILL BASED	2	1

COURSE DESCRIPTION

This course provides focus on the fundamental tools and concepts of Linux and Unix OS. It gives practical exposure on topics such as LINUX environment, commands, file system, processes and utilities. Specific emphasis is given to the bash shell and user environment with several flavours of UNIX/Linux using a version of Red Hat Linux.

COURSE OBJECTIVES

- ❖ To learn the basic set of commands and utilities in Linux.
- ❖ To develop software for Linux systems.

LAB LIST

Shell programming

1. Using Basic Commands.
2. Arithmetic Operations Using Case Statement.



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3. Sum of the Digits Calculation.
4. Check for file Existence.
5. Check for String Palindrome.
6. Prime Number Generation.
7. Factorial Calculation.
8. Pattern checking Using grep command.
9. Open a file using System Call.

C programming

1. Open a file using System Call.
2. Emulate scanf and printf Function.
3. Copying Files.
4. Changing File Permissions.
5. File Copy using fgetc.
6. Print the directory Content.
7. Memory Allocation.
8. File Manipulations.
9. Simple C Programs.



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Use Linux utilities and develop shell scripts to perform tasks.	K2	PSO1
CO 2	Effectively use Linux environment to accomplish software development tasks	K2, K3, K4	PSO1 & PSO2
CO 3	Monitor system performance and network activities	K2 & K3	PSO3



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	1
CO2	2	3	1	1	1
CO3	1	1	3	1	1

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	3	2	1	2	1	1	2	1	3	2
CO2	1	3	2	1	3	2	2	2	1	2	1	1
CO3	1	1	3	2		3	3	1	1	2	1	2

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

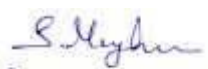
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – P.NANCY VINCENTINA MARY

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

I MCA

SEMESTER – I

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
MCA	20MCA108	SOFT SKILLS I – PROFESSIONAL COMMUNICATION	SOFTSKILLS	2	1

COURSE DESCRIPTION

This course provides skills of oral and written communication to work in different environments, develop emotional sensitivity and an awareness of how to work and negotiate with people.

COURSE OBJECTIVE:

- ❖ To communicate ethically and efficiently.

TOPICS

1. Elements of Communication
 - a. The importance of communication through English
 - b. Factors that influence communication
 - c. Verbal and Non Verbal Communication
 - d. Business Communication
2. Review of English Grammar.
3. Pronunciation Practice.
4. The Sounds of English.
5. Reading and Writing Skills.



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
SECTION 1 – ELEMENTS OF COMMUNICATION				
1.1	The importance of communication through English	3	Lecture	White board
1.2	Factors that influence communication	3	Chalk & Talk	Black Board
1.3	Verbal and Non Verbal Communication	5	Discussion	Black Board
1.4	Business Communication	3	Lecture	White board
SECTION 2 - ENGLISH GRAMMAR				
2.1	Review of English Grammar	5	Lecture	White board
2.2	Pronunciation Practice	3	Chalk & Talk	Black Board
2.3	The Sounds of English	3	Discussion	Black Board
2.4	Reading and Writing Skills	5	Lecture	White board



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Display competence in oral and written communication.	K2	PSO1 & PSO2
CO 2	Use current technology related to the communication.	K2, K3	PSO2 & PSO3
CO 3	Ability to enhance reading and writing skills	K3	PSO3



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	1	1
CO2	1	3	2	1	1
CO3	1	1	3	1	1

Note: ♦ Strongly Correlated – 3 ♦ Moderately Correlated – 2
 ♦ Weakly Correlated -1

Mapping of COs with POs

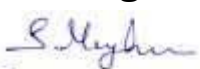
CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	3	2	1	2	1	1	2	1	3	2
CO2	1	3	2	1	3	2	2	2	1	2	1	1
CO3	1	1	3	2	2	3	3	1	1	2	1	2

COURSE DESIGNER:

Staff Name – R. SMEETA MARY

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HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

I MCA

SEMESTER – II

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCA201	DATA STRUCTURES AND ALGORITHMS	MAJOR CORE	4	4

COURSE DESCRIPTION

This course provides knowledge on several fundamental algorithms and data structures and to implement them in C++ to be an effective designer, developer, or customer for new applications.

COURSE OBJECTIVE

- ❖ To understand the concept of data structures through ADT including List, Stack and Queues.
- ❖ To design, develop and implement various data structure algorithms.
- ❖ To compute the complexity of various algorithms.

UNIT – I LISTS, STACKS AND QUEUES

(12 Hours)

Abstract Data Types - The List ADT – Array Implementation of List - Single Linked Lists – Doubly Linked Lists – Circular Linked Lists - The Stack ADT - Stack Model



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– Implementation Of Stacks - The Queue ADT -Queue Model – Implementation Of Queues.

SELF STUDY :Applications of Stack and queue

UNIT - II TREES

(12 Hours)

Preliminaries - Implementation Of Trees – Tree Traversals With An Application – Binary Trees – Implementation – The Search Tree ADT – Binary Search Trees – Make Empty – Find – Min and Max – Insert – Delete.

SELF STUDY :Expression Trees

UNIT - III ADVANCED SEARCH TREES AND HASHING

(12 Hours)

AVL Trees – Splay Trees – Tree Traversals - B-Trees – Hashing - General Idea – Hash Function – Open Addressing – Linear Probing – Quadratic Probing – Double Hashing – Rehashing – Extendible Hashing.

SELF STUDY :Separate Chaining

UNIT - IV PRIORITY QUEUE AND SORTING

(12 Hours)

Priority Queue (Heaps) - Model – Implementation - Binary Heap- Structure Property-Heap Order Property - Basic Heap Operations – Selection Problem - Sorting - Insertion Sort – Heap Sort – Merge Sort – Quick Sort - Bucket Sorting- External Sorting.

SELF STUDY :Application of Priority Queues

UNIT - V GRAPHS

(12 Hours)

Graph Algorithm - Definitions – Representation of Graphs – Shortest-Path Algorithms. Dijkstra's Algorithm – Minimum Spanning Tree – Prim's Algorithm – Kruskal's Algorithm - Greedy Algorithms – Huffman Codes - Divide And Conquer – Running Time Of Divide And Conquer Algorithms-Closest Point Problem.

SELF STUDY :A Simple Scheduling Problem



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REFERENCES :

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education Asia, 2016.
2. Seymour Lipschutz, "Data structures with C", Tata Mc Graw Hill, 2011.
3. Debasis Samanta, "Classic Data Structures", 2nd Edition, PHI, 2012.
4. Ashok N. Kamthane , "Programming and Data structure", Dorling Kindersley, 2012.
5. E. Balagursamy, "Data Structures using C", Tata McGraw Hill, 2015 Reprint.

WEB REFERENCES:

1. <https://www.w3schools.in/data-structures-tutorial/intro>
2. <https://www.tutorialride.com/data-structures/data-structures-tutorial.htm>
3. <https://www.geeksforgeeks.org/fundamentals-of-algorithms/>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT - 1		LISTS, STACKS AND QUEUES		
1.1	Abstract Data Types, List ADT	1	Chalk & Talk	Black Board
1.2	Array Implementation of List	2	Chalk & Talk	Black Board
1.3	The Stack ADT	1	Lecture	White board
1.4	Stack Model	1	Chalk & Talk	Black Board
1.5	Implementation of Stacks	2	Discussion	Black Board
1.6	Applications of Stack	2	Lecture	White board
1.7	Queue Model	1	Lecture	White board
1.8	Implementation, Applications of Queues	2	Discussion	Google classroom
UNIT - 2		TREES		
2.1	Introduction To Trees, Binary Trees	1	Lecture	PPT
2.2	Implementation Of Trees	2	Chalk & Talk	Black Board
2.3	Tree Traversals With An Application	2	Lecture	PPT
2.4	Binary Tree Implementation	2	Lecture	White board
2.5	Expression Trees	1	Discussion	Black Board
2.6	The Search Tree ADT	1	Chalk & Talk	Black Board
2.7	Binary Search Trees	1	Chalk & Talk	Black Board



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2.8	Binary Search Tree Operations	2	Lecture	PPT
UNIT – 3 ADVANCED SEARCH TREES AND HASHING				
3.1	AVL Trees	1	Lecture	White board
3.2	Splay Trees	1	Chalk & Talk	Black Board
3.3	Tree Traversals	1	Lecture	PPT
3.4	B-Trees	1	Lecture	White board
3.5	Hashing, Hash Function	1	Discussion	Black Board
3.6	Separate Chaining	1	Lecture	PPT
3.7	Open Addressing	1	Chalk & Talk	Black Board
3.8	Linear Probing	1	Lecture	White board
3.9	Quadratic Probing	1	Chalk & Talk	Black Board
3.10	Double Hashing	1	Chalk & Talk	Black Board
3.11	Rehashing	1	Discussion	Black Board
3.12	Extendible Hashing	1	Lecture	White board
UNIT - 4 PRIORITY QUEUE AND SORTING				
4.1	Priority Queue Model	1	Lecture	PPT
4.2	Priority Queue Implementation	2	Lecture	PPT
4.3	Binary Heap	1	Chalk & Talk	Black Board
4.4	Basic Heap Operations	1	Chalk & Talk	Black Board
4.5	Application Of Priority Queues	1	Discussion	Black Board
4.6	Selection Problem	1	Lecture	PPT
4.7	Insertion Sort, Heap Sort	1	Chalk & Talk	Black Board
4.8	Merge Sort	1	Lecture	PPT



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4.9	Quick Sort	1	Lecture	PPT
4.10	Bucket Sorting	1	Chalk & Talk	Black Board
4.11	External Sorting	1	Chalk & Talk	Black Board
UNIT – 5 GRAPHS				
5.1	Definition of Graph Algorithm	1	Chalk & Talk	Black Board
5.2	Representation of Graphs	1	Lecture	PPT
5.3	Shortest-Path Algorithms, Minimum Spanning Tree	1	Lecture	PPT
5.4	Dijkstra's Algorithm	1	Lecture	White board
5.5	Prim's Algorithm	1	Lecture	White board
5.6	Kruskal's Algorithm	1	Lecture	White board
5.7	Greedy Algorithms	1	Lecture	White board
5.8	A Simple Scheduling Problem	1	Chalk & Talk	Black Board
5.9	Huffman Codes	1	Chalk & Talk	Black Board
5.10	Divide And Conquer	1	Discussion	Black Board
5.11	Running Time Of Divide And Conquer Algorithms	1	Chalk & Talk	Black Board
5.12	Closest Point Problem	1	Discussion	Black Board



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Select appropriate data structures as applied to specified problem definition.	K2, K4	PSO1 & PSO 2
CO 2	Implement operations like searching, insertion, deletion and traversing in trees.	K2, K3, K4	PSO2 & PSO4
CO 3	Compare the data structures of advanced search trees.	K2 , K4	PSO1 & PSO3
CO 4	Implement appropriate heap operations, sorting, searching techniques for a given problem.	K2, K3,K4 & K5	PSO2 & PSO4
CO 5	Determine and analyze the complexity of graph Algorithms.	K2,K3,K4 & K5	PSO 4 & PSO 5

Mapping COs Consistency with PSOs



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CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	1	1
CO2	1	3	1	2	1
CO3	2	1	3	1	1
CO4	1	2	1	3	1
CO5	1	1	1	2	3

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

♦ Weakly Correlated -1

Mapping of COs with POs

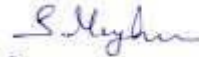
CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	3	2	1	2	1	1	2	1	3	2
CO2	1	3	2	1	3	2	2	2	1	2	1	1
CO3	1	1	3	2		3	3	1	1	2	1	2
CO4	3	2	2	1	3	1	1	1	2	3	2	1
CO5	1	2	1	1	2	1	2	1	1	1	3	1

COURSE DESIGNER:

Staff Name – S. JEBAPRIYA

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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EMPLOYABILITY-100%

I MCA

SEMESTER – II

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCA202	WEBTECHNOLOGIES	MAJOR CORE	4	4

COURSE DESCRIPTION

This course provides the student with foundational programming knowledge and skills for application development on the Internet.

COURSE OBJECTIVES

- ❖ To make the students familiar with client server architecture and able to develop web applications using PHP.
- ❖ To plan, design, construct, and integrate basic server-side components of modern web applications including databases and scripts.
- ❖ To impart the skills and project-based experience needed for entry into web application and development careers.

UNIT – I HTML5 & CSS 3

(12Hours)

The Basics of HTML5 – Document structure – Basic elements – Marking text – Working with characters – Making a list – Table



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The Basics of CSS3 – Understanding styles – Styling text – Box model – Styling tables- Positioning elements

HTML 5 Forms - Using input fields – Adding a Text area – Using Drop-Down Lists – Data Validation

Advance CSS3 – Rounding corners – Colors - Creating fonts – Handling media queries

HTML5 and Multimedia – Working with images – Playing Audio – Watching videos

SELF-STUDY: Positioning elements

UNIT- II JAVASCRIPT & JQUERY

(12Hours)

Introducing JavaScript – The basics of JavaScript – Controlling program flow – Working with functions

Advanced JavaScript Coding – Document Object Model – Finding your Elements - Document Object Model form data

Using jQuery – Loading the jQuery library –Functions –Finding elements – Replacing data – Changing styles – Changing the Document Object Model

Reacting to events with JavaScript and jQuery – Understanding events – Focusing on JavaScript and events - Looking jQuery and events

SELF STUDY: Understanding events

UNIT – IIIINTRODUCING PHP

(12Hours)

Understanding PHP Basics – Benefits – Variable – Operators - Including files

PHP Flow Control – Looping - Building own functions – event driven PHP

PHP Libraries – Text Functions – Math Functions – Date and time functions



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Sessions and carts – Storing Persistent Data – PHP and cookies – PHP and Sessions

SELF STUDY: Math Functions.

UNIT – IV INTRODUCING MYSQL

(12Hours)

Introducing MYSQL – Designing and building a database – Managing data – Creating databases – Building tables

Using the database – Working with data – Searching for data

Communicating with the database from PHP Scripts – Database support in PHP – Using mysqli library

SELF STUDY: Searching for data.

UNIT - V AJAX & PHP FRAMEWORK

(12 Hours)

Using Ajax – Communicating using JavaScript – Using the jQuery library – Transferring data in AJAX

Getting Acquainted with MVC – Comparing MVC to other web models – Implementing MVC

Selecting a Framework – PHP Frameworks – Popular PHP Frameworks - Looking at Micro Frameworks.

SELF STUDY: Transferring data in AJAX



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REFERENCES:

1. Richard Blum, "PHP, MySQL & JavaScript All-in-One For Dummies", John Wiley & Sons, Inc, 2018
2. Robin Nixon, "PHP, MySQL, JavaScript & CSS", 2nd Edition, O'Reilly, 2012.
3. Chris Minnick, Ed Tittel, "Beginning HTML5 and CSS3 For Dummies", 1st edition, 2013
4. Chris Minnick, Eva Holland, "Coding with JavaScript For Dummies", Wiley, 2015

WEB REFERENCES:

1. https://www.w3schools.com/html/html5_intro.asp
2. css3generator.com
3. <https://www.w3schools.com/php/default.asp>
4. https://en.wikiversity.org/wiki/Computer_architecture_and_organization



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 HTML5 & CSS 3				
1.1	The Basics of HTML5 – Document structure – Basic elements	1	Chalk & Talk	Black Board
1.2	Marking text – Working with characters – Making a list – Table	2	Chalk & Talk	LCD
1.3	The Basics of CSS3 – Understanding styles – Styling text – Box model	2	Lecture	PPT & White board
1.4	Styling tables- Positioning elements	1	Chalk & Talk	Smart Board
1.5	HTML 5 Forms - Using input fields – Adding a Text area	2	Discussion	Black Board
1.6	Using Drop-Down Lists – Data Validation	1	Lecture	Google classroom
1.7	Advance CSS3 – Rounding corners – Colors - Creating fonts – Handling media queries	1	Lecture	Google classroom
1.8	HTML5 and Multimedia – Working with images – Playing Audio – Watching videos	2	Discussion	Black board
UNIT - 2 JAVASCRIPT & JQUERY				
2.1	Introducing JavaScript – The basics of	1	Lecture	PPT



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	JavaScript			
2.2	Controlling program flow – Working with functions	2	Chalk & Talk	PPT
2.3	Advanced JavaScript Coding – Document Object Model	2	Lecture	Smart Board
2.4	Finding your Elements - Document Object Model form data	1	Lecture	Black Board
2.5	Using jQuery – Loading the jQuery library –Functions –Finding elements	2	Discussion	Google classroom
2.6	Replacing data – Changing styles – Changing the Document Object Model	2	Lecture	Black Board
2.7	Reacting to events with JavaScript and jQuery –Focusing on JavaScript and events - Looking jQuery and events	2	Chalk & Talk	PPT
UNIT – 3 INTRODUCING PHP				
3.1	Understanding PHP Basics – Benefits – Variable – Operators	2	Chalk & Talk	Black Board
3.2	Including files PHP Flow Control – Looping	2	Chalk & Talk	LCD
3.3	Building own functions – event driven PHP -PHP Libraries	3	Lecture	PPT & White board
3.4	Text Functions – Math Functions – Date and time functions	2	Lecture	Smart Board
3.5	Instruction sets Characteristics and Functions	1	Lecture	Black Board



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3.6	Sessions and carts – Storing Persistent Data – PHP and cookies – PHP and Sessions.	2	Discussion	Google classroom
UNIT - 4 INTRODUCING MYSQL				
4.1	Introducing MYSQL – Designing and building a database	2	Chalk & Talk	Black Board
4.2	Managing data – Creating databases – Building tables	2	Chalk & Talk	LCD
4.3	Using the database	2	Lecture	PPT&White board
4.4	Working with data – Searching for data	2	Lecture	Smart Board
4.5	Communicating with the database from PHP Scripts	2	Lecture	Black Board
4.6	Database support in PHP – Using mysqli library	2	Discussion	Google classroom
UNIT – 5 AJAX & PHP FRAMEWORK				
5.1	Using Ajax – Communicating using JavaScript	2	Chalk & Talk	Black Board
5.2	Using the jQuery library – Transferring data in AJAX	2	Chalk & Talk	LCD
5.3	Getting Acquainted with MVC	2	Lecture	PPT &White



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				board
5.4	Comparing MVC to other web models – Implementing MVC	2	Lecture	Smart Board
5.5	Selecting a Framework – PHP Frameworks ions	2	Lecture	Black Board
5.6	Popular PHP Frameworks - Looking at Micro Frameworks.	2	Discussion	Google classroom



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Use knowledge of HTML and CSS to create personal and/or business websites	K2, K4	PS01 & PS02
CO 2	Create effective scripts using JavaScript and jQuery to enhance the end user experience.	K2, K3, K4	PS01 & PS02
CO 3	Write PHP scripts to handle HTML forms.	K2 , K4	PS01 & PS03
CO 4	Test, debug, and deploy web pages containing PHP and MySQL.	K2, K3,K4 & K5	PS01 & PS03
CO 5	Implement SQL language, JavaScript, Ajax, JQuery, PHP and CSS in the project.	K2,K3,K4 & K5	PS04 & PS05



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	1	1	1
CO2	3	2	1	1	1
CO3	2	1	2	1	1
CO4	2	1	3	1	1
CO5	1	1	1	2	3

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	1	1	2	3	1	2	1	2
CO2	3	2	2	1	1	1	2	3	1	2	1	2
CO3	3	2	3	2	2	2	2	3	2	2	1	3
CO4	3	3	3	2	3	3	2	3	3	2	1	3
CO5	3	3	3	3	3	2	2	3	2	2	3	3

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

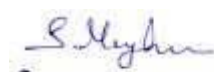
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – S. MARY HELAN FELISTA

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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EMPLOYABILITY-100%

I MCA

SEMESTER – II

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCA203	PROGRAMMING IN JAVA	MAJOR CORE	4	4

COURSE DESCRIPTION

This course provides an exhaustive coverage of Core Java programming language features like OOPS and GUI programming.

COURSE OBJECTIVE

- ❖ To understand the basic Java programming constructs
- ❖ To develop program by using OOPS concept.
- ❖ To handle Packages, Exception , Basics of AWT and Applets
- ❖ To create and manipulate databases in Java using JDBC and show how to create client-server programs using RMI.

UNIT – I INTRODUCTION

(12 Hours)

An overview of Java – Object Oriented Programming – Lexical issues - Data types – Literals – Type conversion and casting - Variables - Arrays – Arithmetic – Bitwise –



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Relational – Assignment – Ternary Operator – Operator precedence – Selection statements – Iteration statements – Jump Statements.

SELF STUDY :Operators, Control statements

UNIT - II CLASSES AND METHODS

(12 Hours)

Introduction to classes – Declaring Objects – Introducing Methods – this Keyword – Garbage Collection – finalize () method – Static class – Method Overloading – Method Overriding – Constructor Overloading - - Inheritance – Multilevel Hierarchy – Abstract class – Final with Inheritance .

SELF STUDY :Constructors

UNIT - III PACKAGES AND THREADS

(12 Hours)

Defining Package Access protection – Importing Packages – Defining Interfaces – Implementing Interfaces – Nested Interface - Exception Types – Using try and catch – Multiple catch – Nested try statements – Built-in Exceptions - Multithreaded Programming – Java Thread Model – Main Thread – Implementing Runnable – Extending Thread – Thread Priorities – Synchronization – Inter-thread communication.

SELF STUDY :Exception Handling

UNIT - IV AWT CLASSES AND CONTROLS

(12 Hours)

The Applet class –Architecture – Skeleton – Applet display methods – HTML Applet tag - AWT classes – Window fundamentals – Frame windows – Color – Fonts – Using Font Metrics – Control fundamentals - Labels – Buttons – Checkbox – Choice control – Lists – Scroll Bars – Layout Managers and Menus – Dialog box – AWT Components.

SELF STUDY :Working with graphics



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UNIT -V DATABASE AND RMI

(12 Hours)

Introduction to JDBC – Installing JDBC – Basic JDBC Programming Concepts - Java RMI - RMI Concepts - Remote Interface - RMI process - Server side - Client side.

SELF STUDY : Passing Objects in RMI :

1. Herbert Schildt, "JAVA the Complete Reference", 9th Edition, Tata McGraw Hill, 2016
2. Jim Keogh, "The Complete Reference J2EE", 3rd Edition, Tata McGraw Hill, Reprint 2010.
3. Ken Arnold, David Holmes, James Gosling, "The JAVA Programming Language", 3rd Edition, PrakashGoteti.

WEB REFERENCES:

1. <https://www.cs.cmu.edu/afs/cs.cmu.edu/user/gchen/www/download/java/LearnJava.pdf>
2. <https://lecturenotes.in/subject/73/java-programming-java>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT - 1 INTRODUCTION				
1.1	An overview of Java & OOPs Concept	1	Chalk & Talk	Black Board
1.2	Data types, Type conversion and casting	2	Chalk & Talk	Black Board
1.3	Variables, arrays	1	Discussion	Google classroom
1.4	Arithmetic, Bitwise operators	2	Chalk & Talk	Black Board
1.5	Relational, Ternary Operator	1	Discussion	Black Board
1.6	operator precedence	1	Lecture	White board
1.7	Control statements	2	Lecture	PPT
1.8	Iteration statements	2	Lecture	White board
UNIT - 2 CLASSES AND METHODS				
2.1	Introduction to classes & Objects	1	Lecture	PPT
2.2	Introducing Methods & Interfaces	2	Chalk & Talk	Black Board
2.3	Constructors, Constructor Overloading	2	Lecture	PPT
2.4	Method Overloading	2	Lecture	White board
2.5	Method Overriding	2	Discussion	Black Board
2.6	Inheritance & its Types	2	Chalk & Talk	Black Board
2.7	Abstract class	1	Chalk & Talk	Black Board
UNIT - 3 PACKAGES AND THREADS				



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3.1	Defining & Importing Packages	1	Lecture	White board
3.2	Defining & Implementing Interfaces	1	Chalk & Talk	Black Board
3.3	Exception Handling	2	Lecture	PPT
3.4	Using try and catch	1	Lecture	White board
3.5	Built-in Exceptions	1	Lecture	PPT
3.6	Multithreaded Programming	1	Discussion	Google classroom
3.7	Implementing Runnable	2	Chalk & Talk	Black Board
3.8	Extending Thread	2	Lecture	PPT
3.9	Synchronization	1	Chalk & Talk	Black Board
UNIT - 4 AWT CLASSES AND CONTROLS				
4.1	Applet class Architecture & Skeleton	1	Lecture	PPT
4.2	HTML Applet tag	1	Lecture	PPT
4.3	AWT classes	2	Chalk & Talk	Black Board
4.4	Frame windows	2	Chalk & Talk	Black Board
4.5	Working with graphics	2	Discussion	Black Board
4.6	Control fundamentals	2	Lecture	PPT
4.7	Layout Managers and Menus	1	Chalk & Talk	Black Board
4.8	AWT Components	1	Discussion	Google classroom
UNIT - 5 DATABASE AND RMI				
5.1	Introduction to JDBC	1	Chalk & Talk	Black Board
5.2	Installing JDBC	2	Lecture	PPT



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5.3	Basic JDBC Programming Concepts	2	Lecture	PPT
5.4	Java RMI	2	Lecture	White board
5.5	RMI Concepts	2	Lecture	White board
5.6	Remote Interface, Passing Objects	1	Lecture	White board
5.7	RMI process	1	Lecture	White board
5.8	Server side - Client side	1	Discussion	PPT



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Apply the basic Java constructs to develop solutions to real time problems.	K2, K4	PSO1 & PSO5
CO 2	Analyze the hierarchy of java classes to develop object oriented programs.	K2, K3, K4	PSO1& PSO2
CO 3	Design software in Java using Packages and Threads.	K2 , K4	PSO1 & PSO3
CO 4	Implement Concepts of AWT for Creating GUI.	K2, K3,K4 & K5	PSO3 & PSO4
CO 5	Design a Software using JDBC and to explain the role of RMI interfaces.	K2,K3,K4 & K5	PSO1&PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	1	1	1
CO2	3	2	1	1	1
CO3	2	1	3	1	1
CO4	1	1	2	3	1
CO5	2	1	1	1	3

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2	1	2	3	1	2	3	2	1
CO2	1	3	2	1	2	2	3	1	1	2	2	1
CO3	3	1	3	1	2	2	3	1	1	3	1	1
CO4	1	1	3	2	3	2	2	2	1	3	2	2
CO5	1	1	2	1	1	2	2	2	3	3	2	3

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

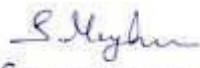
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – S. JEBAPRIYA

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

I MCA

SEMESTER – II

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCADA01	DATA MINING TECHNIQUES	SPECIALIZATION ELECTIVE – DATA ANALYTICS	4	4

COURSE DESCRIPTION

This course provides the basic concepts, principles, methods, implementation techniques and applications of data mining.

COURSE OBJECTIVE

- ❖ To know then scope and necessity of Data mining for the Society.
- ❖ To understand & analyze the various algorithms for Knowledge Extraction.
- ❖ To acquire the basic knowledge of various data mining techniques through Weka tool.



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UNIT I

(12 Hours)

INTRODUCTION:

What is Data Mining? , Data Mining: Definitions, KDD vs Data Mining, Stages of KDD, DBMS vs DM, Other Related Areas, DM Techniques, Other Mining Problems, Issues and Challenges in DM.

SELF STUDY:Issues and Challenges in DM

UNIT II

(12 Hours)

ASSOCIATION RULES:

What is an Association Rule?, Methods to discover Association Rules, A Priori Algorithm, Partition Algorithm, Pincer Search Algorithm, FP-tree Growth Algorithm, Discussion on different algorithms, Generalized Association Rule.

SELF STUDY:Discussion on different algorithms

UNIT III

(12 Hours)

CLUSTERING TECHNIQUES:

Clustering paradigms, Partitioning Algorithms, k-Medoid Algorithms, CLARA, CLARANS, Hierarchical Clustering, DBSCAN.

SELF STUDY:Hierarchical Clustering

UNIT IV

(12 Hours)

WEB MINING:

Web Mining, Web Content Mining, Web Structure Mining, Web Usage Mining, Text Mining.



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TEMPORAL AND SPATIAL DATA MINING:

What is Temporal Data Mining? , Temporal Association Rules, Sequence Mining, The GSP Algorithm, SPIRIT, Spatial Mining, Spatial Mining Tasks, Spatial Clustering, Spatial Trends.

SELF STUDY: SPIRIT

UNIT V WEKA TOOL

(12 Hours)

Introduction, Launching Weka Explorer, Preprocessing Data, File conversion, Opening file from a local file system, Opening file from a web site, Reading data from a database, Preprocessing window, Building Classifiers, Clustering data, Finding associations, Attribute selection, Data visualization.

SELF STUDY :Preprocessing window

REFERENCES :

1. Arun K Pujari , “Data mining Techniques”, Universities Press (India) Private Limited, 2008
2. Jiawei Han, Micheline Kamber, Jian Pei, “Data mining Concepts and Techniques”, Third Edition, Morgan Kaufman Publishers, 2012.
3. Bharat Bhushan Agarwal, Sumit Prakash Tayal, “Data Mining and Data Warehousing”, Laxmi Publications Ltd., 2009
4. Margaret H ,”Data Mining: Introductory And Advanced Topics”, Dunham Pearson Education India, 2006.
5. Usama M.Farrad, GeogoryPiatetsky – Shapiro, Padhraí Smyth and RamasamyUthurusamy, “ Advances in Knowledge Discovery and Data Mining”, The M.I.T. Press 1996.

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1. https://www.tutorialspoint.com/data_mining
2. <http://people.sabanciuniv.edu/berrin/cs512/lectures>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 INTRODUCTION				
1.1	What is Data Mining? , Data Mining: Definitions	2	Lecture	PPT
1.2	KDD vs Data Mining	2	Lecture	PPT
1.3	Stages of KDD	2	Lecture	PPT
1.4	DBMS vs DM	2	Lecture	PPT
1.5	Other Related Areas, DM Techniques	1	Lecture	PPT
1.6	Other Mining Problems	1	Lecture	PPT
1.7	Issues and Challenges in DM	2	Lecture	PPT
UNIT 2 - ASSOCIATION RULES				
2.1	What is an Association Rule?, Methods to discover Association Rules	2	Lecture	PPT
2.2	A Priori Algorithm	2	Chalk & Talk	Black Board
2.3	Partition Algorithm	2	Lecture	PPT
2.4	Pincer Search Algorithm	2	Lecture	White board



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2.5	FP-tree Growth Algorithm	2	Discussion	Black Board
2.6	Discussion on different algorithms, generalized Association Rule	2	Chalk & Talk	Black Board
UNIT 3 - CLUSTERING TECHNIQUES				
3.1	Clustering paradigms	2	Lecture	White board
3.2	Partitioning Algorithms	2	Chalk & Talk	Black Board
3.3	k-Medoid Algorithms	2	Lecture	PPT
3.4	CLARA, CLARANS	2	Lecture	PPT
3.5	Hierarchical Clustering	2	Lecture	White board
3.6	DBSCAN	2	Discussion	Black Board
UNIT 4 - WEB MINING & TEMPORAL AND SPATIAL DATA MINING				
4.1	Web Mining, Web Content Mining	1	Lecture	PPT
4.2	Web Structure Mining, Web Usage Mining	2	Lecture	White board
4.3	Text Mining , What is Temporal Data Mining?	2	Lecture	PPT
4.4	Temporal Association Rules , Sequence Mining	1	Lecture	PPT
4.5	The GSP Algorithm, SPIRIT	2	Lecture	White board
4.6	Spatial Mining, Spatial Mining Tasks	2	Lecture	PPT



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4.7	Spatial Clustering, Spatial Trends	2	Lecture	White board
UNIT V WEKA TOOL				
5.1	Introduction, Launching Weka Explorer	1	Lecture	PPT
5.2	Preprocessing Data, File conversion	1	Demonstration	LCD
5.3	Opening file from a local file system, Opening file from a web site	2	Demonstration	LCD
5.4	Reading data from a database, Preprocessing window	2	Demonstration	LCD
5.5	Building Classifiers, Clustering data	2	Demonstration	LCD
5.6	Finding associations, Attribute selection	2	Demonstration	LCD
5.7	Data visualization	2	Demonstration	LCD



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- **CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Identify the functionalities of Data Mining and various techniques to extract knowledge.	K2, K4	PSO2
CO 2	Analyze the methods to discover Association Rules	K2, K3, K4	PSO1 & PSO2
CO 3	Design & deploy the appropriate Clustering techniques.	K2 , K4	PSO1 & PSO3
CO 4	Outline web mining, temporal and spatial data mining	K2, K3,K4 & K5	PSO1 & PSO4
CO 5	Examine and Explore weka techniques	K2,K3,K4 & K5	PSO2



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	1	1	1
CO2	3	2	1	1	1
CO3	3	1	2	1	1
CO4	3	1	1	2	1
CO5	1	1	2	3	1

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	3	3	3	1	2	2	1	2	1	2
CO2	2	2	3	2	2	3	3	1	1	2	1	1
CO3	1	3	3	3	3	2	2	1	2	2	1	1
CO4	2	2	2	3	3	2	3	2	1	2	1	2
CO5	3	2	2	2	1	3	3	2	1	2	1	2

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

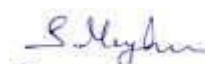
♦ Weakly Correlated -1

COURSE DESIGNER:

Forwarded By

Staff Name – R.SMEETA MARY

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

I MCA

SEMESTER – II

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCADA02	DATA ANALYTICS AND VISUALIZATION USING SPREADSHEETS	SPECIALIZATION ELECTIVE – DATA ANALYTICS	4	4

COURSE DESCRIPTION

This course provides knowledge to perform data analysis using Excel's most popular features.

COURSE OBJECTIVE

- ❖ Learn about the pivot tables in Spreadsheet
- ❖ Provide knowledge on Data Checking and Evaluation.
- ❖ Perform Data Analysis and Evaluation

UNIT I

Introducing Spreadsheet

Building Tables - Analyzing Table Information

Grabbing Data from External Sources



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Getting Data the Export - Import Way - Querying External Databases and Web Page Tables

UNIT II

Cleaning Data

Editing Your Imported Workbook - Cleaning Data with Text Functions

Working with PivotTables

Looking at Data from Many Angles - Running the PivotTable Wizard- Customizing How Pivot Tables Work and Look

UNIT III

Building PivotTable Formulas

Adding Another Standard Calculation - Creating Custom Calculations - Using Calculated Fields and Items - Retrieving Data from a Pivot Table

Working with PivotCharts

Running the PivotTable Wizard - Fooling Around with Your Pivot Chart.

Customizing PivotCharts

Selecting a Chart Type - Working with Chart Styles - Changing Chart Layout - Changing a Chart's Location - Formatting the Plot Area - Formatting the Chart Area

UNIT IV

Using the Database Functions

Using the DAVERAGE Function -Using the DCOUNT and DCOUNTA Functions- Using the DGET Function - Using the DMAX and DMAX Functions - Using the DPRODUCT Function - Using the DSTDEV and DSTDEVP Functions - Using the DSUM Function - Using the DVAR and DVARP Functions

Using the Statistics Functions



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Counting Items in a Data Set - Means, Modes, and Medians - Finding Values, Ranks, and Percentiles - Standard Deviations and Variances - Regression Analysis - Correlation

UNIT V

Descriptive Statistics

Using the Descriptive Statistics Tool - Creating a Histogram - Ranking by Percentile - Calculating Moving Averages Exponential Smoothing - Generating Random Numbers - Sampling Data

Inferential Statistics

Using the t-test Data Analysis Tool - Performing z-test Calculations - Creating a Scatter Plot - Using the Regression Data Analysis Tool - Using the Correlation Analysis Tool - Using the Covariance Analysis Tool - Using the ANOVA Data Analysis Tools - Creating an f-test Analysis - Using Fourier Analysis

REFERENCES:

1. Stephen L. Nelson, and E. C. Nelson, "Excel Data Analysis For Dummies", Second edition, John Wiley & Sons, Inc., 2014
2. Walkenbach, John, "Excel 2016 Bible", John Wiley & Sons, Inc., 2015
3. Jelen, Bill, "Excel 2016 Pivot Table Data Crunching", Pearson Education, Inc, 2016

WEB REFERENCES:

1. owardsdatascience.com/data-analysis-using-excel-885f337c85c
2. <https://people.umass.edu/evagold/excel.html>
3. <https://www.analyticsvidhya.com/blog/2020/04/excel-tips-tricks-data-analysis/>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 Introducing Excel Tables				
1.1	Introducing Spreadsheet	1	Lecture	PPT & White board
1.2	Building Tables	2	Lecture	Smart Board
1.3	Analyzing Table Information	1	Chalk & Talk	Black Board
1.4	Grabbing Data from External Sources	2	Lecture	PPT & White board
1.5	Getting Data the Export	2	Lecture	Smart Board
1.6	Import Way	2	Lecture	PPT & White board
1.7	Querying External Databases and Web Page Tables	2	Discussion	Google classroom
UNIT 2 - Cleaning Data & Working with PivotTables				
2.1	Cleaning Data	1	Lecture	PPT & White board
2.2	Editing Your Imported Workbook	2	Lecture	Smart Board
2.3	Cleaning Data with Text Functions	2	Chalk & Talk	Black Board
2.4	Working with PivotTables	1	Lecture	PPT & White board
2.5	Looking at Data from Many Angles	2	Lecture	PPT & White board



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2.6	Running the PivotTable Wizard	2	Lecture	Smart Board
2.7	Customizing How Pivot Tables Work and Look	2	Chalk & Talk	Black Board
UNIT 3 – PivotTable & PivotCharts				
3.1	Building PivotTable Formulas	1	Lecture	Smart Board
3.2	Adding Another Standard Calculation	1	Chalk & Talk	Black Board
3.3	Creating Custom Calculations - Using Calculated Fields and Items	1	Lecture	PPT & White board
3.4	Retrieving Data from a Pivot Table	1	Discussion	Google classroom
3.5	Working with PivotCharts	1	Lecture	Smart Board
3.6	Running the PivotTable Wizard - Fooling Around with Your Pivot Chart.	2	Chalk & Talk	Black Board
3.7	Customizing PivotCharts	1	Lecture	PPT & White board
3.8	Selecting a Chart Type - Working with Chart Styles - Changing Chart Layout	2	Discussion	Google classroom
3.9	Changing a Chart's Location - Formatting the Plot Area - Formatting the Chart Area	2	Lecture	PPT & White board
UNIT 4 - Database Functions & Statistics Functions				
4.1	Using the Database Functions	1	Lecture	Smart Board
4.2	Using the DAVERAGE Function - Using the DCOUNT and DCOUNTA	2	Lecture	Smart Board



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	Functions			
4.3	Using the DGET Function - Using the DMAX and DMAX Functions - Using the DPRODUCT Function	2	Chalk & Talk	Black Board
4.4	Using the DSTDEV and DSTDEVP Functions - Using the DSUM Function - Using the DVAR and DVARP Functions	2	Lecture	PPT & White board
4.5	Using the Statistics Functions	1	Discussion	Google classroom
4.6	Counting Items in a Data Set - Means, Modes, and Medians	2	Lecture	Smart Board
4.7	Finding Values, Ranks, and Percentiles - Standard Deviations and Variances	1	Chalk & Talk	Black Board
4.8	Regression Analysis - Correlation	1	Lecture	PPT & White board
UNIT -5 Descriptive & Inferential Statistics				
5.1	Descriptive Statistics	1	Lecture	Smart Board
5.2	Using the Descriptive Statistics Tool - Creating a Histogram	2	Chalk & Talk	Black Board
5.3	Ranking by Percentile - Calculating Moving Averages Exponential Smoothing	2	Lecture	PPT & White board
5.4	Generating Random Numbers - Sampling Data	2	Discussion	Google classroom
5.5	Inferential Statistics	1	Lecture	Smart Board



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5.6	Using the t-test Data Analysis Tool - Performing z-test Calculations	1	Chalk & Talk	Black Board
5.7	Creating a Scatter Plot - Using the Regression Data Analysis Tool - Using the Correlation Analysis Tool	1	Lecture	PPT & White board
5.8	Using the Covariance Analysis Tool - Using the ANOVA Data Analysis Tools - Creating an f-test Analysis - Using Fourier Analysis	2	Discussion	Google classroom



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- **CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Ability to analyze data is a powerful skill that helps you make better decisions	K2	PSO1 & PSO5
CO 2	Identify the basic principles of a Pivot Table	K2, K3	PSO1 & PSO2
CO 3	Recognize how to use Pivot Table and Pivot chart	K2 , K4	PSO3 & PSO4
CO 4	Use Excel's powerful functions to efficiently transform mountains of raw data into clear insights	K2,K3,K4	PSO4 & PSO5
CO 5	Use your new-found Excel skills like Descriptive Statistics and Inferential Statistics to analyze what makes a successful project.	K2,K5	PSO3 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	1	1	1	3
CO2	3	2	1	1	1
CO3	1	1	2	2	1
CO4	1	1	3	2	1
CO5	1	1	2	1	3

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

♦ Weakly Correlated -1

Mapping of COs with POs

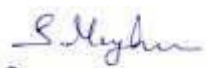
CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	1	2	2	2	3	1	1	1	2
CO2	3	2	2	2	2	2	2	3	1	1	1	2
CO3	3	3	3	2	2	3	2	3	1	2	1	2
CO4	3	3	3	2	3	3	2	3	2	2	1	3
CO5	3	3	3	3	3	3	3	3	2	3	3	3

COURSE DESIGNER:

Forwarded By

Staff Name – S. MARY HELAN FELISTA

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

I MCA

SEMESTER – II

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCADS01	DATA COMMUNICATION & NETWORKING	SPECIALIZATION ELECTIVE – DISTRIBUTED SYSTEM SECURITY	4	4

COURSE DESCRIPTION

This course provides the basic concepts, design principles and underlying technologies of networking.

COURSE OBJECTIVE

- ❖ To familiarize with the basic taxonomy & terminology of data communication.
- ❖ To analyze the function & design strategies of Physical, Datalink, Network and Transport layer.
- ❖ To acquire the basic knowledge of various Application protocols.



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UNIT – I OVERVIEW

(12 Hours)

Introduction: Data Communications – Networks - Network Models: Layered tasks- OSI Model- Layers in the OSI model- TCP/ IP protocols suite- Addressing.

SELF STUDY: OSI Model

UNIT – II PHYSICAL LAYER & MEDIA, DATA LINK LAYER

(12 Hours)

Digital Transmission: Transmission Modes - Transmission Media- Guided Media- Unguided Media.

Switching – Circuit switched Network- Datagram Network- Virtual Circuit Network - Error detection and Correction- Introduction- Block Coding - Data link Control: Framing- Flow and Error control- Protocols- Noiseless Channels- Noisy Channels.

UNIT - III NETWORK LAYER & TRANSPORT LAYER

(12 Hours)

Network Layer: Internet Protocol - Internetworking- IPV4- IPV4- Transition from IPV4 to IPV4 - Routing: Unicast Routing Protocols

Transport Layer: Process-to-Process delivery- UDP – TCP – SCTP.

SELF STUDY: Transition from IPV4 to IPV4

UNIT –IV APPLICATION LAYER

(12 Hours)

Domain Name System : Name Space - Domain Name Space- Distribution of Name Space- DNS in the Internet – DNS Messages- Resolution - Remote Login – DNS Messages – Types of records.

Remote Logging, Electronic Mail and File Transfer: Remote Logging - Email- FTP.

SELF STUDY: Name Space – Domain name space – DNS Messages – Resolution- Remote Login – Email.



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UNIT –V NETWORK SIMULATOR (NS2)

(12 Hours)

Introduction – Features of NS2 – Basic architecture – TCL & C++ - Installation of NS2 – Example on NS2 – Advantages and Dis advantages of NS2

NS Components – Basic Tcl – Simple two node wired network – Adding traffic to the Link – Simulate a topology – UDP Traffic – TCP Traffic

SELF STUDY:Advantages and Dis advantages of NS2

REFERENCES:

1. BEHROUZ A FOROUZAN, “Data Communication and Networking”, 4th Edition, Tata McGraw Hill.
2. Andrew. S. Tanenbaum, “Data Communication and Networking”, 4th Edition, Pearson Education.
3. TeerawatIssariyakul, Ekram Hossain, “Introduction to Network Simulator NS2”, Springer, 2nd Edition

WEB REFERENCES:

1. <http://www.omnisecu.com/basic-networking/>
2. <https://www.tutorialweb.com/ns2/NS2-1.htm>
3. <https://www.isi.edu/nsnam/ns/>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 OVERVIEW				
1.1	Introduction: Data Communications	2	Chalk & Talk	Black Board
1.2	Networks	2	Chalk & Talk	Black Board
1.3	Network Models: Layered tasks	2	Chalk & Talk	Black Board
1.4	OSI Model - Layers in the OSI model	2	Chalk & Talk	Black Board
1.5	TCP/ IP protocols suite	2	Lecture	White board
1.6	Addressing.	2	Chalk & Talk	Black Board
UNIT - 2 PHYSICAL LAYER & MEDIA, DATA LINK LAYER				
2.1	Transmission Media	2	Chalk & Talk	Black Board
2.2	Switching	1	Lecture	PPT
2.3	Datagram Network	1	Lecture	White board
2.4	Virtual Circuit Network	1	Discussion	Black Board
2.5		1	Chalk & Talk	Black Board



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	Data link Control: Framing- Flow and Error control			
2.6	Protocols - Noiseless Channels	3	Chalk & Talk	Black Board
2.7	Protocols – Noisy Channels	3	Lecture	White board
UNIT – 3 NETWORK LAYER& TRANSPORT LAYER				
3.1	Internet Protocol- Internetworking - IP V4 –	2	Lecture	White board
3.2	IP V4 – Transition from IP v4 – IP v4	1	Chalk & Talk	Black Board
3.3	Delivery, Forwarding & Routing	1	Lecture	PPT
3.4	Unicast Routing Protocols	2	Chalk & Talk	Black Board
3.5	Process-to-Process delivery	1	Lecture	PPT
3.6	UDP	2	Lecture	PPT
3.7	TCP	1	Chalk & Talk	Black Board



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3.8	SCTP	2	Chalk & Talk	Black Board
UNIT – 4 APPLICATION LAYER				
4.1	Domain Name System :Name Space	1	Chalk & Talk	Black Board
4.2	Domain Name Space	1	Lecture	PPT
4.3	Distribution of Name Space	1	Lecture	PPT
4.4	DNS in the Internet	1	Lecture	White board
4.5	DNS Messages	1	Lecture	White board
4.6	Resolution	2	Lecture	White board
4.7	Remote Login	1	Lecture	White board
4.8	Remote Logging, Electronic Mail and File Transfer: Remote Logging	1	Chalk & Talk	Black Board
4.9	Email	1	Lecture	White board
4.10	FTP	2	Chalk & Talk	Black Board
UNIT – 5 NETWORK SIMULATOR				
5.1	Introduction – Features of NS2	1	Chalk & Talk	Black Board
5.2	Basic architecture – TCL & C++	1	Lecture	PPT
5.3	Installation of NS2 – Example on NS2	2	Lecture	PPT
5.4	Advantages and Dis advantages of NS2	1	Lecture	PPT
5.5	NS Components – Basic Tcl	1	Lecture	PPT



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5.6	Simple two node wired network	2	Demonstration	White board
5.7	Adding traffic to the Link	2	Demonstration	White board
5.8	Simulate a topology – UDP Traffic – TCP Traffic	2	Demonstration	White board



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- **CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Identify the functionalities of Networking layers of both OSI and TCP/IP reference models.	K2, K4	PSO1 & PSO2
CO 2	Analyze the design issues of Datalink layer and techniques to resolve it.	K2, K3, K4	PSO2 & PSO3
CO 3	Compare the principles of Internet protocols and Routing algorithm. Predict the TCP and UDP related procedures	K2 , K4	PSO3
CO 4	Outline the Application layer protocols.	K2, K3,K4 & K5	PSO1 & PSO4
CO 4	Examine and Explore Network Simulation techniques	K2,K3,K4 & K5	PSO4



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	1	1
CO2	1	3	2	1	1
CO3	3	1	3	1	1
CO4	2	1	1	3	1
CO5	1	1	1	3	1

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

♦ Weakly Correlated -1

Mapping of COs with POs

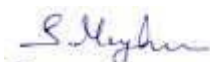
CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12
CO1	3	3	1	2	2	3	3	1	1	3	1	2
CO2	1	2	2	2	3	2	2	3	1	2	3	2
CO3	1	3	1	2	2	3	3	1	3	3	2	3
CO4	2	2	3	3	1	1	2	1	2	2	2	2
CO5	1	2	3	1	1	3	2	2	2	2	1	2

COURSE DESIGNER:

Forwarded By

Staff Name – P. Nancy Vincentina Mary

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

I MCA

SEMESTER – II

(For those who join in 2020 onwards)

PROGRAM ME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
MCA	20MCADS02	WIRELESS COMMUNICATIO N & SECURITY	SPECIALIZATION ELECTIVE – DISTRIBUTED SYSTEM SECURITY	4	4

COURSE DESCRIPTION

This course provides knowledge on key mobile system and wireless communication. It also aims at developing applications using Android

COURSE OBJECTIVE

- ❖ To learn the basic concepts of MAC, SDMA, TDMA, FDMA, CDMA.
- ❖ To have an exposure about GSM and Satellites.
- ❖ To be familiar with wireless protocols, WLAN, Bluetooth.
- ❖ To be acquainted with the Mobile Internet Protocol.
- ❖ To understand the basic concepts of SIP.



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UNIT – I INTRODUCTION

(12 Hours)

Applications - History of wireless communication - Simplified reference model- Medium Access Control - Motivation for a specified MAC- SDMA- FDMA- TDMA- CDMA – Comparison of SDMA, TDMA, FDMA, CDMA.

SELF STUDY: History of wireless communication

UNIT – II Mobile Networks

(12 Hours)

GSM - Mobile services- System Architecture- Protocols- Handover – Security - New data services – DECT – TETRA – Satellite systems –Introduction – Applications - Basics- Routing- Localization- Handover.

SELF STUDY: Satellite systems Basics

UNIT – III Wireless Systems

(12 Hours)

Infra Red Vs Radio transmission- Infrastructure and Adhoc Networks- IEEE 802.11 System Architecture - Protocol Architecture – Newer developments - Bluetooth- Architecture- Link manager Protocol – Security – SDP – IEEE 802.15.

SELF STUDY: Bluetooth

UNIT – IV Mobile IP

(12 Hours)

Basics – IP Packet delivery – Tunneling and encapsulation – IP micro mobility support – Dynamic host configuration protocol – Mobile ad-hoc networks – Overview ad-hoc routing protocols.

UNIT – SIP

(12 Hours)

Introduction - VoIP Technology – SIP Overview – Network Elements – SIP System Architecture – SIP Basic call flow - SIP trapezoid – SIP Messaging – SIP Response Codes – SIP Headers.

SELF STUDY: SIP Headers



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REFERENCES:

- 1 Jochen Schiller, "Mobile communication", Second Edition, Pearson Education, 12th Impression, 2013.
2. Wei- Manglee, "Beginning Android 4 Application Development", Wiley India pvt ltd, Reprint 2013
3. Reto Meier, "Professional Android4 Application Development", Wiley India Edition.
4. Wallace B. Maclure, Nathan Blevins, John J Croft IV, Jonathan Dick, Chris Hardly, "Professional Android Programming", Wiley India Edition

WEB REFERENCES:

1. https://www.tutorialspoint.com/session_initiation_protocol/session_initiation_protocol_introduction.htm
2. <https://nsrc.org/wrc/data/2004/629197984427ef56fc2cd1/sanog4-aarati-voiptut.pdf>
3. <http://www.cse.psu.edu/~pdm12/cse545-s11/slides/cse545-voip.pdf>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 INTRODUCTION				
1.1	Introduction	1	Chalk & Talk	Black Board
1.2	Applications - History of wireless communication	1	Discussion	Google classroom
1.3	Simplified reference model-	1	Lecture	PPT & White board
1.4	MAC- Motivation for a specified MAC	2	Lecture	Smart Board
1.5	SDMA- FDMA	2	Lecture	Black Board
1.6	TDMA	3	Lecture	PPT & White board
1.7	CDMA.	2	Lecture	PPT & White board
UNIT 2 - MOBILE NETWORKS				
2.1	GSM:Mobile services	1	Discussion	Black Board
2.2	Protocols, System Architecture	3	Lecture	Google classroom
2.3	Handover	1	Lecture	PPT & White board



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2.4	Security	1	Lecture	Smart Board
2.5	GPRS	1	Lecture	Black Board
2.6	New data services	1	Lecture	PPT & Black board
2.7	DECT, TETRA	1	Lecture	PPT
2.8	Satellite systems- Basics	1	Lecture	PPT & White board
2.9	Routing- Localization- Handover	2	Lecture	PPT & White board
UNIT 3 – WIRELESS SYSTEMS				
3.1	Wireless LAN: IR Vs Radio transmission , Infrastructure and Adhoc Networks	1	Discussion	Black Board
3.2	IEEE 802.11 System Architecture	1	Lecture	PPT
3.3	IEEE 802.11 Protocol Architecture	2	Lecture	PPT & White board
3.4	Newer developments	1	Lecture	Smart Board
3.5	Bluetooth Architecture	1	Lecture	Black Board
3.6	Link manager Protocol	2	Lecture	PPT & Black board
3.7	Security – SDP	2	Lecture	PPT & White board
3.8	IEEE 802.15	2	Lecture	PPT & White board
UNIT 4 – MOBILE IP				



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4.1	Basics of Mobile IP, IP Packet delivery	2	Lecture	PPT
4.2	Tunneling and encapsulation	2	Lecture	PPT
4.3	IP micro mobility support	2	Lecture	PPT
4.4	Dynamic host configuration protocol	2	Lecture	PPT
4.4	Mobile ad-hoc networks	2	Lecture	PPT & White board
4.5	Ad-hoc routing protocols	2	Lecture	PPT
UNIT -5 – SIP				
5.1	VoIP Technology	1	Lecture	PPT
5.2	SIP Overview	2	Lecture	PPT
5.3	Network Elements	1	Lecture	Smart Board
5.4	SIP System Architecture	2	Lecture	PPT
5.5	SIP Basic call flow	1	Lecture	PPT
5.6	SIP trapezoid	1	Lecture	Smart Board
5.7	SIP Messaging	2	Lecture	PPT
5.8	SIP Response Codes	1	Discussion	Black Board
5.9	SIP Headers.	1	Lecture	PPT



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- **CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Identify, Predict and Evaluate MAC, SDMA, TDMA, FDMA, CDMA	K2, K4	PSO1 & PSO3
CO 2	Demonstrate the architectures, challenges and solutions of Wireless communication	K2, K3, K4	PSO2 & PSO3
CO 3	Assess the role of Wireless Networks in shaping the future internet.	K2 , K4	PSO3 & PSO5
CO 4	Design Mobile IP to support seamless and continuous Internet connectivity	K2, K3,K4 & K5	PSO1 & PSO4
CO 5	Design SIP to create, modify, and terminate a multimedia session over the Internet Protocol.	K2,K3,K4 & K5	PSO1 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	2
CO2	1	3	2	1	1
CO3	1	1	3	1	2
CO4	2	1	1	3	1
CO5	2	1	1	1	3

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

♦ Weakly Correlated -1

Mapping of COs with POs

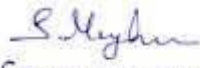
CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2	1	2	2	2	1	1	1	2	1
CO2	3	2	2	1	1	3	3	1	1	1	3	1
CO3	1	2	1	1	1	2	2	2	1	3	2	2
CO4	1	1	3	2	2	2	1	1	1	1	2	1
CO5	2	2	3	1	1	3	2	1	2	3	1	1

COURSE DESIGNER:

Forwarded By

Staff Name – S. JEBAPRIYA

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

I MCA

SEMESTER –II

(For those who join in 2020 onwards)

PROGRAM ME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WE EK	CREDIT S
MCA	20MCAAM 01	ARTIFICIAL INTELLIGEN CE & EXPERT SYSTEMS	SPECIALIZATI ON ELECTIVE – AI & MACHINE LEARNING	4	4

COURSE DESCRIPTION

This course provides the basic principles of artificial intelligence. It will cover problem solving paradigms, constraint propagation and search strategies in the areas of applications including knowledge representation, natural language processing, expert systems, vision and robotics.

COURSE OBJECTIVE

- ❖ To learn the methods of solving problems using Artificial Intelligence.
- ❖ To have an understanding of the basic issues of knowledge representation, blind and heuristic search.
- ❖ To have a basic proficiency in a traditional AI language and ability to write simple to intermediate programs in expert systems through scikit learn tools.



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UNIT – I AI Problems and Problem Characteristics

(12 Hours)

The AI Problems – The underlying assumption - AI techniques – The level of the model – Criteria for success - Problems , Problem space and search – Defining the problem as a state space search – Production Systems – Problem characteristics – Production system characteristics – Issues in the design of search programs- Additional problems.

Self Study :Problem characteristics

UNIT II Search Techniques

(12 Hours)

Heuristic search techniques – Generate and test – Hill climbing – Best first search – Problem reduction – Constraint satisfaction – Means ends analysis. Knowledge Representation Issues- Representations and Mappings- Approaches to Knowledge Representation – Issues in Knowledge Representation – The Frame Problem.

Self Study :Constraint satisfaction

UNIT III Using predicate logic

(12 Hours)

Using predicate logic – Representing simple facts in logic – Representing instance and ISA relationship – Computable functions and predicates – Resolution – Natural deduction - Representing knowledge – Using rules – Procedural versus declarative knowledge – Logic programming – forward versus backward reasoning – Matching – Control knowledge.

Self Study :Natural deduction

UNIT IV Filler Structure and Game playing

(12 Hours)

Weak Slot and Filler Structure: Semantic Nets- Frames. Strong Slot and Filler Structure: Conceptual Dependency- Scripts-CYC. Game playing- The



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minimax search procedure- Adding alpha beta cutoffs- additional refinements- Iterative Deepening.

Self Study :Scripts

UNITV AI Learning, Expert systems and Scikit-Learn (12 Hours)

What is Learning – ROTE Learning - Learning by Taking Advice – Learning in Problem solving –Explanation-based Learning - Discovery – Analogy – Formal Learning Theory. Expert Systems – Representing and using domain knowledge – Expert System Shells – Explanation- Scikit-Learn – Introduction - Modelling process - Data Representation - Estimator API – Conventions - Linear Modelling - Support Vector Machine - Classification with Naïve Bayes - Decision Trees - Clustering Methods.

Self Study :Knowledge Acquisition

REFERENCE BOOKS

1. Elaine Rich, Kevin Knight, “Artificial Intelligence”,III Edition McGraw Hill Education Pvt Ltd.
2. Mishra Ravi Bhushan, “Artificial Intelligence”, PHI learning Pvt. Ltd,2011
3. Kaushik saroj, “Artificial Intelligence” ,Cengage learning India Pvt. Ltd,2011.

WEB RESOURCES

1. http://en.wikipedia.org/wiki/Artificial_intelligence
2. http://www.cee.hw.ac.uk/~alison/ai3notes/subsection2_6_2_3.html
3. <http://starbase.trincoll.edu/~ram/cpsc352/notes/heuristics.html>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 AI PROBLEMS AND PROBLEM CHARACTERISTICS				
1.1	The AI Problems , The underlying assumption	2	Chalk & Talk	Black Board
1.2	AI techniques, The level of the model	2	Chalk & Talk	Black Board
1.3	Criteria for success ,Problems , Problem space and search	2	Lecture	White board
1.4	Defining the problem as a state space search ,Production Systems	2	Chalk & Talk	Black Board
1.5	Problem characteristics , Production system characteristics	2	Discussion	Black Board
1.6	Issues in the design of search programs, Additional problems.	2	Lecture	White board
UNIT - 2 SEARCH TECHNIQUES				
2.1	Heuristic search techniques , Generate and test	2	Lecture	PPT
2.2	Hill climbing , Best first search, Problem reduction	3	Chalk & Talk	Black Board
2.3	Constraint satisfaction , Means ends analysis, Knowledge	2	Lecture	PPT



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	Representation Issues			
2.4	Representations and Mappings, Approaches to Knowledge Representation	3	Lecture	White board
2.5	Issues in Knowledge Representation , The Frame Problem.	2	Discussion	Black Board
UNIT – 3 USING PREDICATE LOGIC				
3.1	Using predicate logic , Representing simple facts in logic	1	Lecture	White board
3.2	Representing instance and ISA relationship	1	Chalk & Talk	Black Board
3.3	Computable functions and predicates	1	Lecture	PPT
3.4	Resolution , Natural deduction	1	Lecture	White board
3.5	Representing knowledge , Using rules	1	Discussion	Black Board
3.6	Procedural versus declarative knowledge	2	Lecture	PPT
3.7	Logic programming	1	Chalk & Talk	Black Board
3.8	forward versus backward reasoning	2	Lecture	White board
3.9	Matching	1	Chalk & Talk	Black Board
3.10	Control knowledge	1	Chalk & Talk	Black Board
UNIT - 4 FILLER STRUCTURE AND GAME PLAYING				
4.1	Weak Slot and Filler Structure:	1	Lecture	PPT



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	Semantic Nets			
4.2	Frames.	2	Lecture	PPT
4.3	Strong Slot and Filler Structure, Conceptual Dependency	1	Chalk & Talk	Black Board
4.4	Scripts, CYC.	2	Chalk & Talk	Black Board
4.5	Game playing	1	Discussion	Black Board
4.6	The minimax search procedure	2	Lecture	PPT
4.7	Adding alpha beta cutoffs, additional refinements	2	Chalk & Talk	Black Board
4.8	Iterative Deepening.	1	Lecture	PPT
UNIT – 5 AI LEARNING AND EXPERT SYSTEMS				
5.1	What is Learning , ROTE Learning	1	Chalk & Talk	Black Board
5.2	Learning by Taking Advice , Learning in Problem solving	1	Lecture	PPT
5.3	Explanation, based Learning , Discovery	1	Lecture	PPT
5.4	Analogy , Formal Learning Theory	1	Lecture	White board
5.5	Expert Systems, Representing and using domain knowledge	1	Lecture	White board
5.6	Expert System Shells, Explanation	1	Lecture	White board
5.7	Scikit-Learn - Introduction, Modelling process	1	Chalk & Talk	White Board
5.8	Data Representation, Estimator API	1	Demonstration	LCD
5.9	Conventions, Linear Modelling	1	Demonstration	LCD



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5.10	Support Vector Machine, Classification with Naïve Bayes	1	Demonstration	LCD
5.11	Decision Trees, Clustering Methods.	2	Demonstration	LCD



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- **CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Identify problems that are amenable to solution by AI methods.	K2, K4	PSO1, PSO2
CO 2	Formulate search problems and implement search algorithms using admissible heuristics.	K2, K3, K4	PSO2, PSO3
CO 3	Design and carry out an empirical evaluation of different algorithms on a predicate logic and state the conclusions that the evaluation supports.	K2, K4	PSO1, PSO3
CO 4	Analyze games playing as adversarial search problems and implement optimal and efficient solutions.	K2, K3, K4 & K5	PSO4, PSO5
CO 5	Apply the concepts of Expert Systems in machine learning, Examine and Explore scikit learn techniques	K2, K3, K4 & K5	PSO3, PSO4



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	1	1
CO2	1	2	3	1	1
CO3	3	1	2	1	1
CO4	1	1	1	2	3
CO5	1	1	2	3	1

Mapping of COs with Pos

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	3	1	2	1	1	1	1	1	1	1	1
CO2	1	1	3	1	2	1	1	1	1	1	1	1
CO3	1	3	1	1	1	1	1	2	1	1	1	1
CO4	1	3	1	1	1	2	1	1	1	1	1	1
CO5	3	1	1	1	1	1	2	1	1	1	1	1

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

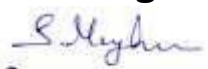
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – R. SMEETA MARY

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

I MCA

SEMESTER –II

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCAAM02	SOFT COMPUTING	SPECIALIZATION ELECTIVE – AI & MACHINE LEARNING	4	4

COURSE DESCRIPTION

This course provides the principal constituents of soft computing that is fuzzy logic, neural network theory and probabilistic reasoning. The course explores the features that are employed in various associated techniques.

COURSE OBJECTIVE

- ❖ To master the various fundamental models of artificial neural networks.
- ❖ To cater the knowledge of Neural Networks and use these for controlling real time systems.
- ❖ To use the fuzzy logic and neural network for application related to design and manufacture.

UNIT – I FUNDAMENTALS OF NEURAL NETWORKS

(12 Hours)

Basic Concepts of Neural Networks – Human Brain - Model of An Artificial Neuron – Neural Network Architectures –Single Layer Feedforward Network – Multilayer Feedforward Network – Recurrent Networks - Learning Methods – Taxonomy of



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Neural Network Architectures –History of Neural Networks Research-Early Neural Networks Architectures – Rosenblatt's Perception – ADALINE Network – MADELINE Networks.

SELF STUDY :Single Layer Feedforward Network

UNIT II BACK PROPAGATION NETWORKS

(12 Hours)

Architecture of back propagation network – The Perceptron Model – The Solution – Single Layer Artificial Neural Network – Model for Multilayer Perceptron - Back Propagation Learning – Input Layer Computation – Hidden Layer Computation – Output Layer Computation – Calculation of Error – Training of Neural Network – Method of Steepest Descent – Effect of Learning Rate – Adding a Momentum Term – Backpropagation Algorithm - Applications – Design of Journal Bearing – Classification of Soil – Hot Extrusion of Steel - Selection Of Various Parameters in BPN – Number of Hidden Nodes – Momentum Coefficient – Sigmoidal Gain – Local Minima – Learning Coefficient.

SELF STUDY :Single Layer Artificial Neural Network

UNIT III ADAPTIVE REASONANCE THEORY

(12 Hours)

Introduction –Cluster Structure – Vector Quantization – Classical ART Networks – Simplified SRT Architecture - ART 1 – Architecture of ART1 – Special Features of ART1 Models – ART1 Algorithm - ART2 – Architecture – ART2 Algorithm - Applications –Character Recognition Using ART1 – Classification of Soil – Prediction of Load from Yield Line Patterns of Elastic Plastic Clamped Square Plate - Sensitivities of ordering of data.

SELF STUDY :Vector Quantization



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UNIT IV

(12 Hours)

FUZZY LOGIC PRINCIPLES, CLASSICAL SETS AND FUZZY SETS

The Case for Imprecision - A Historical Perspective - The Utility of Fuzzy Systems - Limitations of Fuzzy Systems - The Illusion: Ignoring Uncertainty and Accuracy - Uncertainty and Information - The Unknown - Fuzzy Sets and Membership - Chance Versus Fuzziness - Sets as Points in Hypercubes - Classical Sets - Operations on Classical Sets - Properties of Classical (Crisp) Sets - Mapping of Classical Sets to Functions - Fuzzy Sets - Fuzzy Set Operations - Properties of Fuzzy Sets - Alternative Fuzzy Set Operations.

SELF STUDY :Limitations of Fuzzy Systems

UNIT V

(12 Hours)

CLASSICAL RELATIONS AND FUZZY RELATIONS, PROPERTIES OF MEMBERSHIP FUNCTIONS, FUZZIFICATION, AND DEFUZZIFICATION

Cartesian Product - Crisp Relations - Cardinality of Crisp Relations - Operations on Crisp Relations - Properties of Crisp Relations - Composition - Fuzzy Relations - Cardinality of Fuzzy Relations - Operations on Fuzzy Relations - Properties of Fuzzy Relations - Fuzzy Cartesian Product and Composition - Tolerance and Equivalence Relations - Crisp Equivalence Relation - Crisp Tolerance Relation .

Features of the Membership Function - Various Forms - Fuzzification - Defuzzification to Crisp Sets - λ -Cuts for Fuzzy Relations - Defuzzification to Scalars.

SELF STUDY :Cartesian Product.



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REFERENCES:

1. Rajasekaran. S..VijayalakshmiPai. G.A. “Neural Networks, Fuzzy Logic and Genetic Algorithms”, Prentice Hall of India Private Limited, 2011
2. Timothy J.Ross, “Fuzzy logic with Engineering Applications”, McGraw Hill, 2011
3. S.Rajasekaran, G. A. VijayalakshmiPai “Neural Networks, Fuzzy Systems and Evolutionary Algorithms Synthesis and Applications” 2nd Edition, PHI 2017.
4. LauranceFausett, “Fundamentals of Neural Networks”, Prentice hall, 2006.

WEB REFERENCES:

1. http://en.wikipedia.org/wiki/Neural_network
2. http://en.wikipedia.org/wiki/Fuzzy_logic
3. <https://books.google.co.in/books?isbn=8120321863>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT - 1 FUNDAMENTALS OF NEURAL NETWORKS				
1.1	Basic Concepts of Neural Networks , Human Brain	1	Chalk & Talk	Black Board
1.2	Model of An Artificial Neuron , Neural Network Architectures	2	Chalk & Talk	Black Board
1.3	Single Layer Feedforward Network , Multilayer Feedforward Network	1	Lecture	White board
1.4	Recurrent Networks , Learning Methods	1	Chalk & Talk	Black Board
1.5	Taxonomy of Neural Network Architectures	2	Discussion	Black Board
1.6	History of Neural Networks Research	2	Lecture	White board
1.7	Early Neural Networks Architectures , Rosenblatt's Perception	1	Lecture	White board
1.8	ADALINE Network , MADELINE Networks	2	Discussion	Google classroom
UNIT - 2 BACK PROPAGATION NETWORKS				
2.1	Architecture of back propagation network , The Perceptron Model , The Solution	1	Lecture	PPT



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2.2	Single Layer Artificial Neural Network , Model for Multilayer Perceptron	2	Chalk & Talk	Black Board
2.3	Back Propagation Learning , Input Layer Computation , Hidden Layer Computation	2	Lecture	PPT
2.4	Output Layer Computation , Calculation of Error , Training of Neural Network	1	Lecture	White board
2.5	Method of Steepest Descent , Effect of Learning Rate	1	Discussion	Black Board
2.6	Adding a Momentum Term , Backpropagation Algorithm , Applications	1	Chalk & Talk	Black Board
2.7	Design of Journal Bearing , Classification of Soil , Hot Extrusion of Steel	2	Chalk & Talk	Black Board
2.8	Selection Of Various Parameters in BPN , Number of Hidden Nodes , Momentum Coefficient	1	Lecture	PPT
2.9	Sigmoidal Gain , Local Minima , Learning Coefficient	1	Lecture	PPT
UNIT – 3 ADAPTIVE REASONANCE THEORY				
3.1	Introduction , Cluster Structure	1	Lecture	White board
3.2	Vector Quantization , Classical ART Networks	1	Chalk & Talk	Black Board



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3.3	Simplified SRT Architecture , ART 1 , Architecture of ART1	2	Lecture	PPT
3.4	Special Features of ART1 Models , ART1 Algorithm	2	Lecture	White board
3.5	ART2 , Architecture , ART2 Algorithm , Applications	2	Discussion	Black Board
3.6	Character Recognition Using ART1 , Classification of Soil	2	Lecture	PPT
3.7	Prediction of Load from Yield Line Patterns of Elastic Plastic Clamped Square Plate	1	Chalk & Talk	Black Board
3.8	Sensitivities of ordering of data	1	Lecture	White board
UNIT - 4 FUZZY LOGIC PRINCIPLES, CLASSICAL SETS AND FUZZY SETS				
4.1	The Case for Imprecision , A Historical Perspective	2	Lecture	PPT
4.2	The Utility of Fuzzy Systems , Limitations of Fuzzy Systems	2	Lecture	PPT
4.3	The Illusion: Ignoring Uncertainty and Accuracy	1	Chalk & Talk	Black Board
4.4	Uncertainty and Information , The Unknown , Fuzzy Sets and Membership	1	Chalk & Talk	Black Board
4.5	Chance Versus Fuzziness , Sets as	1	Discussion	Black Board



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	Points in Hypercubes			
4.6	Classical Sets , Operations on Classical Sets	1	Lecture	PPT
4.7	Properties of Classical (Crisp) Sets , Mapping of Classical Sets to Functions	1	Chalk & Talk	Black Board
4.8	Fuzzy Sets , Fuzzy Set Operations	1	Lecture	PPT
4.9	Properties of Fuzzy Sets , Alternative Fuzzy Set Operations	2	Lecture	PPT
UNIT – 5 CLASSICAL RELATIONS AND FUZZY RELATIONS, PROPERTIES OF MEMBERSHIP FUNCTIONS, FUZZIFICATION, AND DEFUZZIFICATION				
5.1	Cartesian Product , Crisp Relations	1	Chalk & Talk	Black Board
5.2	Cardinality of Crisp Relations , Operations on Crisp Relations	1	Lecture	PPT
5.3	Properties of Crisp Relations , Composition	1	Lecture	PPT
5.4	Fuzzy Relations , Cardinality of Fuzzy Relations	1	Lecture	White board
5.5	Operations on Fuzzy Relations , Properties of Fuzzy Relations	2	Lecture	White board
5.6	Fuzzy Cartesian Product and Composition	1	Lecture	White board
5.7	Tolerance and Equivalence Relations , Crisp Equivalence Relation	1	Lecture	White board



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5.8	Crisp Tolerance Relation . Features of the Membership Function	1	Chalk & Talk	Black Board
5.9	Various Forms , Fuzzification	1	Chalk & Talk	Black Board
5.10	Defuzzification to Crisp Sets , λ -Cuts for Fuzzy Relations	1	Discussion	Black Board
5.11	Defuzzification to Scalars	1	Chalk & Talk	Black Board



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- **CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explore the functional components of artificial neural networks..	K2, K4	PSO1 & PSO2
CO 2	Examine the principles of back propagation networks.	K2, K3, K4	PSO1 & PSO2
CO 3	Expose the students to the concepts of predicting the functionalities of ART.	K2 , K4	PSO3 & PSO5
CO 4	Analyze the logic principle of classical sets and fuzzy set operations in fuzzy set theory.	K2, K3,K4 & K5	PSO3 & PSO4
CO 5	Identify the concept of fuzzification and defuzzification involved in various systems.	K2,K3,K4 & K5	PSO4 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	1	1
CO2	2	3	1	1	1
CO3	1	1	2	1	3
CO4	1	1	3	2	1
CO5	1	1	1	3	2

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	1	1	1	3	1	1	1	1	1	1
CO2	1	1	1	1	3	1	1	1	1	1	2	1
CO3	1	1	2	1	1	1	1	1	3	1	1	1
CO4	3	1	1	1	1	1	2	1	1	1	1	1
CO5	1	3	1	2	1	1	1	1	1	1	1	1

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

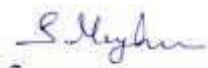
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – R. SMEETA MARY

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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EMPLOYABILITY-100%

I MCA

SEMESTER – II

(For those who joined in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCA204	Lab III – WEB TECHNOLOGIES	MAJOR LAB	4	2

COURSE DESCRIPTION

This course provides information about two powerful technologies. Together, these two technologies provide a powerful platform for building database-driven Web applications.

COURSE OBJECTIVE

- ❖ To understand how client side and server-side programming works on the web.
- ❖ To Test, debug and deploy web pages containing PHP and MySQL.
- ❖ To create, read and process data in a MySQL database.

LAB LIST

1. Basic programs in HTML5, CSS3, JavaScript and jquery
2. Program for implementing mathematical functions.
3. Program for implementing string functions.
4. Program for Validating Registration Form.
5. Program to create Login form using PHP and MYSQL.
6. Program for online quiz using PHP and MYSQL.
7. Programs for manipulating MYSQL database



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-
8. Program for uploading an image using PHP and MYSQL.
 9. Program for Pagination using PHP and MYSQL.
 10. Program for Cookie manipulation using PHP.
 11. Program for Session manipulation using PHP.



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Design WebPages using server side scripting.	K1	PSO1, PSO2 & PSO3
CO 2	Use PHP built-in functions and custom functions for processing.	K1, K2,	PSO1, PSO3 & PSO4
CO 3	Create various interactive and dynamic websites	K1 & K3	PSO4 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	2	1	1
CO2	3	1	2	2	1
CO3	1	1	1	2	2

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	1	1	2	3	1	2	1	2
CO2	3	2	2	1	1	1	2	3	1	2	1	2
CO3	3	2	3	2	2	2	2	3	2	2	1	3

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

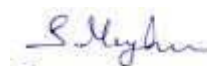
♦ Weakly Correlated

COURSE DESIGNER:

Staff Name – S. MARY HELAN FELISTA

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HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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EMPLOYABILITY-100%

I MCA

SEMESTER – II

(For those who join in 2020 onwards)

PROGRAMM E CODE	COURSE CODE	COURSE TITLE	CATEGOR Y	HRS/WEE K	CREDIT S
MCA	20MCA20 5	LAB IV – JAVA PROGRAMMIN G	MAJOR LAB	4	2

COURSE DESCRIPTION

This course provides experiential learning in the implementation of Core Java Programming.

COURSE OBJECTIVE

- ❖ To understand the basic Java programming constructs
- ❖ To develop program by using OOPS concept.
- ❖ To handle Packages, Exception , Basics of AWT and Applets.
- ❖ To create and manipulate databases in Java using JDBC.



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LAB LIST

1. Programs using Basic Programming Constructs
2. Programs implementing Classes.
3. Programs for implementing Inheritance
4. Programs for implementing Abstract Classes
5. Programs for implementing a Stack Class
6. Programs for implementing Constructor Overloading
7. Programs for implementing Method Overloading
8. Programs for implementing Method Overriding
9. Programs for Handling Errors using Exception Handling
10. Programs using Interfaces.
11. Programs on Packages.
12. Programs on Multithreading
13. Programs in Applets.
14. Programs for Designing Graphical User Interface using AWT
15. Programs for Data Base Management Systems using JDBC



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Understand Java programming development environment, compiling, debugging, linking and executing a program..	K1	PSO1 & PSO3
CO 2	Analyze the complexity of problems, Modularize the problems into small modules and then convert them into programs.	K1 & K2	PSO2 & PSO3
CO 3	Understand and apply the in-built functions and customized functions for solving the problems	K1 & K3	PSO3 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	1	3	1	1
CO2	1	3	2	1	1
CO3	1	1	1	1	3

Mapping of COs with Pos

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	1	1	1	1	1	1	1	1	2
CO2	3	2	3	2	3	1	1	1	1	1	2	2
CO3	3	3	3	3	3	1	1	1	1	1	1	2

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

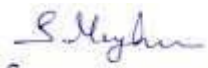
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – S. JEBAPRIYA

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

I MCA

SEMESTER – II

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCA206	SKILL BASED LAB II - R PROGRAMMING	SKILL BASED LAB	2	1

COURSE DESCRIPTION

This course provides an in-depth knowledge on the basic constructs and statistical analysis in R.

COURSE OBJECTIVE

- ❖ Understand the basic constructs of R Programming.
- ❖ Analyze the statistical operations using R.

LAB LIST

1. Exercises to understand the R basics.
2. Exercises to understand the programming constructs of R
3. Exercises to draw a scatter diagram and charts.
4. Exercises to implement statistical operations in R
5. Exercises to implement concepts of probability and distributions in R



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Demonstrate the practical application of R programming tool.	K1	PSO1& PSO3
CO 2	Emphasize the implementation of statistical operations in R	K1, K2,	PSO2& PSO3



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	2	1	1
CO2	1	3	2	1	1

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	2	1	1	1	1	2	1	1	1	1
CO2	1	3	2	1	2	1	1	1	1	1	1	2
CO3	1	1	2	3	1	1	1	1	2	1	1	1

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

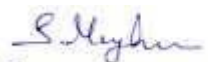
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – B. USHA

Forwarded By

HOD'S Signature & Name


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SKILL DEVELOPMENT-100%

I MCA

SEMESTER – II

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCA207	SOFT SKILL II – APTITUDE TRAINING	SOFT SKILL	2	1

COURSE DESCRIPTION

This course provides gamut of skills which facilitate the students to enhance their employability quotient and to establish a stronger connect with the technical environment in which they operate. It makes them think critically and apply basic mathematics skills to interpret data, draw conclusions and solve problems.

COURSE OBJECTIVE

- ❖ To improve aptitude, problem solving skills and reasoning ability.
- ❖ To comprehend the basic concepts of various domains of computer science.

SECTION 1 – ARITHMETIC ABILITY

1. Problems on Numbers
2. Problems on Ages
3. Time and Work
4. Time and Distance



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5. Simple Interest
6. Permutation and Combination
7. Odd Man Out & Series

SECTION 2- REASONING

1. Logical Sequence of words
2. Blood Relations Test
3. Series Completion
4. Mirror Images.

SECTION 3 –APTITUDE QUESTIONS

1. Computer Networks
2. RDBMS
3. Operating Systems
4. C/ C++
5. Java
- 6. Oracle**



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
SECTION 1 – ARITHMETIC ABILITY				
1.1	Arithmetic ability	1	Lecture	White board
1.2	Problems on Numbers	1	Chalk & Talk	Black Board
1.3	Problems on Ages	1	Chalk & Talk	Black Board
1.4	Time and Work	1	Lecture	White board
1.5	Time and Distance	1	Chalk & Talk	Black Board
1.6	Simple Interest	1	Discussion	Black Board
1.7	Permutation	1	Chalk & Talk	Black Board
1.8	Combination	1	Lecture	White board
1.9	Odd Man Out	1	Chalk & Talk	Black Board
1.10	Odd Man Series	1	Lecture	White board
SECTION 2- REASONING				
1.1	Reasoning	1	Chalk & Talk	Black Board
1.2	Logical Sequence of words	1	Chalk & Talk	Black Board
1.3	Blood Relations Test	2	Lecture	White board
1.4	Series Completion	1	Chalk & Talk	Black Board
1.5	Mirror Images.	1	Discussion	Black Board
SECTION 3 – APTITUDE QUESTIONS				
3.1	Computer Networks	2	Lecture	White board



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3.2	RDBMS	2	Chalk & Talk	Black Board
3.3	Operating Systems	2	Chalk & Talk	Black Board
3.4	C	2	Lecture	White board
3.5	C++	2	Chalk & Talk	Black Board
3.6	Java	2	Discussion	Black Board
3.7	Oracle	2	Chalk & Talk	Black Board

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Apply quantitative techniques to solve variety of problems.	K1	PSO1& PSO3
CO 2	Enhance the technical skills for employability.	K1, K2,	PSO2 & PSO3



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	1	3	1	1
CO2	1	3	2	1	1

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	3	1	1	1	1	2	1	1	1	1
CO2	1	3	2	1	2	1	1	1	1	1	1	2

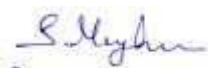
Note: ♦ Strongly Correlated – 3 ♦ Moderately Correlated –2
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – S. JEBAPRIYA

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT – 60%

EMPLOYABILITY - 40 %

II MCA

SEMESTER – III

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCA302	SOFTWARE QUALITY & TESTING	MAJOR CORE	4	4

COURSE DESCRIPTION

This course provides a basic knowledge of in software testing and quality management with a help of different software testing tools.

COURSE OBJECTIVE

- ❖ To understand the fundamental concepts and theory of Software testing and Software Quality Management.
- ❖ To implement process that ensures the Software is developed with good quality standards.
- ❖ To Use the latest tools that help in Software testing and quality assurance.
- ❖ To apply quality management methods to effectively organize staff and lead a successful development of the Software product.



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UNIT – I Fundamentals of software Testing:

(12 Hours)

Definition- Approaches - Popular definitions-Testing during development life cycle- Requirement Traceability Matrix- Essentials- Important features- Principles- Salient features of good testing- Test planning- Challenges in testing- Test team Approach- Cost aspect of testing- Categories of defect- Testing Process.

Software verification and validation:

Introduction – verification – methods of verification – types of review- validation – levels of validation – acceptance testing – management of verification and validation – software development verification and validation activities.

SELF STUDY: Test Planning, types of review

UNIT – II Testing Model and Defect Management

(12 Hours)

V model for software Testing - Testing during requirement stage – testing during test planning phase – testing during design and coding – VV model - **Defect Management** – Defect Classification – Defect Life cycle – Defect template – Defect Management Process- Techniques for finding defects –Reporting Defects.

SELF STUDY :Defect Classification

UNIT – III: Types of Testing and Test case Design:

(12 Hours)

White Box Testing – Testing Techniques in White Box Testing – Black Box Testing – Testing techniques in Black Box Testing – Test case design - **Special Tests** –GUI Testing – Compatibility Testing – Security Testing – Performance Testing , Stress Testing – Recovery Testing -Regression testing –Smoke Testing – Adhoc Testing – Usability Testing

SELF STUDY :Module Testing, GUI Testing



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UNIT – IV Introduction to Quality:

(12 Hours)

Definition- Core Components- TQM- Quality Principles- Quality management through statistical process control – Cause Effect Graphing - **Software Quality:** Quality and Productivity relationship- Requirement of a product- Organization culture- Type of products- Software quality management.

UNIT – V Software Testing tools

(12 Hours)

Need for automated Testing tools- Taxonomy of Testing tools- Functional - Regression testing tools- Performance Testing Tools- Testing Management tools- Source code testing tools

Software tool: Selenium- Introduction- Selenium IDE and RC- Selenium web driver introduction.

SELF STUDY: Need for automated Testing tools

REFERENCES:

1. “Software testing principles , techniques and tools”, M.G. LIMAYE , Tata McGraw Hill ,2011.
2. “Testing Computer Software”, CemKaner, Jack Falk, Hung Quoc Nguyen, Wiley India, Reprint 2012.
3. Software Quality Assurance, MilindLimaye, Tata McGraw-Hill, 2011.
4. SoftwareTestingTools,Dr.K.V.K.K.Prasad,DreamTechpress,2009

WEB REFERENCES:

1. <https://www.softwaretestinghelp.com/resources/>
2. <https://www.testbytes.net/blog/top-10-websites-to-learn-software-testing/>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT - 1 Fundamentals of software Testing				
1.1	Definition – Approaches - Popular definitions-Testing during development life cycle	1	Chalk & Talk	Black Board
1.2	Requirement Traceability Matrix- Essentials- Important features- Principles- Salient features of good testing	2	Chalk & Talk	Black Board
1.3	Test planning- Challenges in testing- Test team Approach- Cost aspect of testing- Categories of defect- Testing Process.	3	Lecture	White board
1.4	Introduction – verification – methods of verification – types of review	2	Chalk & Talk	Black Board
1.5	validation – levels of validation – acceptance testing	1	Discussion	Black Board
1.6	management of verification and validation	1	Chalk & Talk	Black Board
1.7	Software development verification and validation activities.	2	Chalk & Talk	Black Board
UNIT - 2 V Test Model				
2.1	V model for software – testing during proposal stage	1	Lecture	PPT



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2.2	testing during requirement stage	2	Chalk & Talk	Black Board
2.3	testing during test planning phase – testing during design , coding – VV model.	2	Lecture	PPT
2.4	Defect Classification	1	Lecture	White board
2.5	Defect Life cycle – Defect template	2	Discussion	Black Board
2.6	Defect Management Process	2	Chalk & Talk	Black Board
2.7	Techniques for finding defects	1	Chalk & Talk	Black Board
2.9	Reporting Defects.	1	Chalk & Talk	Black Board
UNIT – 3 Levels of Testing				
3.1	Introduction – Proposal Testing	1	Lecture	White board
3.2	Requirement Testing- Design Testing	1	Chalk & Talk	Black Board
3.3	Code Review – Unit testing – Module Testing	2	Lecture	PPT
3.4	Integration testing – Big – Bang Testing- System testing- Testing stages.	2	Lecture	White board
3.5	Complexity Testing – GUI Testing – Compatibility Testing – Security Testing	2	Discussion	PPT
3.6	Performance Testing , Volume Testing and Stress Testing – Recovery Testing- Installation Testing -Regression testing	2	Lecture	PPT
3.7	Manual Support Testing – Smoke Testing – Adhoc Testing – Compliance Testing – Usability	2	Lecture	PPT



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	Testing – Decision Table Testing.			
UNIT - 4 Introduction to Quality				
4.1	What is quality- Definition- Core Components- Quality view- Financial Aspect of quality- Definitions of quality	2	Lecture	PPT
4.2	TQM- Quality Principles- Quality management through statistical process control, Cultural changes	2	Lecture	PPT
4.3	Continual improvement cycle- Quality in different areas- Benchmarking and Metrics	2	Chalk & Talk	Black Board
4.4	Quality and Productivity relationship	2	Chalk & Talk	Black Board
4.5	Requirement of a product	1	Discussion	Black Board
4.6	Organization culture	1	Lecture	PPT
4.7	Type of products- Software quality management	2	Chalk & Talk	Black Board
UNIT – 5 Software Testing tools an Overview:				
5.1	Need for automated Testing tools- Taxonomy of Testing tools	2	Chalk & Talk	Black Board
5.2	Functional/ Regression testing tools- Performance Testing Tools	2	Lecture	PPT
5.3	Testing Management tools- Source code testing tools	3	Lecture	PPT
5.4	Selenium- Introduction- Selenium IDE and RC	3	Lecture	White board
5.5	Selenium web driver introduction.	2	Lecture	White board



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	W1+ W2 5+5=10	Avg (M1 & M2) 10	Mid-Sem. Test 15	Once in a Sem. 10		5	50	
K1	-	-	-	-	-		-	-
K2	5	2	3	-	10		10	20 %
K3	5	3	4		12		12	24 %
K4	-	5	4	5	14		14	28%
K5	-	-	4	5	9		9	18 %
Non-Scho.							5	10 %
Total	10	10	15	10	45	5	50 mks.	100 %

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	10	15	10	5	50	50	100

C1 – Sum of Two Weekly Tests

C2 – Average of Two Monthly Tests

C3 - Mid Sem Test

C4 – Once in a semester (Seminar / Assignment)

C5 – Non – Scholastic



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Understand software testing and quality assurance as a fundamental component of software life cycle	K2	PSO1 & PSO2
CO 2	Define the scope of SW T&QA project	K2, K3, K4	PSO1 & PSO2
CO 3	Efficiently perform T&QA activities using modern software tools	K2 & K3	PSO1 & PSO3
CO 4	Prepare test plans and schedules for a T&QA project	K2, K3 & K5	PSO1 & PSO4
CO 5	Effectively manage a T&QA project	K2, K3 & K5	PSO1 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	1	1
CO2	2	3	1	1	1
CO3	1	1	2	1	3
CO4	1	1	3	2	1
CO5	1	1	1	3	2

Mapping of COs with POs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	2	1	2	1	1	2	2	1	1	1
CO2	1	2	3	2	1	1	1	1	2	2	2	2
CO3	1	3	3	1	2	2	1	1	2	2	2	1
CO4	1	2	2	1	2	2	1	1	2	2	1	2
CO5	1	3	2	2	1	1	2	1	2	1	1	2

Note: ♦ Strongly Correlated – 3 ♦ Moderately Correlated – 2

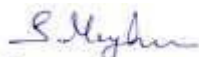
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – P.NANCY VINCENTINA MARY

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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EMPLOYABILITY - 100 %

II MCA

SEMESTER – III

(For those who join in 2020 onwards)

PROGRAM ME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/W EEK	CREDITS
MCA	20MCA303	MOBILE APPLICATION DEVELOPMENT	MAJOR CORE	4	4

COURSE DESCRIPTION

This course introduces students to programming technologies, design and development related to mobile applications. Students will learn application development on the Android platform.

COURSE OBJECTIVE

- ❖ To learn application development on the Android platform.
- ❖ To have an exposure about android interface.
- ❖ To be familiar with creating databases using Android platform.
- ❖ To be acquainted with the Mobile Application Development Platform.
- ❖ To become skilled on sharing data in Android.

UNIT – I

(12 Hours)

GETTING STARTED WITH ANDROID PROGRAMMING

Introduction to Android – Required Tools – Anatomy of an Android Application

ACTIVITIES, FRAGMENTS AND INTENTS



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Understanding Activities – Linking Activities using Intents – Fragments – Calling Built in Applications using Intents –Displaying notifications

SELF STUDY: Displaying notifications

UNIT – II

(12 Hours)

ANDROID USER INTERFACE

Understanding the Components of a screen – Adapting to display orientation – Managing changes to screen orientation –Utilizing the Action bar – Creating User interface programmatically – Listening for UI notifications

DESIGNING USER INTERFACE WITH VIEWS

Using Basic Views – Using Picker Views – Using List Views – Understanding Specialized Fragments

SELF STUDY:Listening for UI notifications

UNIT – III

(12 Hours)

DATA PERSISTENCE

Saving and Loading User Preferences – Persisting Data to Files – Creating and using Databases using SQLite

DISPLAY PCTURES AND MENUS WITH VIEWS

Using Image Views to display picture – Using Menus with Views – Clock View – Web View

SELF STUDY: Clock View – Web View

UNIT – IV

(12 Hours)

CONTENT PROVIDERS

Sharing Data in Android – Using a Content Provider – Creating Own Content Providers – Using the Content Provider

MESSAGING



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SMS Messaging - Sending SMS Programmatically - Getting Feedback after Sending a Message - Sending SMS using Intent - Receiving SMS

SELF STUDY: Using the Content Provider

UNIT - V

(12 Hours)

LOCATION BASED SERVICES

Displaying Maps - Getting Location Data - Monitoring a Location

PUBLISHING ANDROID APPLICATIONS

Preparing for Publishing - Versioning Application - Digitally Signing Application - Deploying APK Files - Using adb.exe Tool - Using Web server - Publishing in the Android Market

SELF STUDY: Publishing in the Android Market

REFERENCES:

1. Wei- Manglee, "Beginning Android 4 Application Development", Wiley India pvt ltd, Reprint 2013.
2. Reto Meier, "Professional Android4 Application Development", Wiley India Edition.
3. Wallace B. Maclure, Nathan Blevins, John J Croft IV, Jonathan Dick, Chris Hardly, "Professional Android Programming", Wiley India Edition.

WEB REFERENCES:

1. www.radio-electronics.com
2. www.developer.android.com



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 INTRODUCTION				
1.1	Introduction to Android	1	Chalk & Talk	Black Board
1.2	Required Tools – Anatomy of an Android Application	1	Discussion	Google classroom
1.3	Understanding Activities	2	Lecture	PPT & White board
1.4	Linking Activities using Intents	2	Lecture	Smart Board
1.5	Fragments	2	Lecture	Black Board
1.6	Calling Built in Applications using Intents	2	Lecture	PPT & White board
1.7	Displaying notifications	2	Lecture	PPT & White board
UNIT 2 - ANDROID USER INTERFACE				
2.1	Understanding the Components of a screen	2	Discussion	Black Board
2.2	Adapting to display orientation	2	Lecture	Google classroom
2.3	Managing changes to screen orientation	1	Lecture	PPT & White board
2.4	Utilizing the Action bar – Creating User interface programmatically	1	Lecture	Smart Board
2.5	Listening for UI notifications	1	Lecture	Black Board



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2.6	Using Basic Views	1	Lecture	PPT & Black board
2.7	Using Picker Views	1	Lecture	PPT
2.8	Using List Views	1	Lecture	PPT & White board
2.9	Understanding Specialized Fragments	2	Lecture	PPT & White board
UNIT 3 – DATA PERSISTENCE				
3.1	Saving and Loading User Preferences	2	Discussion	Black Board
3.2	Persisting Data to Files	1	Lecture	PPT
3.3	Creating and using Databases using SQLite	2	Lecture	PPT & White board
3.4	Using Image Views to display picture	2	Lecture	Smart Board
3.5	Using Menus with Views	1	Lecture	Black Board
3.6	Clock View	2	Lecture	PPT & Black board
3.7	Web View	2	Lecture	PPT & White board
UNIT 4 – CONTENT PROVIDERS				
4.1	Sharing Data in Android	1	Lecture	PPT
4.2	Using a Content Provider	1	Lecture	PPT
4.3	Creating Own Content Providers	2	Lecture	PPT
4.4	Using the Content Provider	2	Lecture	PPT



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4.5	SMS Messaging - Sending SMS Programmatically	2	Lecture	PPT & White board
4.6	Getting Feedback after Sending a Message	2	Lecture	PPT & White board
4.7	Sending SMS using Intent – Receiving SMS	2	Lecture	PPT & White board
UNIT -5 – LOCATION BASED SERVICES				
5.1	Displaying Maps	1	Lecture	PPT
5.2	Getting Location Data – Monitoring a Location	2	Lecture	PPT
5.3	Preparing for Publishing	1	Lecture	PPT
5.4	Versioning Application	2	Lecture	PPT
5.5	Digitally Signing Application - Deploying APK Files	2	Lecture	PPT
5.6	Using adb.exe Tool – Using Web server	2	Lecture	PPT
5.7	Publishing in the Android Market	2	Lecture	PPT



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- **CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Understand the capabilities and limitations of mobile platforms that affect application development and deployment	K2, K4	PSO1 & PSO2
CO 2	Compare and analyze various technology and business trends impacting mobile application development	K2, K3, K4	PSO1 & PSO2
CO 3	Demonstrate the characterisation and architecture of mobile applications	K2 , K4	PSO1 & PSO3
CO 4	Assess the way how to send messages through android phones.	K2, K3,K4 & K5	PSO1,PSO2 & PSO4
CO 5	Design and develop the techniques for deploying and testing mobile applications, and for enhancing their performance and scalability	K2,K3,K4 & K5	PSO1, PSO3 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	1	1
CO2	2	3	1	1	1
CO3	3	1	2	1	1
CO4	3	3	1	2	1
CO5	2	1	2	1	3

Mapping of COs with POs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	3	1	2	2	1	1	3
CO2	3	2	3	2	1	3	1	1	2	2	2	2
CO3	3	3	3	3	2	2	1	1	2	2	2	3
CO4	3	2	2	2	2	2	1	1	2	2	1	2
CO5	3	3	2	2	1	3	2	1	2	1	1	2

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

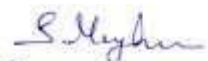
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – B. USHA

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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EMPLOYABILITY - 100 %

II MCA

SEMESTER – III

(For those who joined in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCA304	ENTERPRISE APPLICATION DEVELOPMENT	MAJOR CORE	4	4

COURSE DESCRIPTION

This course provides exposure to different frameworks namely, Struts, Hibernate, Spring and Django. This collective information supports the learner for developing advanced enterprise applications.

COURSE OBJECTIVES

- ❖ To know the architectures of Distributed systems, to understand and compare the technologies associated with J2EE and DOTNET.
- ❖ To build lightweight enterprise-ready applications
- ❖ To acquire capability in Python programming and grow true web applications utilizing Django.

UNIT – I CLIENT SERVER ARCHITECTURE

(12 Hours)

2-tier model - 3-tier model - n-tier model -J2EE architecture - DOTNET architecture - MVC architecture.

MVC Architecture - How to start an ASP.NET MVC application - The folders and files for a new MVC application

SELF STUDY :Working with Views - Working with controls



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UNIT – II SPRING

(12 Hours)

Web services – Consuming a restful web service – Java desktop application / JSP, building REST service with spring – Spring security architecture – accessing relational data using JDBC with spring – Handling form submission – Creation of batch service – Securing web applications

SELF STUDY :Uploading files – Validating form input

UNIT –III STRUTS

(12 Hours)

Struts – Introduction – MVC framework – STRUTS architecture – Business service – Parameter passing – Action class and configuration files – struts.xml tags – Namespace and wild cards – Validation – Interceptors – In built interceptors – Custom interceptors

SELF STUDY :Model driven action – Value stack and OGNL

UNIT – IV HIBERNATE

(12 Hours)

HIBERNATE ORM – Persistence – Relational Database – The object relational impedance mismatch – Using native Hibernated APTs and hbm.xml – Using the java persistence API's – Hibernate Validator – HIBERNATE OGM – Configuration of tools – HIBERNATE SEARCH – Enabling full text search capabilities in entities – Introduction to Full Text Search.

SELF STUDY :Indexing – Searching

UNIT – V DJANGO

(12 Hours)

Introduction - Django model layer – View layer - Template layer – Forms – Automated admin interface – Django security – Django web application tools – Core functionalities – Geographic Framework.

SELF STUDY :Internationalization and localization



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REFERENCES:

1. Justin Couch, Daniel H.Steinberg, "J2EE Bible", Wiley India(P) Ltd, NewDelhi , 2002
2. William S. Vincent, "Django for Beginners: Build websites with Python and Django", 2018
3. Christian Bauer, Gavin King, and Gary Gregory, "Java Persistence with Hibernate", Second Edition, Manning Publications Co, 2019
4. Craig Walls, "Spring in Action", Fifth Edition, Manning Publications,2018
- 5.Sharanam Shah, Vaishali Shah, "Struts 2 for Beginners Struts 2 for Beginners", 3rd Edition, Arizona Business Alliance,2014

WEB REFERENCES:

1. <https://www.javatpoint.com/spring-tutorial>
2. https://www.tutorialspoint.com/asp.net_mvc/index.htm
3. <https://www.journaldev.com/2134/struts-tutorial-for-beginners#struts-tutorial-8211-result-pages>
4. <https://howtodoinjava.com/hibernate-tutorials/>
5. <https://www.guru99.com/django-tutorial.html>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT - 1		Client server architecture		
1.1	2-tier model - 3-tier model	2	Chalk & Talk	Black Board
1.2	n-tier model - J2EE architecture	2	Chalk & Talk	Black Board
1.3	DOTNET architecture - MVC architecture	2	Discussion	Google classroom
1.4	MVC Architecture	2	Chalk & Talk	Black Board
1.5	How to start an ASP.NET MVC application	2	Discussion	Black Board
1.6	The folders and files for a new MVC – application	2	Lecture	White board
UNIT - 2		SPRING		
2.1	Web services – Consuming a restful web service	1	Lecture	PPT
2.2	Java desktop application / JSP, building REST service with spring	2	Chalk & Talk	Black Board
2.3	Spring security architecture – accessing relational data using JDBC with spring	1	Lecture	PPT
2.4	Handling form submission	1	Lecture	White board
2.5	Creation of batch service	2	Discussion	Black Board
2.6	Securing web applications	2	Chalk & Talk	Black Board
2.7	Accessing data with mongo DB –	1	Chalk & Talk	Black Board
2.8	Creating asynchronous method	1	Lecture	PPT



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2.9	Using web socket to build an interactive web application	1	Lecture	PPT
UNIT – 3 STRUTS				
3.1	Struts – Introduction	1	Lecture	White board
3.2	MVC framework – STRUTS architecture	2	Chalk & Talk	Black Board
3.3	Business service – parameter passing	2	Lecture	PPT
3.4	Action class and configuration files	2	Lecture	White board
3.5	struts.xml tags –Name space and wild cards	1	Lecture	PPT
3.6	Validation	1	Discussion	Google classroom
3.7	Interceptors	1	Chalk & Talk	Black Board
3.8	In built interceptors	1	Lecture	PPT
3.9	Custom interceptors	1	Chalk & Talk	Black Board
UNIT - 4 HIBERNATE				
4.1	HIBERNATE ORM – Persistence	1	Lecture	PPT
4.2	Relational Database	1	Lecture	PPT
4.3	The object relational impedance mismatch	1	Chalk & Talk	Black Board
4.4	using native Hibernated APTs and hbm.xml	2	Chalk & Talk	Black Board
4.5	Using the java persistence API's – Hibernate Validator	2	Discussion	Black Board
4.6	HIBERNATE OGM – configuration of tools	2	Lecture	PPT



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4.7	HIBERNATE SEARCH – Enabling full text search capabilities in entities	2	Chalk & Talk	Black Board
4.8	Introduction to Full Text Search	1	Discussion	Google classroom
UNIT – 5 DJANGO				
5.1	Introduction - Django model layer	2	Chalk & Talk	Black Board
5.2	View layer	1	Lecture	PPT
5.3	Template layer	1	Lecture	PPT
5.4	Forms	1	Lecture	White board
5.5	Automated admin interface	2	Lecture	White board
5.6	Django security	2	Lecture	White board
5.7	Django web application tools	1	Lecture	White board
5.8	Core functionalities – Geographic Framework.	2	Discussion	Google classroom



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	W1+ W2 5+5=10	Avg (M1 & M2) 10	Mid-Sem.Test 15	Once in a Sem. 10		5	50	
K1	-	-	-	-	-		-	-
K2	5	2	3	-	10		10	20 %
K3	5	3	4		12		12	24 %
K4	-	5	4	5	14		14	28%
K5	-	-	4	5	9		9	18 %
Non-Scho.							5	10 %
Total	10	10	15	10	45	5	50 mks.	100 %

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :
K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	10	15	10	5	50	50	100

C1 – Sum of Two Weekly Tests

C2 – Average of Two Monthly Tests

C3 - Mid Sem Test

C4 – Once in a semester (Seminar / Assignment)

C5 – Non – Scholastic



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Develop dynamic web applications using MVC	K2	PSO1
CO 2	Use dependency injection & inversion of control in developing Spring project	K2, K3, K4	PSO2
CO 3	Create the Struts classes and use MVC design pattern for creating large web applications	K2 & K3	PSO3
CO 4	Map Java classes and object associations to relational database tables with Hibernate mapping files	K2, K3 & K5	PSO2 & PSO4
CO 5	Use Django for rapid development, pragmatic, maintainable, clean design, and secures websites..	K2,K3 & K5	PSO2 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	1	1
CO2	2	3	1	1	1
CO3	1	1	1	3	1
CO4	1	3	1	2	1
CO5	1	1	3	1	1

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2	1	2	1	1	2	3	2	1
CO2	1	3	2	1	2	2	1	1	1	2	2	3
CO3	3	1	3	1	2	2	2	1	1	3	1	1
CO4	1	1	3	2	3	2	2	2	1	3	2	2
CO5	1	1	2	1	1	2	2	2	3	3	2	3

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

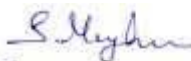
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – S.MARY HELAN FELISTA

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

II MCA

SEMESTER – III

(For those who join in 2020 onwards)

PROGRAM ME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/W EEK	CREDITS
MCA	20MCADA03	BIG DATA ANALYTICS	SPECIALIZATION ELECTIVE – DATA ANALYTICS	4	4

COURSE DESCRIPTION

This course provides familiarization to the important information technologies used in manipulating, storing and analyzing big data.

COURSE OBJECTIVE

- ❖ To explore the fundamental concepts of Big Data analytics
- ❖ To understand the various technology foundations for Big Data
- ❖ To learn the Hadoop and Map Reduce Concepts

UNIT – I

(12 Hours)

GRASPING THE FUNDAMENTALS OF BIG DATA

Evolution of Data Management –Understanding the waves of managing data –
Defining Big Data – Building a Successful Big Data management architecture

EXAMINING BIG DATA TYPES

Defining Structured data- Defining Unstructured data- Real time and non- real –
time requirements – Managing Different data types – Integrating Data types



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SELF STUDY: Managing Different data types

UNIT- II

(12 Hours)

BIG DATA TECHNOLOGY COMPONENTS

Exploring the Big Data stacks – Redundant physical Infrastructure – Security Infrastructure –Operational Databases – Organizing data services and tools – Analytical data warehouses –Big data analytics- Big data applications

DEFINING BIG DATA ANALYTICS

Using Big Data to Get Results – Modifying Business intelligence Products to Handle Big Data – Studying Big Data Analytics Examples – Big data Analytics Solutions

SELF STUDY: Organizing data services and tools

UNIT- III

(12 Hours)

GETTING STARTED WITH HADOOP

Introduction - Need for Hadoop – Origin and Design of Hadoop – Examining the various offerings of Hadoop

USE CASES FOR BIG DATA IN HADOOP

Adopting Hadoop – Log Data Analysis – Data Warehouse Modernization – Fraud Detection – Risk Modeling – Social Sentiment Analysis – Image Classification

SETTING UP THE HADOOP ENVIRONMENT– Choosing a Hadoop Distribution – Hadoop cluster architecture

SELF STUDY: Fraud Detection

UNIT - IV

(12 Hours)

STORING DATA IN HADOOP : THE HDFS

Storing data in Hadoop - Data Storage in HDFS – HDFS federation – HDFS High Availability



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READING AND WRITING DATA

Compressing Data – Managing files – Ingesting Log Data

MAPREDUCE PROGRAMMING

Importance – Doing things in parallel – Writing Map Reduce Applications

SELF STUDY: Compressing Data

UNIT - V

(12 Hours)

HADOOP AND DATA WAREHOUSE

Compare & Contrast Hadoop with Relational Databases - Modernizing the warehouse with Hadoop

STORING DATA IN HBASE

HBase – Understanding HBase Data model – Understanding the HBase architecture – Test run – HBase and RDBMS –Deploying HBase

REFERENCES:

1. Judith Hurwitz, Alan Nugent, Dr. Fern Halper, Marcia Kaufman, “ Big Data”, Wiley India Pvt ltd, 2015
2. Dirk deRoos , “Hadoop for Dummies”, John Wiley and sons , 2014
3. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, “Professional Hadoop Solutions”, Wiley, 2015.
4. Chris Eaton, Dirk deroos et al., “Understanding Big data”, McGraw Hill, 2012.
5. Tom White, “HADOOP: The definitive Guide”, O Reilly 2012.

WEB REFERENCES:

1. http://www.planetdata.eu/sites/default/files/presentations/Big_Data_Tutorial_1_part4.pdf
2. <https://www.guru99.com/introduction-to-mapreduce.html>
3. <https://www.dezyre.com/hadoop-tutorial/hadoop-mapreduce-tutorial>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 Grasping the Fundamentals of BIG DATA				
1.1	Evolution of Data Management – Understanding the waves of managing data – Defining Big Data	3	Lecture	Black Board
1.2	Building a Successful Big Data management architecture	2	Lecture	White board
1.3	Defining Structured data- Defining Unstructured data-	2	Lecture	PPT
1.4	Real time and non- real – time requirements	2	Lecture	PPT
1.5	Managing Different data types – Integrating Data types	3	Lecture	PPT
UNIT-2 BIG DATA TECHNOLOGY COMPONENTS & DEFINING BIG DATA ANALYTICS				
2.1	Exploring the Big Data stacks – Redundant physical Infrastructure – Security Infrastructure	2	Lecture	White board
2.2	Operational Databases – Organizing data services and tools	2	Discussion	Black Board
2.3	– Analytical data warehouses –Big data analytics- Big data applications	2	Chalk & Talk	Black Board
2.4	Defining Big Data Analytics	2	Chalk & Talk	Black Board
2.5	Using Big Data to Get Results –	2	Discussion	Black Board



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	Modifying Business intelligence Products to Handle Big Data			
2.6	Studying Big Data Analytics Examples – Big data Analytics Solutions	2	Discussion	Black Board
UNIT-3 GETTING STARTED WITH HADOOP				
3.1	Introduction - Need for Hadoop	2	Lecture	White board
3.2	Origin and Design of Hadoop– Examining the various offerings of Hadoop	2	Chalk & Talk	Black Board
3.3	Adopting Hadoop – Log Data Analysis – Data Warehouse Modernization	2	Lecture	PPT
3.4	Fraud Detection – Risk Modeling – Social Sentiment Analysis – Image Classification	2	Lecture	White board
3.5	Setting up the Hadoop environment – Choosing a Hadoop Distribution	2	Discussion	Black Board
3.6	Hadoop cluster architecture	2	Lecture	PPT
UNIT 4 - STORING DATA IN HADOOP				
4.1	Storing data in Hadoop - Data Storage in HDFS – HDFS federation	3	Lecture	PPT
4.2	HDFS High Availability	2	Lecture	PPT
4.3	Compressing Data – Managing files – Ingesting Log Data	2	Lecture	Black Board
4.4	MapReduce programming - Importance	2	Lecture	PPT



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4.5	Doing things in parallel – Writing Map Reduce Applications	3	Lecture	White board
UNIT -5 HADOOP AND DATA WAREHOUSE				
5.1	Compare & Contrast Hadoop with Relational Databases	2	Lecture	PPT
5.2	Modernizing the warehouse with Hadoop	2	Lecture	PPT
5.3	HBase – Understanding HBase Data model	2	Lecture	PPT
5.4	Understanding the HBase architecture	2	Lecture	White board
5.5	Test run – HBase and RDBMS –	2	Lecture	PPT
5.6	Deploying HBase	2	Lecture	White board



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	W1+ W2 5+5=10	Avg (M1 & M2) 10	Mid-Sem.Test 15	Once in a Sem. 10		5	50	
K1	-	-	-	-	-		-	-
K2	5	2	3	-	10		10	20 %
K3	5	3	4		12		12	24 %
K4	-	5	4	5	14		14	28%
K5	-	-	4	5	9		9	18 %
Non-Scho.							5	10 %
Total	10	10	15	10	45	5	50 mks.	100 %

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :
K2-Understand, K3-Apply, K4-Analyse, K5 - Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	10	15	10	5	50	50	100

C1 – Sum of Two Weekly Tests

C2 – Average of Two Monthly Tests

C3 - Mid Sem Test

C4 – Once in a semester (Seminar / Assignment)

C5 – Non - Scholastic



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Understand the fundamentals of various big data analysis techniques	K2	PSO1 & PSO2
CO 2	Analyze the big data analytic techniques for useful business applications.	K2, K3, K4	PSO1 & PSO2
CO 3	Examine the HADOOP and Map Reduce technologies associated with big data analytics	K2 & K3	PSO1 & PSO3
CO 4	Scrutinize the various storage architecture using HDFS and Map reducing techniques	K2, K3 & K5	PSO1 & PSO4
CO 5	Understand, Explore and deploy Hbase	K2,K3 & K5	PSO1 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	1	1	1
CO2	1	2	1	3	1
CO3	1	1	2	2	1
CO4	1	1	3	1	2
CO5	1	1	1	2	3

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

♦ Weakly Correlated -1

Mapping of COs with POs

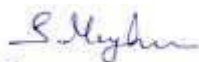
CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1	1	1	2	2	2	1	1	1	2
CO2	2	2	1	2	1	2	2	2	2	1	1	2
CO3	2	2	2	1	2	3	2	2	1	2	1	2
CO4	2	3	3	1	2	3	2	3	2	2	2	2
CO5	3	3	3	2	3	3	3	3	2	3	3	3

COURSE DESIGNER:

Staff Name – B. USHA

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

II MCA

SEMESTER – III

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WE EK	CREDITS
MCA	20MCADA04	DATA ANALYTICS TOOLS & TECHNIQUES	SPECIALIZATION ELECTIVE – DATA ANALYTICS	4	4

COURSE DESCRIPTION

This course provides knowledge on creating applications to analyze big data.

COURSE OBJECTIVE

- ❖ Learn about the fundamental concepts of Pig and Hive.
- ❖ Provide knowledge on writing scripts through Pig Latin and understanding Hive data model.
- ❖ Perform data definition and data manipulation operations using HiveQL and apply these to perform analytics

UNIT – I DATA ANALYTICS USING PIG

(12 Hours)

Introduction – Downloading and installing pig – Running Pig – Grunt – Pig's Data model – Types – Schemas.

SELF STUDY:Types



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UNIT – II INTRODUCTION TO PIG LATIN

(12 Hours)

Preliminary matters - Input and Output – Relational operations – User defined functions-Advanced relational Operations -Integrating Pig with legacy code and map reduce – Controlling execution.

SELF STUDY: Relational operations

UNIT - III DEVELOPING AND TESTING PIG LATIN SCRIPTS (12 Hours)

Writing Evaluation and filter functions – Writing load and store functions –

HIVE - INTRODUCTION

Developing Hive – Services in Hive – Understanding Hive Data model.

UNIT – IV HIVEQL: DATA DEFINITION

(12 Hours)

Databases – Alter database – Create Tables – Alter Tables – Manage Tables – Drop Tables.

HIVEQL: DATA MANIPULATION

Load Data into managed tables – Insert into tables from Queries - Creating Tables and Loading Them in One Query - Exporting Data.

SELF STUDY: Insert into tables from Queries

UNIT – V HIVEQL QUERIES

(12 Hours)

SELECT ... FROM Clauses –Where Clauses – Group by clauses - Join Statements – ORDER BY and SORT BY- DISTRIBUTE BY with SORT BY- CLUSTER BY – casting - Queries that Sample Data – UNION ALL

HIVEQL VIEWS

HiveQL: Indexes - Schema Design – Tuning – Functions – Streaming - Customizing Hive File and Record formats – Security – Locking

SELF STUDY: ORDER BY and SORT BY



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REFERENCES:

1. Alan Gates ,“Programming Pig”, First edition, O’Reilly Media, 2011
2. Hanish Bansal, Saurabh Chauhan ,“Apache Hive Cookbook”, Packt publishing, 2016
3. 3.Jason Rutherglen, Dean Wampler, Edward Capriolo , “Programming Hive”, First edition, O’Reilly Media , 2012
4. “Alan Gates & Daniel Dai ,Pig :Data flow Scripting with Hadoop”, O’Reilly Media, 2016
5. BalaswamyVaddeman , “Beginning Apache Pig” , Apress Publications, 2016
6. Dayong Du, “Apache Hive Essentials”, Packet Publishing, 2015

WEB REFERENCES:

1. <https://cognitiveclass.ai/courses/introduction-to-pig/>
2. <https://data-flair.training/blogs/apache-hive-tutorial/>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT 1 DATA ANALYTICS USING PIG				
1.1	Data Analytics using Pig: Introduction	2	Lecture	Black Board
1.2	Downloading and installing pig	2	Chalk & Talk	White board
1.3	Running Pig	2	Lecture	PPT
1.4	Grunt	2	Discussion	PPT
1.5	Pig's Data model	2	Lecture	PPT
1.6	Schemas	2	Chalk & Talk	White board
UNIT 2 INTRODUCTION TO PIG LATIN				
2.1	Introduction to Pig Latin – Preliminary matters	2	Lecture	PPT
2.2	Input and Output	2	Chalk & Talk	Black Board
2.3	User defined function	2	Lecture	PPT
2.4	Advanced relational Operations	2	Lecture	White board
2.5	Integrating Pig with legacy code and map reduce	2	Discussion	Black Board
2.6	Controlling execution	2	Chalk & Talk	Black Board
UNIT 3 DEVELOPING AND TESTING PIG LATIN SCRIPTS& HIVE - INTRODUCTION				
3.1	Developing and Testing Pig Latin Scripts	2	Lecture	White board
3.2	Writing Evaluation and filter functions	2	Chalk & Talk	Black Board



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3.3	Writing load and store functions	2	Lecture	PPT
3.4	Developing Hive	2	Lecture	White board
3.5	Services in Hive	2	Discussion	Black Board
3.6	Understanding Hive Data model	2	Lecture	PPT
UNIT 4 HIVEQL: DATA DEFINITION&HIVEQL: DATA MANIPULATION				
4.1	HiveQL: Data definition – Databases	2	Lecture	PPT
4.2	Alter database – Create Tables	2	Lecture	PPT
4.3	Alter, Manage & Drop Tables.	2	Discussion	Black Board
4.4	HiveQL: Data manipulation	2	Lecture	PPT
4.5	Load Data into managed tables	2	Chalk & Talk	White board
4.6	Creating Tables and Loading Them in One Query-Exporting Data	2	Lecture	White board
UNIT 5 HIVEQL QUERIES&HIVEQL VIEWS				
5.1	HiveQL: Queries – SELECT ... FROM Clauses- Where Clauses – Group by clauses	2	Lecture	PPT
5.2	Join Statements	1	Chalk & Talk	PPT
5.3	DISTRIBUTE BY with SORT BY	2	Lecture	PPT
5.4	CLUSTER BY – casting	1	Discussion	White board
5.5	Queries that Sample Data – UNION ALL	2	Lecture	Black Board
5.6	HiveQL: Views - HiveQL: Indexes - Schema Design	2	Chalk & Talk	Black Board
5.7	Tuning – Functions – Streaming - Customizing Hive File and Record	2	Chalk & Talk	Black Board



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	formats – Security – Locking			

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CIA	
Scholastic	45
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EVALUATION PATTERN

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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Identify the programming constructs of Pig and database management using HiveQL	K2	PSO1 & PSO2
CO 2	Write scripts using Pig latin and perform various HiveQLqueries by applying RDBMS concepts	K2, K3, K4	PSO1 & PSO2
CO 3	Apply the concepts of Pig and Hive in simple tasks	K2 & K3	PSO1 & PSO3
CO 4	Formulate and analyse different databases for different situations	K2, K3 & K5	PSO1 & PSO4
CO 5	Create real time applications	K2,K3 & K5	PSO1 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	1	1
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CO3	3	2	3	1	1
CO4	3	2	2	3	1
CO5	2	2	2	1	3

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	1	1	2	2	1	1	1	1	2
CO2	2	2	2	2	1	2	2	2	2	1	1	2
CO3	2	3	2	1	2	3	2	1	1	2	1	2
CO4	2	3	3	1	2	3	2	2	2	2	2	2
CO5	3	3	3	2	3	3	3	2	2	1	2	3

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

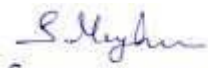
♦ Weakly Correlated -1

COURSE DESIGNER:

Forwarded By

Staff Name – B. USHA

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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EMPLOYABILITY-100%

II MCA

SEMESTER -III

(For those who join in 2020 onwards)

PROGRAM ME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WE K	CREDIT S
MCA	20MCADS 03	CRYPTOGRAPHY & NETWORK SECURITY	SPECIALIZATION ELECTIVE - DISTRIBUTED SYSTEM SECURITY	4	4

COURSE DESCRIPTION

This course provides basic understanding of previous attacks on cryptosystems with the aim of preventing future attacks and to provide security using various cryptographic tools.

COURSE OBJECTIVE

- ❖ Understand the OSI security architecture and classical encryption techniques.
- ❖ To be able to secure a message over insecure channel by various means.
- ❖ Acquire knowledge on various algorithms, block and stream cipher models.
- ❖ Portray the principles of public key cryptosystems.



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UNIT –IOVERVIEW AND CLASSICAL ENCRYPTION TECHNIQUES (12 Hours)

Computer Security Concepts – OSI Security Architecture – Security attacks – Security Services – Security mechanisms –Model for Network Security - Symmetric Cipher Model - Cryptography – Cryptanalysis and Brute Force Attack – Substitution techniques – Caesar Cipher – Monoalphabetic Ciphers – Playfair cipher – Polyalphabetic Cipher – Vigenere Cipher – Vernam Cipher.

SELF STUDY : Steganography, Transposition techniques

UNIT - II BLOCK CIPHERS, DES AND AES ` (12 Hours)

Traditional Block Cipher Structure – Stream Ciphers and Block Ciphers – Feistel Cipher Structure – Feistel Decryption Algorithm - Data Encryption Standard – DES Encryption – DES Decryption – Block Cipher Design Principles – AES Structure – AES Transformation Functions – Electronic Codebook – Cipher Block Chaining Mode – Cipher Feedback Mode – Output Feedback Mode.

UNIT- III PUBLIC-KEY CRYPTOGRAPHY & DIGITAL SIGNATURES(12 Hours)

Principles of Public Key Cryptosystems – Applications - Cryptanalysis - RSA Algorithm – Description – Computational Aspects – Security of RSA - Diffie - Hellman key Exchange – Algorithm – Key Exchange Protocols – Man in the middle attack – Message Authentication Requirements – Functions – Message encryption - Digital Signatures – Properties – Attacks and forgeries – Requirements – Direct Digital Signature.

SELF STUDY : Requirements of Public key cryptosystem

UNIT - IV ELECTRONIC MAIL AND IP SECURITY (12 Hours)

Internet Mail Architecture – Protocols - Pretty Good Privacy – Notation – Operational Description – Domain Keys identified Mail Architecture –



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Characteristics – DKIM strategy – DKIM Functional flow - IP Security Overview – Applications – Benefits – Routing Applications – Authentication plus Confidentiality – Key Determination Protocol – Header and Payload Formats.

SELF STUDY : Email Components

UNIT V CrypTool 2

(12 Hours)

Introduction – components – Startcenter – Wizard – Workspace Manager – Online Help – Templates - CrypCloud.

REFERENCES :

1. William Stallings, “Cryptography and Network Security Principles & Practice”, 7th Edition, Pearson Education Limited, 2018.
2. Atul Kahate, “Cryptography and Network Security”, 3rd Edition, Tata McGraw Hill, 2013.
3. William stalling, “Network security essentials”, Pearson publication.
4. Johannes A. Buchaman, “Introduction to cryptography”, Verlag, 2013.

WEB REFERENCES:

1. www.cse-eb.iitkgp.ernet.in/~debdeep/courses_iitkgp/Crypto/index.htm
2. <https://www.tutorialspoint.com/cryptography/>
3. <https://www.future-forces-forum.com/download/Workshop-IntroductionToCrypTool.pdf>

COURSE CONTENTS & LECTURE SCHEDULE:



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Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT - 1 OVERVIEW AND CLASSICAL ENCRYPTION TECHNIQUES				
1.1	Introduction to Computer Security Concepts	1	Chalk & Talk	Black Board
1.2	OSI Security Architecture	1	Chalk & Talk	Black Board
1.3	Security attacks	1	Lecture	PPT
1.4	Security Services & mechanisms	2	Chalk & Talk	Black Board
1.5	Model for Network Security	1	Discussion	Black Board
1.6	Symmetric Cipher Model	1	Lecture	White board
1.7	Substitution techniques	1	Lecture	PPT
1.8	Playfair, Polyalphabetic Cipher	2	Lecture	White board
1.9	Vigenere, Vernam Cipher	1	Chalk & Talk	Black Board
1.10	Steganography	1	Discussion	Google classroom
UNIT - 2 BLOCK CIPHERS, DES AND AES				
2.1	Traditional Block Cipher Structure	2	Lecture	PPT
2.2	Traditional Block Cipher Structure	2	Chalk & Talk	Black Board
2.3	Traditional Block Cipher Structure	1	Lecture	PPT
2.4	Data Encryption Standard	2	Lecture	White board
2.5	Block Cipher Design Principles	1	Discussion	Black Board
2.6	AES Structure	1	Chalk & Talk	Black Board



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2.7	Electronic Codebook	1	Chalk & Talk	Black Board
2.8	Cipher Block Chaining Mode	1	Lecture	White board
2.9	Cipher, Output Feedback Mode	1	Discussion	Black Board
UNIT - 3 PUBLIC-KEY CRYPTOGRAPHY AND DIGITAL SIGNATURES				
3.1	Principles of Public Key Cryptosystems	1	Lecture	White board
3.2	Requirements of Public key cryptosystem	1	Chalk & Talk	Black Board
3.3	RSA Algorithm	2	Lecture	PPT
3.4	Diffie - Hellman key Exchange	2	Lecture	White board
3.5	Man in the middle attack	1	Lecture	PPT
3.6	Message Authentication Requirements	1	Discussion	Google classroom
3.7	Digital Signatures	2	Chalk & Talk	Black Board
3.8	Direct Digital Signature	2	Lecture	PPT
UNIT - 4 ELECTRONIC MAIL AND IP SECURITY				
4.1	Internet Mail Architecture	1	Lecture	PPT
4.2	Pretty Good Privacy	2	Lecture	PPT
4.3	Domain Keys identified Mail Architecture	1	Chalk & Talk	Black Board
4.4	DKIM Functional flow	1	Chalk & Talk	Black Board
4.5	IP Security Overview	1	Discussion	Black Board
4.6	Routing Applications	2	Lecture	PPT
4.7	Authentication plus Confidentiality	1	Chalk & Talk	Black Board



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Evaluate the fundamentals of networks security, security architecture, threats and vulnerabilities	K2	PSO1
CO 2	Compare Stream ciphers and block ciphers.	K2, K3, K4	PSO2
CO 3	Apply the different cryptographic operations of public key cryptography.	K2 & K3	PSO3
CO 4	Pertain the various Authentication schemes to simulate different applications.	K2, K3 & K5	PSO2 & PSO4
CO 5	Applying CrypTool 2 to encrypt and decrypt texts using different ciphers.	K2, K3 & K5	PSO5



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Mapping COs Consistency with PSOs

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CO4	1	2	1	3	1
CO5	1	1	1	2	3

Note: ♦ Strongly Correlated – 3 ♦ Moderately Correlated – 2
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Mapping of COs with POs

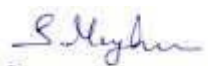
CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1	1	2	2	1	1	2	2	1
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CO3	1	3	2	1	3	2	2	2	1	2	1	1
CO4	2	3	1	2	3	1	1	2	2	1	1	1
CO5	1	2	1	1	2	3	3	1	2	2	3	2

COURSE DESIGNER:

Staff Name – S. JEBAPRIYA

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

II MCA

SEMESTER – III

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
MCA	20MCADS04	CYBER FORENSICS	SPECIALIZATION ELECTIVE – DISTRIBUTED SYSTEM SECURITY	4	4

COURSE DESCRIPTION

This course provides the investigation of computer-related crimes with the goal of obtaining evidence to be presented in a court of law.

COURSE OBJECTIVE

- ❖ Understand the definition of computer forensics fundamentals.
- ❖ Describe the types of computer forensics technology.
- ❖ Analyze various computer forensics systems.
- ❖ Learn to duplicate and preserve digital evidence.

UNIT – I COMPUTER FORENSICS FUNDAMENTALS

(12 Hours)

Introduction - Use in Law Enforcement - Assistance to Human Resources - Services - Benefits of Forensics Methodology - Steps Taken by Specialists – Users



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of Computer Forensic Evidence - Types of Computer Forensics Technology - Military Forensic Technology - Types of Law Enforcement - Types of Business Technology - Specialized Forensics Techniques - Hidden Data - Spyware and Adware - Encryption Methods and Vulnerabilities - Protecting Data - Internet Tracing Methods - Security and Wireless Technologies - Avoiding Pitfalls with Firewalls.

SELF STUDY : Biometric Security Systems

UNIT II COMPUTER FORENSICS EVIDENCE AND CAPTURE (12 Hours)

Data Recovery -Definition - Data Backup and Recovery – Data Recovery Solution - Hiding and Recovering Hidden Data - Evidence Collection and Data Seizure – Obstacles - Types - Rules - Volatile Evidence - Methods of Collection - Artifacts - Collection Steps - The Chain of Custody - Reconstructing the Attack – Preservation of Digital Evidence and Digital Crime Scene - Computer Evidence Processing Steps – Legal Aspects - Computer Image - Verification and Authentication- Special Needs of Evidential Authentication.

SELF STUDY : Controlling Contamination, The Chain of Custody

UNIT III COMPUTER FORENSICS ANALYSIS (12 Hours)

Discovery of Electronic Evidence - Electronic Document Discovery: A Powerful New Litigation Tool - Identification of Data - Timekeeping - Forensic Identification and Analysis of Technical Surveillance Devices - Reconstructing Past Events - How to Become a Digital Detective - Useable File Formats - Unusable File Formats - Converting Files - Networks - Network Forensics Scenario - A Technical Approach - Destruction of Email – Damaging Computer Evidence - Tools Needed for Intrusion Response to the Destruction of Data.

SELF STUDY : System Testing



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UNIT IV THE IW ARSENAL AND TACTICS OF THE MILITARY (12 Hours)

Overview of Military Tactics - Offensive Ruinous IW Tools and Tactics – Offensive Containment IW Tools and Tactics - Defensive Preventive IW Tools and Tactics – Defensive Ruinous IW Tools and Tactics - Defensive Responsive Containment IW Tools and Tactics - Countering Sustained Terrorist IW Tactics - Dealing with Random Terrorist IW - The Future of Information Warfare Arsenal – Weapons of the Future - The Global Positioning System - Snoop, Sniff, and Snuff Tools - Email Wiretaps Like Carnivore Can Steal Sensitive Correspondence - IW Weapons of the Future.

SELF STUDY : Nanotechnology

UNIT V SURVEILLANCE TOOLS FOR IW OF THE FUTURE (12 Hours)

Monitoring Everything - The Cyber Footprint and Criminal Tracking - The Implications of Cookies and Integrated Platforms - Wintel Inside, or How Your Computer Is Watching You - Data Mining - The Internet Is Big Brother - The Wireless Internet: Friend or Foe - Advanced Computer Forensics - Advanced Encryption: The Need to Conceal - Advanced Hacking - Advanced Tracker Hackers - The Problems of the Present.

SELF STUDY : Cyber Surveillance

REFERENCES:

1. John R. Vacca, “Computer Forensics: Computer Crime Scene Investigation”, Second Edition , 2005.
2. Kevin Mandia, Chris Prosise, Matt Pepe, “Incident Response and Computer Forensics “, Tata McGraw -Hill, New Delhi, 2014.
3. Nelson Phillips and EnfingerSteuart, “Computer Forensics and Investigations”, Cengage Learning, New Delhi, 2016.
4. Bill Nelson, Amelia Phillips, Chris Steuart, “Guide to Computer Forensics and Investigations processing Digital Evidence”, Fifth Edition, Tata McGraw - Hill, New Delhi, 2016.



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WEB REFERENCES:

4. <https://homelandforensics.com/forensics.htm>
5. https://en.wikipedia.org/wiki/Computer_forensics



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 COMPUTER FORENSICS FUNDAMENTALS				
1.1	Introduction to Computer Forensics Fundamentals	1	Chalk & Talk	Black Board
1.2	Benefits of Forensics Methodology	1	Chalk & Talk	Black Board
1.3	Users of Computer Forensic Evidence	1	Lecture	PPT
1.4	Military Forensic Technology	2	Chalk & Talk	Black Board
1.5	Specialized Forensics Techniques	1	Discussion	Black Board
1.6	Encryption Methods and Vulnerabilities	1	Lecture	White board
1.7	Internet Tracing Methods	1	Lecture	PPT
1.8	Security and Wireless Technologies	2	Lecture	White board
1.9	Biometric Security Systems.	2	Chalk & Talk	Black Board
UNIT - 2 COMPUTER FORENSICS EVIDENCE AND CAPTURE				
2.1	Data Backup and Recovery	1	Lecture	PPT
2.2	Evidence Collection and Data Seizure	1	Chalk & Talk	Black Board
2.3	Methods of Collection	2	Lecture	PPT
2.4	Collection Steps	2	Lecture	White board



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2.5	Controlling Contamination	1	Discussion	Black Board
2.6	Reconstructing the Attack	1	Chalk & Talk	Black Board
2.7	Preservation of Digital Evidence and Digital Crime Scene	1	Chalk & Talk	Black Board
2.8	Computer Evidence Processing Steps	1	Lecture	White board
2.9	Computer Image - Verification and Authentication	1	Discussion	Black Board
2.10	Special Needs of Evidential Authentication	1	Lecture	PPT
UNIT - 3 COMPUTER FORENSICS ANALYSIS				
3.1	Discovery of Electronic Evidenc	1	Lecture	White board
3.2	Electronic Document Discovery: A Powerful New Litigation Tool	2	Chalk & Talk	Black Board
3.3	Forensic Identification and Analysis of Technical Surveillance Devices	2	Lecture	PPT
3.4	How to Become a Digital Detective	1	Lecture	White board
3.5	Useable & Unusable File Formats	1	Lecture	PPT
3.6	Network Forensics Scenario - A Technical Approach	2	Discussion	Google classroom
3.7	Destruction of Email	1	Chalk & Talk	Black Board
3.8	Damaging Computer Evidence	1	Lecture	PPT
3.9	Tools Needed for Intrusion Response to the Destruction of Data	1	Discussion	Google classroom
UNIT - 4 THE IW ARSENAL AND TACTICS OF THE MILITARY				



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4.1	Overview of Military Tactics	1	Lecture	PPT
4.2	Offensive Ruinous IW Tools and Tactics	1	Lecture	PPT
4.3	Offensive Containment IW Tools and Tactics	1	Chalk & Talk	Black Board
4.4	Defensive Preventive IW Tools and Tactics	1	Chalk & Talk	Black Board
4.5	Defensive Ruinous IW Tools and Tactics	1	Discussion	Black Board
4.6	Defensive Responsive Containment IW Tools and Tactics	1	Lecture	PPT
4.7	Weapons of the Future	2	Chalk & Talk	Black Board
4.8	Snoop, Sniff, and Snuff Tools	2	Discussion	Google classroom
4.9	IW Weapons of the Future	2	Discussion	Google classroom
UNIT – 5 SURVEILLANCE TOOLS FOR IW OF THE FUTURE				
5.1	Cyber Surveillance	2	Chalk & Talk	Black Board
5.2	Cyber Footprint and Criminal Tracking	1	Lecture	PPT
5.3	Implications of Cookies and Integrated Platforms	2	Lecture	PPT
5.4	Data Mining	1	Lecture	White board
5.5	The Wireless Internet: Friend or	2	Lecture	White board



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	Foe.			
5.6	Advanced Encryption: The Need to Conceal	1	Lecture	White board
5.7	Advanced Hacking	1	Lecture	White board
5.8	Advanced Tracker Hackers	1	Discussion	Google classroom
5.9	The Problems of the Present.	1	Chalk & Talk	Black Board



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- **CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Predict the forensics fundamentals and the various technologies used to avoid computer crimes	K2, K4	PSO1 & PSO3
CO 2	Illustrate different methods to collect and preserve digital evidence and Digital Crime Scene.	K2, K3, K4	PSO2 & PSO5
CO 3	Identify and Analyze Forensic Technical Surveillance Devices.	K2 , K4	PSO3 & PSO4
CO 4	Evaluate the Various tools and tactics followed in military.	K2, K3,K4 & K5	PSO2 & PSO4
CO 5	Demonstrate the Usage of surveillance tools for tracking cyber criminals	K2,K3,K4 & K5	PSO2 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	2	1	1
CO2	1	3	1	1	2
CO3	1	1	3	2	1
CO4	1	2	1	3	1
CO5	1	2	1	1	3

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	3	1	3	1	3	2	1	3	1	2
CO2	2	1	3	2	2	3	3	1	1	3	3	1
CO3	1	3	3	1	3	2	2	1	2	2	1	1
CO4	1	1	2	1	3	2	3	2	2	2	1	1
CO5	3	2	1	2	1	3	3	2	1	3	3	1

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

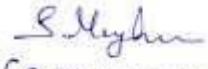
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – S. JEBAPRIYA

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

II MCA

SEMESTER – III

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCAAM03	MACHINE LEARNING	SPECIALIZATION ELECTIVE – AI & MACHINE LEARNING	4	4

COURSE DESCRIPTION

This course provides an introduction to learn Machine Intelligence and Machine Learning Applications algorithms to solve real world problems.

COURSE OBJECTIVE

- ❖ To introduce the fundamentals of Machine Learning and algorithms.
- ❖ To define the classifiers and its associated algorithms
- ❖ To impart the knowledge on supervised and unsupervised learning algorithms used for classification, prediction and clustering.

UNIT - I INTRODUCTION

(12 Hours)

Introduction to machine learning - Learning Problems – Learning System – Issues in machine learning - Concept Learning - Learning Task – General-to-specific Ordering – Specific Hypothesis – Candidate Elimination – Inductive Bias.

SELF STUDY : Choosing the Target Function



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UNIT – II DECISION TREE & BAYESIAN LEARNING (12 Hours)

Decision Tree Learning -Decision tree representation – Issues in decision tree learning- Bayesian Learning - Bayes Theorem – Bayes Theorem and Concept Learning – Naive Bayes classifier - Bayesian Networks -EM Algorithm

SELF STUDY : Avoiding Overfitting the Data

UNIT - III GENETIC ALGORITHMS (12 Hours)

Introduction to Instance Based Learning – K-Nearest Neighbor Learning - Radial Basis Function, Case based reasoning - Genetic Algorithms - Hypotheses – Genetic Operators – Hypothesis Space Search – Genetic Programming – Models of Evolution and Learning.

SELF STUDY : Parallelizing Genetic Algorithms

UNIT - IV LEARNING SETS OF RULES (12 Hours)

Introduction to Learning Sets of Rules -Sequential Covering Algorithms – Learning First order Rules – FOIL – Inverting Resolution - Analytical Learning - PROLOG EBG – Explanation Based learning – Features.

SELF STUDY : Deductive Learning

UNIT - V KNIME (12 Hours)

Introduction – Installation – First Run – Workbench – Running Workflow – Exploring Workflow – Building own Model – Testing Model .



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REFERENCES :

1. Tom M. Mitchell, "Machine Learning", Tata McGraw-Hill, New Delhi, 1997.
2. Hastie.T, Tibshirani.R, and Friedman.J, "The Elements of Statistical Learning: Data Mining Inference and Prediction", Second edition, Springer, 2009.
3. Christopher M. Bishop, "Pattern Recognition and Machine Learning" – Information Science and Statistics, Springer, 2007.

WEB REFERENCES :

1. <https://machinelearningmastery.com/machine-learning-with-python/>
2. http://ibpsa.fr/jdownloads/Simurex/2015/Presentations/30_03_atelierdata_mining.pdf
3. <https://www.tutorialspoint.com/knime/index.htm>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 INTRODUCTION				
1.1	Introduction to Machine Learning	1	Chalk & Talk	Black Board
1.2	Learning problems	2	Chalk & Talk	Black Board
1.3	Learning System	2	Lecture	PPT
1.4	Issues in machine learning	2	Chalk & Talk	Black Board
1.5	Concept Learning	1	Discussion	Black Board
1.6	Learning Task	1	Lecture	White board
1.7	General-to-specific Ordering	2	Lecture	PPT
1.8	Inductive Bias	1	Lecture	White board
UNIT -2 DECISION TREE & BAYESIAN LEARNING				
2.1	Decision Tree Learning	2	Lecture	PPT
2.2	Bayesian Learning	2	Discussion	Black Board
2.3	Bayes Theorem	2	Chalk & Talk	PPT
2.4	Bayes Theorem and Concept Learning	2	Lecture	White board
2.5	Naive Bayes classifier	2	Discussion	Black Board
2.6	Bayesian Networks	2	Lecture	PPT
UNIT -3 GENETIC ALGORITHMS				
3.1	Introduction to Instance Based Learning	2	Lecture	White board



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3.2	K-Nearest Neighbor Learning	2	Chalk & Talk	Black Board
3.3	Genetic Algorithms	2	Lecture	PPT
3.4	Hypotheses	2	Lecture	White board
3.5	Genetic Operators	2	Lecture	PPT
3.6	Genetic Programming	2	Discussion	Google classroom
UNIT -4 LEARNING SETS OF RULES				
4.1	Introduction to Learning Sets of Rules	2	Lecture	PPT
4.2	Sequential Covering Algorithms	2	Lecture	PPT
4.3	Learning First-Order Rules, FOIL	2	Chalk & Talk	Black Board
4.4	Analytical Learning	2	Chalk & Talk	Black Board
4.5	PROLOG EBG	2	Discussion	Black Board
4.6	Explanation, Based Learning	2	Discussion	Google classroom
UNIT -5 KNIME				
5.1	Introduction	1	Lecture	PPT
5.2	Installation	2	Lecture	PPT
5.3	First Run	1	Lecture	White board
5.4	Workbench	2	Lecture	White board
5.5	Running Workflow	1	Lecture	White board



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5.6	Exploring Workflow	2	Lecture	White board
5.7	Building own Model	2	Lecture	White board
5.8	Testing Model	1	Discussion	Google classroom



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Identify the concepts of machine learning	K2, K4	PSO1, PSO2
CO 2	Demonstrate Decision Tree learning and Bayesian Learning for classification.	K2, K3, K4	PSO2, PSO3
CO 3	Analyze the logic behind Genetic Algorithms.	K2, K4	PSO1, PSO3
CO 4	Compare various set of rules available for Learning.	K2, K3, K4 & K5	PSO4, PSO5
CO 5	Propose solution for real world problems based on Inductive and Analytical Learning.	K2, K3, K4 & K5	PSO3, PSO4



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	1	1	1
CO2	1	2	3	1	1
CO3	3	1	2	1	1
CO4	1	1	1	2	3
CO5	1	1	2	3	1

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	1	1	1	1	1	1	1	1	1	1
CO2	1	1	1	1	1	1	1	2	1	1	3	1
CO3	1	3	2	1	1	1	1	1	1	1	1	1
CO4	1	1	1	1	1	1	2	1	1	3	1	1
CO5	1	1	1	2	1	3	1	1	1	1	1	1

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

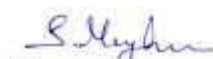
♦ Weakly Correlated -1

COURSE DESIGNER:

Forwarded By

Staff Name – R. SMEETA MARY

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

II MCA

SEMESTER – III

(For those who join in 2020 onwards)

PROGRAM ME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/W EEK	CREDITS
MCA	20MCAAM04	NEURAL NETWORKS	SPECIALIZATION ELECTIVE – AI & MACHINE LEARNING	4	4

COURSE DESCRIPTION

This course provides the basic principles of Neural Networks. It will cover Neurocomputing, Layer Perceptron, Pattern Association, HopField Net, Back Propagation Network, Probabilistic Neural Network and Application of Neural Networks

COURSE OBJECTIVE

- ❖ To learn the various fundamental models of artificial neural networks.
- ❖ To have an understanding of Neural Networks and use these for controlling real time systems.
- ❖ To have a basic proficiency to use neural network for application related to design and manufacture.



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UNIT – I Introduction to NN and Artificial NN (12 Hours)

Introduction - Neural Processing - Overview – The Rise of Neurocomputing - Introduction - Artificial Neural Networks - Historical Development of Neural Networks - Biological Neural Networks - Comparison between the brain and the computer - Comparison between artificial and biological Neural Network - Artificial Neural Network Terminologies.

Self Study : Historical Development of Neural Networks

UNIT II Models of Artificial NN&Perceptron Networks (12 Hours)

Introduction - McCulloch-Pitts Neuron Model - Learning Rules – Introduction - Single Layer Perceptron - Brief Introduction to Multilayer Perceptron Networks

Self Study : Single Layer Perceptron

UNIT III Associative Memory Networks (12 Hours)

Introduction - Algorithm for Pattern Association - Hetero Associative Memory Neural Networks - Auto Associative Memory Network.

Self Study: Auto Associative Memory Network

UNIT IV Feedback and Feed forward Network (12 Hours)

Introduction - Discrete Hopfield Net - Continuous Hopfield Net – Introduction - Back Propagation Network.

Self Study: Discrete Hopfield Net

UNIT V AI Special Networks Applications of NN (12 Hours)

Introduction - Probabilistic Neural Network – Cognitron – Neocognitron - Boltzman Machine - Boltzman Machine with Learning - Support Vector Machine - Application of Neural Networks in Arts – Bioinformatics – Use of Neural Networks in Knowledge Extraction.

Self Study: Application of Neural Networks in Arts



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REFERENCE BOOKS

1. S N Sivanandam, S. Sumathi, S.N.Deepa, "Introduction to Neural Networks", Tata McGraw – Hill Publishing Company Limited, 2008
2. S.Rajasekaran, G.A.Vijayalakshmi, "Neural Networks, Fuzzu Logic and Genetic Algorithms", PHP Learning Private Limited, Delhi, 2015.
3. Bart Kosko, "Neural Networks and Fuzzy Systems", PHP Learning Private Limited, Delhi, 2012.
4. Jhh-shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, Bart Kosko "Neuro-Fuzzy and Soft Computing", PHP Learning Private Limited, Delhi, 2012.

WEB RESOURCES

1. http://www.soukalfi.edu.sk/01_NeuroFuzzyApproach
2. https:// /Neuro_fuzzy_and_Soft_Computing.html?id=vn5qaaaamaaj
3. https://en.wikipedia.org/wiki/Neural_network



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 INTRODUCTION TO NN AND ARTIFICIAL NN				
1.1	Introduction , Neural Processing , Overview	2	Chalk & Talk	Black Board
1.2	The Rise of Neurocomputing , Introduction	2	Chalk & Talk	Black Board
1.3	Artificial Neural Networks , Historical Development of Neural Networks	2	Lecture	White board
1.4	Biological Neural Networks , Comparison between the brain and the computer	2	Chalk & Talk	Black Board
1.5	Comparison between artificial and biological Neural Network	2	Discussion	Black Board
1.6	Artificial Neural Network Terminologies	2	Lecture	White board
UNIT - 2 MODELS OF ARTIFICIAL NN & PERCEPTRON NETWORKS				
2.1	Introduction, McCulloch-Pitts Neuron Model	2	Lecture	PPT
2.2	Learning Rules	3	Chalk & Talk	Black Board
2.3	Introduction	2	Lecture	PPT
2.4	Single Layer Perceptron	3	Lecture	White board
2.5	Brief Introduction to Multilayer Perceptron Networks	2	Discussion	Black Board
UNIT -3 ASSOCIATIVE MEMORY NETWORKS				



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3.1	Introduction	1	Lecture	White board
3.2	Algorithm for Pattern Association	1	Chalk & Talk	Black Board
3.3	Hetero Associative Memory Neural Networks	5	Lecture	PPT
3.4	Auto Associative Memory Network	5	Lecture	PPT
UNIT – 4 FEEDBACK AND FEED FORWARD NETWORK				
4.1	Introduction	1	Lecture	PPT
4.2	Discrete HopFiled Net	3	Lecture	PPT
4.3	Continuous Hoppfiled Net	3	Chalk & Talk	Black Board
4.4	Introduction	1	Chalk & Talk	Black Board
4.5	Back Propagation Network	4	Discussion	Black Board
UNIT – 5 AI SPECIAL NETWORKS &APPLICATIONS OF NN				
5.1	Introduction , Probabilistic Neural Network	1	Chalk & Talk	Black Board
5.2	Cognitron	1	Lecture	PPT
5.3	Neocognitron	1	Lecture	PPT
5.4	Boltzman Machine	1	Lecture	White board
5.5	Boltzman Machine with Learning	2	Lecture	White board
5.6	Support Vector Machine	2	Lecture	White board
5.7	Application of Neural Networks in Arts	2	Chalk & Talk	White Board
5.8	Bioinformatics	1	Demonstration	LCD
5.9	Use of Neural Networks in Knowledge Extraction	1	Demonstration	LCD



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- **CIA Components**

				Nos		
C1	-	Test (CIA 1)		2*	-	10 Mks
C2	-	Test (CIA 2)		1	-	15 Mks
C3	-	Assignment / Open Book Test		2	-	10 Mks
C4	-	Seminar		1	-	10 Mks
C5	-	Attendance		1	-	5 Mks

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Identify problems that are amenable to solution by Neural networks methods.	K2, K4	PSO1& PSO2
CO 2	Formulate searching rules and implement Single Layer Perceptron and Multilayer Perceptron Networks.	K2, K3, K4	PSO2 & PS03
CO 3	Design and carry out an empirical evaluation of different algorithms on Pattern Association	K2 , K4	PSO1 & PS04
CO 4	Analyze Feedback and Feed forward Network and implement optimal and efficient solutions.	K2, K3,K4 & K5	PS03 & PS05
CO 5	Apply the application of Neural Networks in Arts, Bioinformatics and use of Neural Networks in Knowledge Extraction.	K2,K3,K4 & K5	PS04 &PS05



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	1	1
CO2	1	3	2	1	1
CO3	2	1	1	3	1
CO4	1	1	3	1	2
CO5	1	1	1	2	3

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	3	1	1	1	2	1	1	1	1	1	1
CO2	1	1	1	1	3	1	2	1	1	1	1	1
CO3	1	1	3	1	1	1	1	2	1	1	1	1
CO4	1	3	1	1	1	1	1	1	2	1	1	1
CO5	3	1	1	1	1	1	1	1	1	2	1	1

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

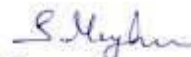
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – R. SMEETA MARY

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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EMPLOYABILITY – 100%

II MCA

SEMESTER – III

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCA305	LAB V - MOBILE APPLICATION DEVELOPMENT	MAJOR LAB	4	2

COURSE DESCRIPTION

This course provides knowledge of developing applications for mobiles using native and hybrid frameworks.

COURSE OBJECTIVE

- ❖ Know the components and structure of mobile application development frameworks
- ❖ Learn the basic and important design concepts and issues of development of mobile applications.
- ❖ Write applications for the platforms used, simulate them, and test them on the mobile hardware where possible



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LAB LIST FOR CREATING NATIVE & HYBRID APPLICATIONS USING ANDROID & REACT

1. Create Applications using Layouts.
2. Create Event Driven Applications.
3. Create Applications using Date and Time.
4. Create Applications to include Menus
5. Create an application for sending and receiving SMS
6. Creating Android Audio Video Application
7. Create an Application with One-Time, Repeating Alarms
8. Create an Application which uses Multiple Activities
9. Create an Application To Call Built In Applications.
10. Create an Application for Simple Mobile Game.
11. Create an Application that implements database connectivity



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	1	1	1
CO2	3	3	2	1	1
CO3	3	2	3	2	1
CO4	3	2	2	2	1
CO5	2	2	2	2	3

Mapping of COs with POs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	3	1	2	2	1	1	3
CO2	3	2	3	2	1	3	1	1	2	2	2	2
CO3	3	3	3	3	2	2	1	1	2	2	2	3
CO4	3	2	2	2	2	2	1	1	2	2	1	2
CO5	3	3	2	2	1	3	2	1	2	1	1	2

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

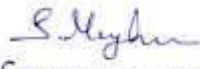
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – B. USHA

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HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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EMPLOYABILITY-100%

II MCA

SEMESTER – III

(For those who joined in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
MCA	20MCA306	LAB VI – ENTERPRISE APPLICATION DEVELOPMENT	MAJOR LAB	4	2

COURSE DESCRIPTION

This lab course provides the experience in creating, debugging, testing & deploying dynamic web applications. It also gives thorough coverage of the use of MVC for creating web applications.

COURSE OBJECTIVE

- ❖ To design applications using J2EE, Struts and Hibernate.
- ❖ To develop a web application with n-tier architecture.
- ❖ To develop a simple application using Spring MVC.



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LAB LIST

1. Create a program to connect with database and manipulate the records in the database using ADO.NET
2. Develop a car showroom inventory web application with 2-tier architecture
3. Develop a real estate web application with n-tier architecture
4. Develop a simple Spring MVC application that take user input and checks the input using standard validation annotations
5. Design a student identity management web application using struts framework. The application should be able to provide an identity such as student id, access to department assets with department id, access to lab assets with lab id.
6. Create a simple online bookstore using Django as a back end.
7. Creating a Java Application using Hibernate technology.
8. Example for Basic Hibernate CRUD operations.
9. Example for Spring Dependency Injection and Types
10. Example for Simple spring JDBC program



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	1	1	1
CO2	3	3	2	1	1
CO3	3	2	3	2	1

Mapping of COs with POs

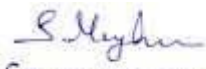
CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	3	2	1	2	1	1	2	1	3	2
CO2	1	3	2	1	3	2	2	2	1	2	1	1
CO3	1	1	3	2		3	3	1	1	2	1	2

COURSE DESIGNER:

Staff Name – P.NANCY VINCENTINA MARY

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SKILL DEVELOPMENT-100%

II MCA

SEMESTER – III

For those who joined in 2020 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WE EK	CREDITS
MCA	20MCA307	SKILL BASED LAB III – COMPUTER AIDED SOFTWARE ENGINEERING (CASE) TOOLS	SKILL BASED LAB	2	1

COURSE DESCRIPTION

This course provides automation of the entire information systems development life cycle process using a set of integrated software tools.

COURSE OBJECTIVE

- ❖ To plan project using open source planning tools.
- ❖ To design project using designing tools.
- ❖ To test projects using testing tools.

LAB LIST

1. Project planning Tools.
 - MS project / Any open source planning tools
2. Designing tools
 - Visual Paradigm
 - Smart draw



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3. Testing Tools.

- JMETER
- Selenium
- JUNIT
- NUNIT

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Planning project using open source planning tools	K2	PSO1 & PSO3
CO 2	Designing project using designing tools	K2, K3, K4	PSO2 & PSO3
CO 3	Testing projects using testing tools	K2 & K3	PSO3 & PSO4



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	2	1	1
CO2	1	3	2	1	1
CO3	1	1	2	3	1

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	2	1	1	1	1	2	1	1	1	1
CO2	1	3	2	1	2	1	1	1	1	1	1	2
CO3	1	1	2	3	1	1	1	1	2	1	1	1

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

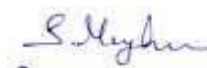
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – S. JEBAPRIYA

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SKILL DEVELOPMENT-100%

II MCA

SEMESTER – III

(For those who joined in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCA308	SOFT SKILL III – INTERPERSONAL SKILLS FOR CORPORATE READINESS	SOFT SKILL	2	1

COURSE DESCRIPTION

This course provides the skills needed to find a job and also the skills needed to excel at the time of entering a career.

COURSE OBJECTIVES

- ❖ To impart the importance of Interpersonal skills in the working environment

UNIT- I Simulating an Interview

Telephone Interviews



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-
- a. How to dress
 - b. Body language
 - c. Case Interview

UNIT - II Team Skills Development

- a. Quick plan exercise
- b. Group connections activity
- c. Coded team communication activity
- d. Personality tree exercise
- e. Management and leadership training

UNIT – III Time Management Skills

- a. Individual Target achievement activity
- b. Group Target activity



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 Simulating an Interview				
1.1	Telephone Interviews	1	Chalk & Talk	Black Board
1.2	How to dress	1	Chalk & Talk	LCD
1.3	Body language	4	Lecture	PPT & White board
1.4	Case Interview	1	Lecture	Smart Board
UNIT -2 Team Skills Development				
2.1	Quick plan exercise	1	Lecture	Green Board Charts
2.2	Group connections activity	2	Chalk & Talk	Green Board
2.3	Coded team communication activity	1	Lecture	Smart Board
2.4	Personality tree exercise	1	Lecture	Black Board
2.5	Management and leadership	2	Discussion	Google classroom



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	training			
2.1	Quick plan exercise	1	Lecture	Green Board Charts
2.2	Group connections activity	2	Chalk & Talk	Green Board
2.3	Coded team communication activity	1	Lecture	Smart Board
2.4	Personality tree exercise	1	Lecture	Black Board
2.5	Management and leadership training	2	Discussion	Google classroom
UNIT -3 Time Management Skills				
3.1	Individual Target achievement activity	5	Discussion	Google classroom
3.2	Group Target activity	4	Discussion	Google classroom



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Develop skills for producing high quality etiquettes at the time of interviews	K2	PSO1, PSO4
CO 2	Exhibit competencies expected by employers	K2, K3, K4	PSO4
CO 3	Demonstrate emotional intelligence and inter cultural competencies and to be ready to work in teams	K2, K3& K5	PSO4 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	1	1	3	1
CO2	1	1	1	3	1
CO3	1	1	1	2	3

Mapping of COs with POs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	1	1	1	2	2	2	1	3	3
CO2	1	1	1	2	1	1	3	2	2	2	2	2
CO3	1	1	1	1	1	1	2	2	3	2	2	3

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

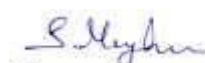
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name - B.USHA

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HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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EMPLOYABILITY-100%

II MCA

SEMESTER – IV

(For those who joined in 2020 onwards)

PROGRAM ME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
MCA	20MCA401	LAB VII - UIX DESIGN PROGRAMMING	MAJOR LAB	4	2

COURSE DESCRIPTION

This course provides an overview of client-side web user interfaces. It focuses on grids and responsive design using CSS pre-processors, Less and Sass and the basics of Node.js. It takes the students to move to the next level by building data-driven web apps using React

COURSE OBJECTIVES

- ❖ To develop rich interactive web pages.
- ❖ To understand the modern technologies, components and frameworks for developing web pages.
- ❖ To build websites by apply mark-up languages for processing, identifying, and presenting of information in web pages.



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LAB LIST

REACT JS

1. Setup a React project
2. Add and use components
3. Pass data to child components
4. Use state variables
5. Use callback functions to communicate data

ANGULAR

1. Add and use components
2. Add and use Modules
3. Data and Event binding
4. Templates
5. Implement navigation using the angular router (angular-route).

BOOTSTRAP 4

1. Menu
2. Header
3. Tabs & Filters
4. Table
5. Footer

NODE.JS

1. HTTP Module
2. File System
3. URL Module
4. Upload files
5. Email



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6. NODE.JS MYSQL

7. NODE.JS MONGODB

LESS & SASS

1. Less Basics–Variables
2. Mixins
3. Operators
4. Functions
5. Namespaces and Accessors
6. Saas Basics – Variables
7. Nesting – Partial
8. Import–Mixins
9. Inheritance
10. Operators



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Design websites using various React and Angular features	K1, K2,	PSO1 & PSO2
CO 3	Build applications using Node.JS along with MongoDB & MySQL.	K1 & K3	PSO2 & PSO3
CO 5	Utilize the conceptual and practical aspects of CSS Pre-processors	K2 & K4	PSO3 & PSO4



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	1	1	1
CO2		3	2	1	1
CO3	1	1	2	2	1

Mapping of COs with Pos

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	1	1	2	3	1	2	1	2
CO2	3	2	2	1	2	1	2	3	1	2	2	2
CO3	3	3	3	2	3	2	2	3	2	3	3	3

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

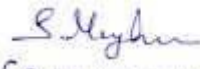
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – S. MARY HELAN FELISTA

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

II MCA

SEMESTER – IV

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WE EK	CREDITS
MCA	20MCADA05	BUSINESS ANALYTICS USING R	SPECIALIZATION ELECTIVE – DATA ANALYTICS	4	4

COURSE DESCRIPTION

This course provides a comprehensive study on business analytics that can be applied to many business settings and its practical implementation using a tool.

COURSE OBJECTIVES

- ❖ To introduce the principles and concepts of business analytics and R programming
- ❖ To gain a practical knowledge on the concept of supervised and unsupervised machine learning
- ❖ To implement the various techniques of Regression in R.

UNIT – I

(12 HRS.)

OVERVIEW OF BUSINESS ANALYTICS

Drivers for Business Analytics – Applications of Business Analytics – Skills Required for a Business Analyst – Life cycle of a Business Analytics Project – The Framework for Business Analytics



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INTRODUCTION TO R

Data Analysis Tools – R Installation – Basics of R Programming – R object types – Data Structures in R

SELF STUDY :The Framework for Business Analytics , R object types

UNIT – II

(12 HRS.)

R FOR DATA ANALYSIS

Reading and Writing Data – Using Control Structures in R – Working with R Packages and Libraries

INTRODUCTION TO DESCRIPTIVE ANALYTICS

Descriptive Analytics – Population and sample – Statistical parameters of interest – Graphical description of the data – Computations on data frames - Probability

SELF STUDY :Graphical description of the data

UNIT – III

(12 HRS.)

BUSINESS ANALYTICS PROCESS AND DATA EXPLORATION

Business Analytics Life Cycle – Understanding the Business Problem – Collecting and Integrating the Data – Preprocessing the Data – Exploring and Visualizing the Data – Using Modeling Techniques and Algorithms – Evaluating the Model – Presenting a Management Report and Review – Deploying the Model

SELF STUDY :Presenting a Management Report and Review

UNIT – IV

(12HRS.)

SUPERVISED MACHINE LEARNING

Classification and Prediction - Probabilistic Models for Classification - Decision Trees - Other Classifier Types - Classification Example Using R

UNSUPERVISED MACHINE LEARNING



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Clustering- Hierarchical Clustering – Non Hierarchical Clustering - Clustering Case Study - Association Rule

SELF STUDY :Other Classifier Types, Association Rule

UNIT – V

(12 HRS.)

SIMPLE LINEAR REGRESSION

Introduction – Correlation – Hypothesis Testing – Simple Linear Regression

MULTIPLE LINEAR REGRESSION

Using Multiple Linear Regression – Using an Alternative Method in R - Predicting the Response Variable - Training and Testing the Model - Cross Validation

LOGISTIC REGRESSION

Logistic Regression– Training and Testing the Model - Multinomial Logistic RegressionRegularization

SELF STUDY :Multinomial Logistic Regression , Regularization

REFERENCES:

1. Dr.Umesh R. Hodeghatta, UmeshaNayak, “Business Analytics Using R – A Practical Approach” Apress Media, 2017
2. A.Ohri, “R for Business Analytics”, Springer, 2012
3. Johannes Ledolter, “Data Mining and Business Analytics with R “John Wiley & Sons Inc., 2013.
4. Dr. Bharti Motwani, “ Data analytics with R”, Wiley India

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2. <https://www.sisense.com/glossary/r-analytics/>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT – 1 OVERVIEW OF BUSINESS ANALYTICS & INTRODUCTION TO R				
1.1	Drivers for Business Analytics – Applications of Business Analytics	2	Chalk & Talk	Black Board
1.2	Skills Required for a Business Analyst – Life cycle of a Business Analytics Project	2	PPT	LCD
1.3	The Framework for Business Analytics	2	Flipped Classroom	LCD
1.4	Data Analysis Tools – R Installation	2	PPT	LCD
1.5	Basics of R Programming	2	Group Discussion	White Board
1.6	R object types – Data Structures in R	2	PPT	LCD
UNIT -2 R FOR DATA ANALYSIS & INTRODUCTION TO DESCRIPTIVE ANALYTICS				



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2.1	Reading and Writing Data – Using Control Structures in R	3	PPT	LCD
2.2	Working with R Packages and Libraries	2	PPT	LCD
2.3	Descriptive Analytics – Population and sample – Statistical parameters of interest	2	LECTURE	BLACK BOARD
2.4	Graphical description of the data	3	PPT	LCD
2.5	Computations on data frames – Probability	2	PPT	LMS tool – Edmodo and LCD
UNIT -3 BUSINESS ANALYTICS PROCESS AND DATA EXPLORATION				
3.1	Business Analytics Life Cycle – Understanding the Business Problem	2	PPT	LCD AND WHITE BOARD
3.2	Collecting and Integrating the Data – Preprocessing the Data	2	LECTURE	BLACK BOARD
3.3	Exploring and Visualizing the Data – Using Modeling Techniques and Algorithms	2	PPT	LCD



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3.4	Evaluating the Model	2	PPT	LCD
3.5	Presenting a Management Report and Review	2	Chalk and Talk	Blackboard
3.6	Deploying the Model	2	PPT	LCD
UNIT – 4 SUPERVISED & UNSUPERVISED MACHINE LEARNING				
4.1	Classification and Prediction	1	Chalk and Talk	Blackboard
4.2	Probabilistic Models for Classification	2	PPT	LCD
4.3	Decision Trees	2	Chalk and Talk	Blackboard
4.4	Other Classifier Types	1	PPT	LCD
4.5	Classification Example Using R	1	PPT	LCD
4.6	Clustering- Hierarchical Clustering – Non Hierarchical Clustering	2	PPT	LCD
4.7	Clustering Case Study	1	PPT	LCD
4.8	Association Rule	2	Flipped Classroom	LCD
UNIT - 5 SIMPLE LINEAR, MULTIPLE LINEAR & LOGISTIC REGRESSION				



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5.1	Introduction – Correlation	2	LECTURE	BLACK BOARD
5.2	Hypothesis Testing – Simple Linear Regression	2	LECTURE	BLACK BOARD
5.3	Using Multiple Linear Regression	1	PPT	LCD
5.4	Using an Alternative Method in R - Predicting the Response Variable	2	PPT	LCD
5.5	Training and Testing the Model - Cross Validation	2	PPT	LCD
5.6	Logistic Regression – Training and Testing the Model	2	PPT	LCD
5.7	Multinomial Logistic Regression Regularization	1	PPT	LCD



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Level s	C1	C2	C3	C4	Total Scholasti c Marks	Non Scholasti c Marks C5	CIA Tota l	% of Assessmen t
	10 Mk s	15 Mk s	5+5=10 Mks .	10 Mk s	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non- Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

✓ All the course outcomes are to be assessed in the various CIA components.



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✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate

EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- **CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Examine the concepts around Business analytics	K2, K4	PSO1,PS02
CO 2	Evaluate the process of analysing a business descriptively using the tool	K2, K3, K4	PSO2, PSO3
CO 3	Explore data and business analytic process	K2 , K4	PSO1, PSO3
CO 4	Apply various supervised and unsupervised Machine learning techniques	K2, K3,K4 & K5	PSO4, PSO5
CO 5	Learn to apply different algorithms of regression for business problems	K2,K3,K4 & K5	PSO3, PSO4



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	1	1
CO2	1	2	3	1	1
CO3	3	1	2	1	1
CO4	1	1	1	2	3
CO5	1	1	2	3	1

Mapping COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	3	3	3	1	2	2	1	2	1	2
CO2	2	2	3	2	2	3	3	1	1	2	1	1
CO3	1	3	3	3	3	2	2	1	2	2	1	1
CO4	2	2	2	3	3	2	3	2	1	2	1	2
CO5	3	2	2	2	1	3	3	2	1	2	1	2

Note: ϕ Strongly Correlated – 3

ϕ Moderately Correlated – 2

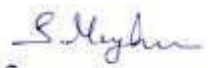
ϕ Weakly Correlated -1

COURSE DESIGNER:

Staff Name –R. SMEETA MARY

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HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

II CA

SEMESTER – IV

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
MCA	20MCADA06	BIG DATA SECURITY	SPECIALIZATION ELECTIVE – DATA ANALYTICS	4	4

COURSE DESCRIPTION

This course provides an overview of the cutting edge and new technologies in the area of big data security.

COURSE OBJECTIVE

- ❖ Understand the significance of privacy and ethics in big data environment
- ❖ Learn about the security issues in Hadoop environment
- ❖ To become familiar with various algorithms for implementing security

UNIT- I

(12 Hours)

SECURITY AND GOVERNANCE FOR BIG DATA ENVIRONMENTS

Security in context with Big data – Understanding data protection options – Data governance challenge – Putting the right organizational structure in place – Developing a well governed and secured big data environment Big data best practices – Big data do's and don'ts

SELF STUDY: Big data do's and don'ts

UNIT - II

(12 Hours)



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HADOOP SECURITY OVERVIEW

Challenges for securing the hadoop eco system – key security considerations

Hadoop security design : Kerberos – terminologies – advantages – Hadoop security model without Kerberos – Hadoop Kerberos security implementation.

SELF STUDY:key security considerations

UNIT - III

(12 Hours)

SETTING UP A SECURED HADOOP CLUSTER

Setting up Kerberos – configuring hadoop with Kerberos authentication

SECURING THE HADOOP ECO SYSTEM

Configuring kerberos for Hadoop eco system components – securing Hive, Oozie, flume, Hbase, Scoop, Pig

UNIT - IV

(12 Hours)

SECURING SENSITIVE DATA IN HADOOP

Securing insights in Hadoop – Securing data in Motion – Security data in Rest – Implementing data encryption in Hadoop.

SELF STUDY: Security data in Rest

UNIT - V

(12 Hours)

SECURITY EVENT AND AUDIT LOGGING IN HADOOP

Security incident and event monitoring in Hadoop Cluster – Audit logging in a secured Hadoop cluster.

SELF STUDY: Audit Logging



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REFERENCES:

1. Judith Hurwitz, Alan Nugent, Dr. Fern Halper and Marcia Kaufman, “Big Data”, Wiley Publications, 2014.
2. Sudeesh Narayanan, “Securing Hadoop”, Packt Publishing, 2013.
3. Tom White, “Hadoop: The Definitive Guide”, Third Edition, O’reilly Media, 2012
4. Mark Van Rijmenam, “Think Bigger: Developing a Successful Big Data Strategy for Your Business “, Amazon, First edition, 2014.
5. Frank Ohlhorst, “Big Data Analytics: Turning Big Data into Big Money”, John Wiley & Sons, John Wiley & Sons, 2013.

WEB REFERENCES:

1. <https://www.sisense.com/glossary/big-data-security/>
2. <https://www.datamation.com/big-data/big-data-security.html>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 SECURITY AND GOVERNANCE FOR BIG DATA ENVIRONMENTS				
1.1	Security and Governance for Big Data environments: Security in context with Big data	2	Lecture	Black Board
1.2	Understanding data protection options – Data governance challenge	2	Lecture	White board
1.3	Putting the right organizational structure in place	3	Lecture	PPT
1.4	Developing a well governed and secured big data environment	3	Lecture	PPT
1.5	Big data best practices	2	Lecture	PPT
UNIT - 2 HADOOP SECURITY OVERVIEW				
2.1	Hadoop Security overview : Challenges for securing the hadoop eco system	2	Lecture	PPT
2.2	key security considerations	2	Chalk & Talk	Black Board
2.3	Hadoop security design : Kerberos – terminologies	2	Lecture	PPT
2.4	Advantages	2	Lecture	White board
2.5	Hadoop security model without Kerberos	2	Discussion	Black Board



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2.6	Hadoop Kerberos security implementation	2	Chalk & Talk	Black Board
UNIT-3 SETTING UP A SECURED HADOOP CLUSTER				
3.1	Setting up a secured Hadoop cluster	2	Lecture	White board
3.2	Setting up Kerberos	2	Chalk & Talk	Black Board
3.3	Configuring Hadoop with Kerberos authentication	2	Lecture	PPT
3.4	Securing the Hadoop eco system configuring Kerberos for Hadoop eco system components	3	Lecture	White board
3.5	Securing Hive, Oozie, Flume, Hbase, Scoop, Pig.	3	Discussion	Black Board
UNIT-4 SECURING SENSITIVE DATA IN HADOOP				
4.1	Securing sensitive data in Hadoop	3	Lecture	PPT
4.2	Securing insights in Hadoop	3	Lecture	PPT
4.3	Securing data in Motion	3	Discussion	Black Board
4.4	Implementing data encryption in Hadoop	3	Lecture	PPT
UNIT-5 SECURITY EVENT AND AUDIT LOGGING IN HADOOP				
5.1	Security Event and Audit Logging in Hadoop	4	Lecture	PPT
5.2	Security incident and event monitoring in Hadoop Cluster	4	Lecture	PPT
5.3	Audit logging in a secured Hadoop cluster.	4	Lecture	PPT



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Level s	C1	C2	C3	C4	Total Scholasti c Marks	Non Scholasti c Marks C5	CIA Tota l	% of Assessmen t
	10 Mk s	15 Mk s	5+5=10 Mks .	10 Mk s	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

All the course outcomes are to be assessed in the various CIA components.

✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- **CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Identify the need for security and best practices in a big data environment	K2, K4	PSO1 & PSO2
CO 2	Analyze the steps to secure big data	K2, K3, K4	PSO1, PSO2 & PSO3
CO 3	Build security in hadoop eco system	K2 , K4	PSO1, PSO2 & PSO3
CO 4	Assess the sensitivity of data in Hadoop	K2, K3, K4 & K5	PSO1 & PSO4
CO 5	Outline data security and event logging	K2, K3, K4 & K5	PSO4 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	2	1	1
CO2	2	3	2	1	1
CO3	3	3	2	1	1
CO4	3	2	1	3	1
CO5	2	1	2	3	3

Mapping COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	1	2	2	2	2	1	1	1	2
CO2	2	2	1	2	1	2	2	2	2	1	1	2
CO3	2	2	2	1	2	3	2	2	1	2	1	2
CO4	2	3	3	1	2	3	2	3	2	2	2	2
CO5	3	3	3	2	3	3	3	3	2	3	3	3

Note: ϕ Strongly Correlated – 3

ϕ Moderately Correlated – 2

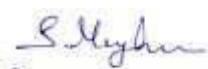
ϕ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – B. USHA

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

II MCA

SEMESTER - IV

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
MCA	20MCADS05	CLOUD SECURITY	SPECIALIZATION ELECTIVE – DISTRIBUTED SYSTEM SECURITY	4	4

COURSE DESCRIPTION

This course provides a comprehensive study on the unique security challenges and opportunities in cloud platforms and guides through the security best practices for multivendor cloud environments.

COURSE OBJECTIVES

- ❖ To introduce the principles and concepts related to cloud security
- ❖ To gain a practical knowledge on the concept of asset management
- ❖ To understand the issues and security incidents on network security.

UNIT –I

(12 HRS.)

PRINCIPLES AND CONCEPTS

Least Privilege – Defense in Depth – Threat Actors, Diagrams and Trust Boundaries
– Cloud Delivery Models – The cloud shared responsibility model – Risk management



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DATA ASSET MANAGEMENT AND PROTECTION

Data identification and classification – Example Data Classification Levels – Relevant Industry or Regulatory Requirements – Data Asset Management in the Cloud – Protecting Data in the cloud – Tokenization - Encryption

SELF STUDY :Cloud delivery Models, Data Asset Management in the Cloud

UNIT –II

(12 HRS.)

CLOUD ASSET MANAGEMENT AND PROTECTION

Types of Cloud assets – Compute Assets – Storage Assets – Network Assets. Asset management Pipeline – Procurement Leaks – Processing Leaks – Tooling Leaks – Findings Leaks. Tagging Cloud Assets

IDENTITY AND ACCESS MANAGEMENT

Life Cycle for identity and Access – Request –Approve – Create, Delete, Grant or Revoke – Authentication – Authorization – Revalidate – Sample Application

SELF STUDY :Tagging Cloud Assets , Authorization

UNIT –III VULNERABILITY MANAGEMENT

(12 HRS.)

Vulnerable Areas – Finding and Fixing Vulnerabilities – Risk Management Processes – Vulnerability Management Metrics – Change Management – Sample Application

UNIT – IV

(12 HRS.)

DETECTING , RESPONDING TO, AND RECOVERING FROM SECURITY INCIDENTS

What to Watch – Privileged User Access – Logs from Defensive Tooling – Cloud Service Logs and Metrics – Operating System Logs and Metrics – Middleware Logs – Secrets Server. How to Watch – Aggregation and Retention – Parsing Logs –



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Searching and Correlation – Alerting and Automated Response – Security Information and Event Managers – Thread Hunting. Preparing for an Incident – Responding to an Incident – Recovery – Example Metrics – Example Tools for Detection, Response and Recovery – Sample Application

UNIT V

(12 HRS)

VMWARE CLOUD SECURITY

VMware workspace One Intelligence – Addressing Common vulnerabilities and exposures – VMware Workspace One – Purpose – Secure devices – Loading – Assessing Common Vulnerabilities – Workspace One UEM

AZURE CLOUD SECURITY

Azure Security Centre, Azure Active Directory – VPN Gateway – DDoS Protection – Key vaults – Dedicated HSM – Application Gateways – Sentinel – Information Protection

REFERENCES:

1. Chris Dotson, “Practical Cloud Security” O’Reilly Media, Inc. [ISBN : 9781492037514] , 2019
2. Tim Mather, SubraKumaraswamy, ShahedLatif, “Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance” O’Reilly Media; 1edition [ISBN: 0596802765], 2009.
3. Ronald L. Krutz, Russell Dean Vines, “Cloud Security” [ISBN: 0470589876],2010.
4. John W.RittingHouse, James F.Ransome, Cloud Computing Implementation, Management and Security, CRC Press, 2013.
5. Timothy Grance; Wayne Jansen;NIST “Guidelines on Security and Privacy in Public Cloud Computing”, 2011.
6. Cloud Security Alliance 2010, “Top Threats to Cloud Computing” Microsoft



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WEB REFERENCES :

1. https://resources.sei.cmu.edu/asset_files/presentation/2012_017_001_52439.pdf
2. <https://www.simplilearn.com/cloud-network-security-tutorial>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 PRINCIPLES AND CONCEPTS & DATA ASSET MANAGEMENT AND PROTECTION				
1.1	Least Privilege – Defense in Depth – Threat Actors, Diagrams and Trust Boundaries	2	Chalk & Talk	Black Board
1.2	Cloud Delivery Models	1	PPT	LCD
1.3	The cloud shared responsibility model – Risk management	2	Flipped Classroom	LMS tool - and LCD
1.4	Data identification and classification – Example Data Classification Levels	2	PPT	LMS tool - and LCD
1.5	Relevant Industry or Regulatory Requirements	1	Group Discussion	White Board
1.6	Data Asset Management in the Cloud	2	Flipped Classroom	LMS tool - and LCD
1.7	Protecting Data in the cloud – Tokenization - Encryption	2	PPT	LCD
UNIT -2 CLOUD ASSET MANAGEMENT AND PROTECTION& IAM				
2.1	Types of Cloud assets – Compute Assets – Storage Assets – Network Assets.	1	Flipped Classroom	LMS tool – and LCD
2.2	Asset management Pipeline	1	Lecture	White Board



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2.3	Procurement Leaks – Processing Leaks- Tooling Leaks – Findings Leaks	1	PPT	White Board
2.4	Tagging Cloud Assets	1	Flipped Classroom	LMS tool – and LCD
2.5	Life Cycle for identity and Access – Request –Approve	2	PPT	CD
2.6	Create, Delete, Grant or Revoke	2	PPT	LCD
2.7	Authorization	2	Self Study	Presentation using PPT
2.8	Authentication - Revalidate – Sample Application	2	PPT	LCD
UNIT -3 VULNERABILITY MANAGEMENT				
3.1	Vulnerable Areas	2	Flipped Classroom	LMS tool - and LCD
3.2	Finding and Fixing Vulnerabilities	2	PPT	White Board
3.3	Risk Management Processes	2	PPT	LMS tool - and LCD
3.4	Vulnerability Management Metrics	2	PPT	LCD
3.5	Change Management	2	Chalk and Talk	Blackboard
3.6	Sample Application	2	PPT	LCD
UNIT 4 - DETECTING , RESPONDING TO, AND RECOVERING FROM SECURITY INCIDENTS				
4.1	What to Watch – Privileged User Access – Logs from Defensive Tooling – Cloud	2	Chalk and Talk	Blackboard



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	Service Logs and Metrics –			
4.2	Operating System Logs and Metrics – Middleware Logs – Secrets Server.	2	Chalk and Talk	Blackboard
4.3	How to Watch – Aggregation and Retention – Parsing Logs – Searching and Correlation –	2	Chalk and Talk	Blackboard
4.4	Alerting and Automated Response – Security Information and Event Managers – Thread Hunting.	2	Flipped Classroom	LCD
4.5	Preparing for an Incident – Responding to an Incident – Recovery – Example Metrics – Example Tools for Detection, Response and Recovery –	2	PPT	LCD
4.6	Sample Application	2	PPT	LCD
UNIT - 5 VMWARE & AZURE CLOUD SECURIT				
5.1	VMware workspace One Intelligence	2	Flipped Classroom	LMS tool - and LCD
5.2	Addressing Common vulnerabilities and exposures	1	Flipped Classroom	LMS tool and LCD
5.3	Vmware Workspace One – Purpose – Secure devices – Loading	2	Lecture	PPT
5.4	Assessing Common Vulnerabilities	1	PPT	White Board
5.5	Workspace One UEM	2	Demonstration	White Board



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5.6	Azure Security Centre, Azure Active Directory	1	PPT	White Board
5.7	VPN Gateway – DDoS Protection – Key vaults – Dedicated HSM	2	Demonstration	White Board
	Application Gateways - Sentinel – Information Protection	1	Lecture	PPT



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- **CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Examine the security threats in cloud platforms	K2, K4	PSO3
CO 2	Evaluate Data Asset and Identity Access Management	K2, K3, K4	PSO2, PSO3
CO 3	Manage the vulnerable cloud environment	K2 , K4	PSO1
CO 4	Understand the security issues that arises over a Network	K2, K3,K4 & K5	PSO4, PSO5
CO 5	Explore the security incidents by detecting, responding and recovering	K2,K3,K4 & K5	PSO3, PSO4



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	3	1	1
CO2	1	2	3	1	1
CO3	3	1	1	1	1
CO4	1	1	1	3	2
CO5	1	1	3	2	1

Note: ♦ Strongly Correlated – 3 ♦ Moderately Correlated – 2
 ♦ Weakly Correlated - 1

Mapping of COs with Pos

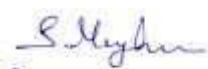
CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	2	2	3	3	1	1	3	1	2
CO2	1	2	2	2	3	2	2	3	1	2	2	2
CO3	1	3	1	2	2	3	3	1	3	3	2	1
CO4	2	2	3	1	1	1	2	1	2	2	2	2
CO5	1	2	3	1	1	3	2	2	2	1	1	2

COURSE DESIGNER:

Staff Name – P. Nancy Vincentina Mary

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

III MCA

SEMESTER – IV

(For those who join in 2020 onwards)

PROGRAMM E CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
MCA	20MCADS06	HIGH SPEED NETWORKS	SPECIALIZATION ELECTIVE- DISTRUIBUTED SYSTEM SECURITY	4	4

COURSE DESCRIPTION

This course covers the basics, architectures, protocols and technologies for high-speed networks. It includes LANs, Protocols, TCP/IP Suite, Data Networks, high speed LANs, link level flow and error control, transport level traffic control, routing, MPLS switching and Network security.

COURSE OBJECTIVE

- ❖ To highlight the features of different technologies involved in High Speed Networking and their Performance.
- ❖ To facilitate on the basis of ATM and Frame Relay concepts and their applications.
- ❖ To learn about the various high speed digital access and broadband technologies Switching techniques.



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UNIT I

(12 Hours)

Packet Switching Networks – Frame Relay Networks - Asynchronous Transfer Mode - ATM Protocol Architecture - ATM Logical Connections – ATM cell – ATM Service Categories – AAL - Fast Ethernet – Gigabit Ethernet – Fiber Channel – Wireless LANS – Applications – Requirements – Architecture of 802.11 – Services – Protocol layers

SELF STUDY: Asynchronous Transfer Mode

UNIT II

(12 Hours)

QUEUING ANALYSIS, CONGESTION CONTROL IN DATA NETWORKS AND INTERNETS

Queuing analysis – Queuing Models – Single Server Queues – Multi Server Queues Effects of Congestion – Congestion control – Traffic Management – Congestion control in Packet Switching Networks – Frame relay Congestion control.

SELF STUDY: Congestion control

UNIT III

(12 Hours)

TCP Flow control – TCP Congestion control – Retransmission – Timer Management – Exponential RTO Hackoff – KARN's Algorithm – Window Management – Performance of TCP over ATM

SELF STUDY: Window Management

UNIT IV

(12 Hours)

Integrated and Differentiated Services

Integrated Services Architecture – Approach – Components – Services – Queuing – Discipline – FQ – PS – BRFQ – GPS – WFQ – Random Early Detection – Differentiated services

SELF STUDY: GPS



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UNIT V

(12 Hours)

PROTOCOLS FOR QOS SUPPORT

RSVP – Goals & Characteristics – Data flow – RSVP operations – Protocol Mechanisms – Multiprotocol Label Switching – operations – Label Stacking and Protocol details – RTP – Protocol Architecture, Data transfer Protocol, RTCP

SELF STUDY: Data flow

REFERENCES :

1. William Stallings, “HIGH SPEED NETWORKS AND INTERNET”, Pearson Education, Second Edition, 2010
2. Data Communication and Networking, BEHROUZ A FOROUZAN, 4th Edition, Tata Mc Graw Hill.
3. High Speed Networking Technology, Harry J. R. Dutton, Harry, Jr. Dutton, Peter Lenhard, Prentice Hall, 2016.
4. Planning and Designing High Speed Networks, Costa, Hewlett-Packard Company, Prentice Hall, 2016.

WEB REFERENCES:

1. <https://www.hi-speed.net.au>
2. <https://sterbenz.org/jpgs/tutorials/hsn>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT 1				
1.1	Packet Switching Networks – Frame Relay Networks	1	Lecture	Black Board
1.2	ATM Protocol Architecture	1	Lecture	White board
1.3	ATM Logical Connections	1	Lecture	PPT
1.4	ATM cell	1	Lecture	PPT
1.5	ATM Service Categories – AAL - Fast Ethernet	2	Lecture	PPT
1.6	Gigabit Ethernet – Fiber Channel	2	Lecture	White board
1.7	Wireless LANS – Applications	2	Lecture	PPT
1.8	Requirements – Architecture of 802.11	1	Chalk & Talk	Black Board
1.9	Services – Protocol layers	1	Lecture	PPT
UNIT 2				
2.1	Queuing analysis – Queuing Models	2	Lecture	PPT
2.2	Single Server Queues	2	Chalk & Talk	Black Board
2.3	Multi Server Queues Effects of Congestion	2	Lecture	PPT
2.4	Traffic Management	2	Lecture	White board
2.5	Congestion control in Packet Switching Networks	2	Discussion	Black Board
2.6	Frame relay Congestion control	2	Chalk & Talk	Black Board



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UNIT 3				
3.1	TCP Flow control	2	Lecture	White board
3.2	TCP Congestion control	2	Chalk & Talk	Black Board
3.3	Retransmission	2	Lecture	PPT
3.4	Timer Management	2	Lecture	White board
3.5	Exponential RTO Hackoff – KARN's Algorithm	2	Discussion	Black Board
3.6	Performance of TCP over ATM	2	Lecture	PPT
UNIT 4				
4.1	Integrated Services Architecture	2	Lecture	PPT
4.2	Approach – Components – Services	2	Lecture	PPT
4.3	Queuing – Discipline	2	Discussion	Black Board
4.4	FQ – PS – BRFQ	2	Lecture	PPT
4.5	WFQ – Random Early Detection	2	Chalk & Talk	White board
4.6	Differentiated services	2	Lecture	White board
UNIT 5				
5.1	RSVP – Goals & Characteristics	2	Lecture	PPT
5.2	RSVP operations – Protocol Mechanisms	2	Lecture	PPT
5.3	Protocol Mechanisms- Multiprotocol Label Switching	2	Chalk & Talk	PPT
5.4	operations – Label Stacking and Protocol details – RTP	2	Lecture	PPT
5.5	Protocol Architecture	2	Discussion	White board
5.6	Data transfer Protocol, RTCP	2	Lecture	Black Board



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- **CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Identify the building blocks and operation of high speed networking and ATM.	K2, K4	PSO1 & PSO2
CO 2	Analyze the cause of congestion, traffic slow down and related factors for Quality of Service Identify.	K2, K3, K4	PSO1 & PSO2
CO 3	Apply the concepts learnt in this course to optimize performance of high-speed networks using Flow Control.	K2 , K4	PSO1 & PSO3
CO 4	Compare the different architectures used for HSN.	K2, K3,K4 & K5	PSO1 & PSO4
CO 5	Describe the protocols that are used to design high speed networks.	K2,K3,K4 & K5	PSO1 & PSO5



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	1	1
CO2	2	3	1	1	1
CO3	2	1	3	1	1
CO4	3	1	1	2	1
CO5	2	1	1	1	3

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1	1	1	2	2	2	1	1	1	2
CO2	2	2	2	1	1	2	2	2	2	2	1	2
CO3	2	2	2	1	2	2	2	2	1	2	1	2
CO4	2	2	2	1	1	3	2	3	1	2	2	3
CO5	3	3	3	2	2	3	3	3	3	3	3	3

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

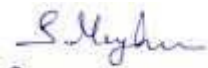
♦ Weakly Correlated -1

COURSE DESIGNER:

Forwarded By

Staff Name – B. USHA

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

II MCA

SEMESTER – IV

(For those who join in 2020 onwards)

PROGRAM ME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/W EEK	CREDITS
MCA	20MCAAM05	HUMAN COMPUTER INTERACTION	SPECIALIZATION ELECTIVE – AI & MACHINE LEARNING	4	4

COURSE DESCRIPTION

This course introduces the fundamental theories and concepts of human computer interaction. It provides knowledge on analyzing interaction problems from a technical, cognitive and functional perspective.

COURSE OBJECTIVE

- ❖ Learn the foundations of Human Computer Interaction
- ❖ Be familiar with the design technologies for individuals and persons with disabilities
- ❖ Be aware of mobile HCI
- ❖ Learn the guidelines for user interface.



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UNIT I

(12 Hours)

FOUNDATIONS OF HCI

The Human: Introduction – Input/Output Channels – Human Memory – Thinking: Reasoning and problem solving;

The Computer: Introduction – Text entry Devices – Positioning, pointing and drawing – Display devices – Devices for virtual reality and 3D interaction -Memory – Processing and networks;

SELF STUDY: Devices for virtual reality and 3D interaction

UNIT II

(12 Hours)

THE INTERACTION: Models of interaction – Models of interaction – Frameworks and HCI – Ergonomics – Interaction styles – Elements of the WIMP interface – Interactivity- the context of the interaction

PARADIGMS : Introduction – Paradigms for interaction

Self Study: Interactivity- the context of the interaction

UNIT III

(12 Hours)

INTERACTION DESIGN BASICS: Introduction – the process of design – User focus – the process of design – scenarios – navigation design – screen design – Iteration and prototyping.

HCI IN SOFTWARE PROCESS: Introduction – software life cycle – usability engineering – Prototyping in practice – design rationale.

SELF STUDY: software life cycle



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UNIT IV

(12 Hours)

DESIGN RULES: Introduction – principles to support usability- standards - guidelines – rules and heuristics – HCI patterns.

EVALUATION TECHNIQUES: Goals of evaluation – evaluation through expert analysis – evaluation through user participation – choosing an evaluation method.

SELF STUDY: HCI patterns , Choosing an evaluation method.

UNIT V

(12 Hours)

UNIVERSAL DESIGN: Introduction – Universal design principles – Multi modal interaction – Designing web sites for screen readers – choosing the right kind of speech – Designing for diversity

USER SUPPORT: Introduction – Requirements of user support – Approaches to user support –Adaptive help systems

SELF STUDY:Designing for diversity , Approaches to user support

REFERENCES:

1. Alan Dix, Janet Finlay , “Human-Computer Interaction”,3rdedition, Pearson India
2. Uzma Shaheen, Shweta Saini ,”Human Computer Interaction”, A. B. Publication
3. Dan Olsen, “HUMAN COMPUTER INTERACTION”, CENEAGE LEARNING INDIA PVT LTD
4. Preece, Rogers, Sharp, “Interaction Design : Beyond Human - Computer Interaction”, Wiley Publication
5. Cohen, Jacobs, Shneiderman, Plaisant, “Designing the User Interface: Strategies for Effective Human-ComputerInteraction”, Pearson Education.



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WEB RESOURCES:

1. <https://www.hcibib.org/>
2. <https://www.interaction-design.org/literature/topics/human-computer-interaction>



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Affiliated to Madurai Kamaraj University
Re-Accredited with 'A++' (CGPA 3.61) by NAAC (Cycle - IV)
 Mary Land, Madurai - 625018, Tamil Nadu

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 FOUNDATIONS OF HCI				
1.1	The Human: Introduction – Input/Output Channels	2	Chalk & Talk	Black Board
1.2	Human Memory	2	Lecture	PPT & White board
1.3	Thinking: Reasoning and problem solving	2	Lecture	PPT & White board
1.4	The Computer: Introduction	2	Lecture	PPT & White board
1.5	Text entry Devices – Positioning, pointing and drawing – Display devices	2	Lecture	PPT
1.6	Devices for virtual reality and 3D interaction -Memory – Processing and networks	2	Lecture	PPT
UNIT 2 - The Interaction & Paradigms				
2.1	Models of interaction Frameworks and HCI	2	Discussion	Black Board
2.2	Ergonomics	2	Lecture	Google classroom
2.3	Interaction styles	2	Lecture	PPT



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2.4	Elements of the WIMP interface – Interactivity- the context of the interaction	2	Lecture	Smart Board
2.5	Paradigms - Introduction	2	Lecture	Black Board
2.6	Paradigms for interaction	2	Lecture	PPT & Black board
UNIT 3 – Interaction Design & HCI in software process				
3.1	Interaction Design basics: Introduction	1	Discussion	Black Board
3.2	The process of design – User focus	2	Lecture	PPT
3.3	The process of design – scenarios	2	Lecture	PPT & White board
3.4	Navigation design – screen design – Iteration and prototyping.	3	Lecture	Smart Board
3.5	HCI in software process: Introduction, software life cycle – usability engineering	2	Lecture	Black Board
3.6	Prototyping in practice – design rationale	2	Lecture	PPT
UNIT 4 – Design rules & Evaluation Technique				
4.1	Design rules: Introduction – principles to support usability	3	Lecture	PPT
4.2	standards - guidelines – rules and heuristics	3	Lecture	PPT
4.3	HCI patterns	1	Lecture	PPT
4.4	Evaluation Techniques: Goals of evaluation – evaluation through	2	Lecture	PPT



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	expert analysis			
4.5	Evaluation through user participation – choosing an evaluation method.	3	Discussion	White Board
UNIT -5 – Universal Design & User support				
5.1	Universal Design: Introduction – Universal design principles	2	Lecture	PPT
5.2	Multi modal interaction – Designing web sites for screen readers	3	Lecture	PPT
5.3	choosing the right kind of speech – Designing for diversity	2	Lecture	PPT
5.4	User support: Introduction – Requirements of user support	3	Lecture	PPT
5.5	Approaches to user support – Adaptive help systems	2	Lecture	PPT



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	10 Mks	15 Mks	5+5=10 Mks .	10 Mks	45 Mks .	5 Mks .	50 Mks .	
K1	-	-	-	-	-		-	-
K2	-	5	5	2.5	12.5		12.5	25%
K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	15	10	10	5	50	50	100

- **CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Design effective dialog for HCI	K2, K4	PSO1 & PSO2
CO 2	Design effective HCI for individuals and persons with disabilities	K2, K3, K4	PSO2
CO 3	Assess the importance of user feedback	K2 , K4	PSO3 & PSO4
CO 4	Explain the HCI implications for designing websites	K2, K3,K4 & K5	PSO1 & PSO4
CO 5	Develop meaningful user interface	K2,K3,K4 & K5	PSO1 & PSO2



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	1	1
CO2	1	3	1	1	1
CO3	1	1	3	2	1
CO4	3	1	1	2	1
CO5	3	2	1	1	1

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	3	1	1	2	1	1	1	1	1	2	1
CO2	1	2	1	1	2	1	2	1	1	1	3	1
CO3	1	2	1	1	2	3	1	1	1	1	3	1
CO4	1	3	1	1	3	1	2	1	1	1	2	1
CO5	3	2	1	1	2	2	3	1	1	1	2	1

Note: ♦ Strongly Correlated – 3 ♦ Moderately Correlated – 2

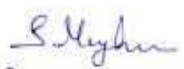
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – P. Nancy Vincentina Mary

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

II MCA

SEMESTER – IV

(For those who join in 2020 onwards)

PROGRAM ME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/W EEK	CREDITS
MCA	20MCAAM06	DEEP LEARNING	SPECIALIZATION ELECTIVE – AI & MACHINE LEARNING	60	4

COURSE DESCRIPTION

The course aims to provide an understanding of different types of Deep Architectures, including Convolutional Networks and Recurrent Networks.

COURSE OBJECTIVE

- ❖ To learn feed forward deep networks
- ❖ To understand convolutional networks and sequence modelling
- ❖ To study auto encoders and representation learning
- ❖ To expose the students to various deep generative models
- ❖ To study the various applications of deep learning

UNIT – I Deep Networks

(12 Hours)

Learning Basics: Learning Algorithms – Supervised Learning Algorithms – Unsupervised Learning Algorithms.



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Regularization for Deep Learning: Parameter Norm Penalties – Norm Penalties as Constrained Optimization – Regularization and Under Constrained Problems.

Optimization for Training Deep Models: Challenges In NN Optimization

Self Study : Unsupervised Learning Algorithms

UNIT II Deep Networks : Modern Practices

(12 Hours)

Convolutional Networks – Convolution operation – Motivation - Pooling – Efficient Convolution Algorithms

Recurrent and Recursive Nets: Recurrent neural networks – Deep Recurrent Networks – Recursive Neural Networks – challenge of Long Term Dependencies – Optimization for Long Term Dependencies.

Self Study : Motivation

UNIT III Deep Learning Research

(12 Hours)

Autoencoders: Undercomplete Autoencoders – Regularized Autoencoders – Representational Power, Layer Size and Depth – Stochastic Encoders and Decoders.

Representation Learning: Greedy Layer Wise Unsupervised pretraining – Transfer Learning and Domain Adaptation – Semi Supervised Disentangling of Causal Factors – Distributed Representation – Exponential Gains from Depth – Providing Clues to Discover Underlying Causes.

Self Study: Stochastic Encoders and Decoders

UNIT IV Structured Probabilistic, Monte Carlo Methods

(12 Hours)

Structured Probabilistic Models: Challenges of Unstructured Modeling – Using Graphs to Describe Model Structure – Learning About Dependencies – Inference and Approximate Inference – Deep Learning Approach



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Monte Carlo Methods: Sampling and Monte Carlo Methods – Importance Sampling – Markov Chain Monte Carlo Methods – Gibbs Sampling – Challenge of Mixing between Separate Modes

Self Study: Deep Learning Approach

UNIT V Applications

(12 Hours)

Large Scale Deep Learning – Fast CPU Implementations – GPU Implementations – Large Scale Distributed Implementations – Model Compression - Computer Vision - Speech Recognition – Natural Language Processing- n-grams – Neural Language Models – High Dimensional outputs – Neural Machine translation

Self Study: Model Compression

REFERENCE BOOKS

1. Yoshua Bengio and Ian J. Goodfellow and Aaron Courville, "Deep Learning", MIT Press, 2015
2. Li Deng, Dong Yu, "Deep Learning: Methods and Applications", now publishers, 2014.
3. Special Issue on deep learning for speech and language processing, IEEE Transaction on Audio, Speech and Language Processing, vol. 18, iss. 5, 2010

WEB RESOURCES

1. <http://www.deeplearning.net>
2. www.cs.toronto.edu/~fritz/absps/imagenet.pdf
3. <http://neuralnetworksanddeeplearning.com/>



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Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 DEEP NETWORKS				
1.1	Learning Algorithms	1	Chalk & Talk	Black Board
1.2	Supervised Learning Algorithms	2	Chalk & Talk	Black Board
1.3	Unsupervised Learning Algorithms	1	Lecture	White board
1.4	Regularization for Deep Learning, Parameter Norm Penalties	1	Chalk & Talk	Black Board
1.5	Norm Penalties as Constrained Optimization, Regularization and Under Constrained Problems	2	Discussion	Black Board
1.6	Optimization for Training Deep Models ,Challenges In NN Optimization	2	Lecture	White board
UNIT - 2 DEEP NETWORKS MODERN PRACTICES				
2.1	Convolutional Networks, Convolution operation, Motivation	2	Lecture	PPT
2.2	Pooling , Efficient Convolution Algorithms	2	Chalk & Talk	Black Board
2.3	Recurrent and Recursive Nets, Recurrent neural networks,Deep Recurrent neural networks	2	Lecture	PPT



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2.4	Recursive Neural Networks, challenge of Long Term Dependencies	2	Lecture	White board
2.5	Optimization for Long Term Dependencies	2	Discussion	Black Board
UNIT - 3 DEEP LEARNING RESEARCH				
3.1	Autoencoders, Undercomplete, Regularized Autoencoders	2	Lecture	White board
3.2	Representational Power, Layer Size and Depth, Stochastic Encoders and Decoders	2	Chalk & Talk	Black Board
3.3	Representation Learning, Greedy Layer Wise Unsupervised pretraining	2	Lecture	PPT
3.4	Transfer Learning and Domain Adaptation, Semi Supervised Disentangling of Causal Factors	2	Lecture	PPT
3.5	Distributed Representation	2	Lecture	White board
3.6	Exponential Gains from Depth	1	Discussion	Black Board
3.7	Providing Clues to Discover Underlying Causes	1	Lecture	White board
UNIT - 4 STRUCTURED PROBABILISTIC, MONTE CARLO METHODS				
4.1	Challenges of Unstructured Modeling	1	Lecture	PPT
4.2	Using Graphs to Describe Model Structure, Learning About	2	Lecture	PPT



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	Dependencies			
4.3	Inference and Approximate Inference	2	Chalk & Talk	Black Board
4.4	Deep Learning Approach	1	Chalk & Talk	Black Board
4.5	Monte Carlo Methods, Sampling and Monte Carlo Methods	2	Discussion	Black Board
4.6	Importance Sampling, Markov Chain Monte Carlo Methods	2	Lecture	PPT
4.7	Gibbs Sampling	1	Lecture	White board
4.8	Challenge of Mixing between Separate Modes	1	Discussion	Black Board
UNIT – 5 APPLICATIONS				
5.1	Large Scale Deep Learning, Fast CPU Implementations, GPU Implementations	1	Chalk & Talk	Black Board
5.2	Large Scale Distributed Implementations	1	Lecture	PPT
5.3	Model Compression, Computer Vision	1	Lecture	PPT
5.4	Speech Recognition	1	Lecture	White board
5.5	Natural Language Processing, n-grams	2	Lecture	White board
5.6	Neural Language Models	2	Lecture	White board



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5.7	High Dimensional outputs	2	Chalk & Talk	White Board
5.8	Neural Machine translation	2	Demonstration	LCD



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K3	5	-	-	5	10		10	20%
K4	5	5	-	2.5	12.5		12.5	25%
K5	-	5	5	-	10		10	20%
Non-Scho.	-	-	-	-	-	5	5	10%
Total	10	15	10	10	45	5	50	100%

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
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10	15	10	10	5	50	50	100

- **CIA Components**

				Nos			
C1	-	Test (CIA 1)		2*	-	10 Mks	
C2	-	Test (CIA 2)		1	-	15 Mks	
C3	-	Assignment / Open Book Test		2	-	10 Mks	
C4	-	Seminar		1	-	10 Mks	
C5	-	Attendance		1	-	5 Mks	

- **The Average of two will be taken into account**



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Identify problems that are amenable to solution by deep networks	K2, K4	PSO1& PSO2
CO 2	Formulate convolutional networks and sequence modelling for problem solving	K2, K3, K4	PSO2 & PS03
CO 3	Design and carry out an empirical evaluation of autoencoders and representation learning	K2 , K4	PSO1 & PS04
CO 4	Analyze structured probabilistic and Monte Carlo Methods	K2, K3,K4 & K5	PS03 & PS05
CO 5	Apply the applications of deep learning.	K2,K3,K4 & K5	PS04 &PS05



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Mapping COs Consistency with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	1	1
CO2	1	3	2	1	1
CO3	2	1	1	3	1
CO4	1	1	3	1	2
CO5	1	1	1	2	3

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	3	1	1	1	1	1	1	2	1	1	1
CO2	1	1	1	3	1	1	2	1	1	1	1	1
CO3	1	1	3	1	1	1	1	2	1	1	1	1
CO4	1	3	1	1	1	1	1	1	1	2	1	1
CO5	3	1	1	1	2	1	1	1	1	1	1	1

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

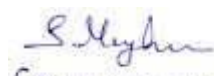
♦ Weakly Correlated -1

COURSE DESIGNER:

Staff Name – R. SMEETA MARY

Forwarded By

HOD'S Signature & Name


(S. MARY HELAN FELISTA)



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SKILL DEVELOPMENT-100%

III MCA

SEMESTER – V

(For those who join in 2019 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	19MCA501	SOFTWARE PROJECT MANAGEMENT	MAJOR CORE	4	4

COURSE DESCRIPTION

This course provides knowledge in applying different techniques to monitor & control project and people.

COURSE OBJECTIVE

- ❖ To understand the fundamental principles of Software Project management.
- ❖ To have a good knowledge of the responsibilities of project manager and how to handle them.
- ❖ To be familiar with the different methods and techniques used for project management.
- ❖ To know the issues and challenges faced while developing software.
- ❖ To be able to do the Project Scheduling, tracking, Risk analysis, Quality management and Project Cost estimation using different techniques.



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UNIT-I

(12 Hours)

INTRODUCTION TO SOFTWARE PROJECTMANAGEMENT

Introduction - Definition of Project – Comparison of projects – Activities – Plans, Methods and Methodologies – Categorization – Stakeholders - Setting Objectives - The business case - What is Management –Management control – Traditional versus Modern Project management Practices.

PROJECT EVALUATION & PROGRAMME MANAGEMENT

Introduction – Project Portfolio Management – Evaluation of individual project – Cost-benefit Evaluation techniques – Risk evaluation – Programme management – Allocation of resources – Strategic Program management – Creating a Programme – Aids to management – Benefits management

SELF STUDY: Risk evaluation

UNIT - II

(12 Hours)

OVERVIEW OF PROJECT PLANNING SELECTION OF AN APPROPRIATE PROJECT APPROACH

Introduction – build or buy – Choosing Methodologies and technologies – Software Process and Process Models – Choice of process models – Structure versus speed of delivery

ACTIVITY PLANNING

Objectives – When to plan – Project Schedules – Projects & activities – Sequencing & scheduling – Network Planning Models - Formulating a Network model - Adding Time dimensions – Forward & Backward pass – Identifying Critical path – Activity float



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UNIT - III RISK MANAGEMENT

(12 Hours)

Risk – Categories of risk – Framework for Risk – Risk Identification – Assessment, planning, Management – Evaluating risks to the schedule – Applying the PERT technique – Monte Carlo Simulation – Critical chain concepts

RESOURCE ALLOCATION

Nature of Resources – Identifying resource requirements – Scheduling Resources – Creating Critical paths – Counting the cost – Being Specific – Publishing the resource schedule - Cost schedule – The scheduling sequence.

SELF STUDY: cost schedule

UNIT - IV MONITORING AND CONTROL

(12 Hours)

Creating Framework - Collecting the data- Review – Project Termination Review - Visualizing the progress – Cost monitoring – Earned Value Analysis – Prioritizing Monitoring – Change Control

MANAGING PEOPLE IN SOFTWARE ENVIRONMENTS

Introduction – Understanding behaviour – Organizational behaviour – Selection of people – Instruction in the best methods –Motivation – Job Characteristics model – Stress – Health and safety.

SELF STUDY: Cost monitoring

UNIT – VWORKING IN TEAMS

(12 Hours)

Becoming a team – Decision making – Organizational structures – Coordination dependencies – Dispersed & Virtual teams – Communication plans – Leadership

SOFTWARE QUALITY

The place of software quality in project planning - Definition of Software Quality – Importance – ISO 9126 – Product and Process Metrics - Product versus Process Quality Management – Quality management systems – Process capability models - Techniques to enhance quality – Testing – Software reliability - Quality plans.

SELF STUDY: Organizational structures



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REFERENCES:

1. Bob Hughes and Mike Cotterell, "Software Project Management", Fifth Edition, Tata McGraw-Hill Edition 2015.
 2. Pankaj Jalote, "Software Project Management in Practice", Pearson Education Edition, 2008.
 3. Joel Henry, "Software Project Management", Pearson Education.
- Walker Royce, "Software Project Management", Pearson Education, 2005.

WEB REFERENCES:

1. https://www.tutorialspoint.com/software_engineering/software_project_management.htm
2. <https://www.studocu.com/en/book/software-project-management/bob-hughes-mike-cotterell>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 INTRODUCTION PROJECT EVALUATION & PROGRAMME MANAGEMENT				
1.1	Introduction - Definition of Project	1	Lecture	PPT
1.2	Comparison of projects – Activities	1	Lecture	PPT
1.3	Plans, Methods and Methodologies	1	Lecture	PPT
1.4	Categorization – Stakeholders	1	Lecture	PPT
1.5	Setting Objectives - The business case	1	Lecture	PPT
1.6	What is Management –Management control	1	Lecture	PPT
1.7	Traditional versus Modern Project management Practices.	1	Lecture	PPT
1.8	Introduction – Project Portfolio Management	1	Chalk & Talk	Black Board
1.9	Evaluation of individual project – Cost-benefit Evaluation techniques	1	Chalk & Talk	Black Board
1.10	Risk evaluation – Programme management	1	Lecture	White board
1.11	Allocation of resources – Strategic Program management	1	Lecture	White board
1.12	Creating a Programme – Aids to management – Benefits	1	Lecture	



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	management			White board
UNIT 2 PROJECT PLANNING				
2.1	Steps of Project Planning.	1	Lecture	PPT
2.2	Introduction – build or buy	1	Chalk & Talk	Black Board
2.3	Choosing Methodologies and technologies	1	Lecture	PPT
2.4	Software Process and Process Models	2	Lecture	White board
2.5	Choice of process models – Structure versus speed of delivery	1	Discussion	Black Board
2.6	Objectives – When to plan – Project Schedules	1	Chalk & Talk	Black Board
2.7	Projects & activities – Sequencing & scheduling	1	Chalk & Talk	Black Board
2.8	Network Planning Models - Formulating a Network model	2	Lecture	PPT
2.9	Adding Time dimensions – Forward & Backward pass	1	Chalk & Talk	Black Board
2.10	Identifying Critical path – Activity float	1	Chalk & Talk	Black Board
UNIT 3 RISK MANAGEMENT AND RESOURCE ALLOCATION				
3.1	Risk – Categories of risk – Framework for Risk	1	Lecture	White board
3.2	Risk Identification – Assessment, planning, Management	1	Chalk & Talk	Black Board
3.3	Evaluating risks to the schedule – Applying the PERT technique	2	Lecture	PPT



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3.4	Monte Carlo Simulation – Critical chain concepts	1	Lecture	White board
3.5	Nature of Resources – Identifying resource requirements	1	Discussion	Black Board
3.6	Scheduling Resources – Creating Critical paths	2	Lecture	PPT
3.7	Counting the cost – Being Specific	1	Chalk & Talk	Black Board
3.8	Publishing the resource schedule	2	Chalk & Talk	Black Board
3.9	Cost schedule – The scheduling sequence	1	Chalk & Talk	Black Board
UNIT 4 MONITORING AND CONTROL - MANAGING PEOPLE IN SOFTWARE ENVIRONMENTS				
4.1	Creating Framework - Collecting the data	1	Lecture	PPT
4.2	Review – Project Termination Review	2	Lecture	PPT
4.3	Visualizing the progress – Cost monitoring	1	Lecture	PPT
4.4	Earned Value Analysis – Prioritizing Monitoring – Change Control	2	Lecture	PPT
4.5	Introduction – Understanding behaviour	2	Lecture	PPT
4.6	Organizational behaviour – Selection of people	1	Lecture	PPT
4.7	Instruction in the best methods – Motivation	2	Lecture	PPT
4.8	Job Characteristics model – Stress – Health and safety	1	Chalk & Talk	Black Board



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UNIT -5 WORKING IN TEAMS AND SOFTWARE QUALITY				
5.1	Becoming a team – Decision making	1	Lecture	PPT
5.2	Organizational structures – Coordination dependencies	1	Lecture	PPT
5.3	Dispersed & Virtual teams	1	Lecture	PPT
5.4	Communication plans – Leadership	1	Lecture	PPT
5.5	The place of software quality in project planning	1	Lecture	PPT
5.6	Definition of Software Quality – Importance	1	Lecture	PPT
5.7	ISO 9126 – Product and Process Metrics	1	Lecture	PPT
5.8	Product versus Process Quality Management	1	Chalk & Talk	Black Board
5.9	Quality management systems	2	Chalk & Talk	Black Board
5.10	Process capability models - Techniques to enhance quality	1	Lecture	White board
5.11	Testing – Software reliability - Quality plans.	1	Lecture	White board



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	W1+ W2 5+5=10	Avg (M1 & M2) 10	Mid-Sem.Test 15	Once in a Sem. 10		5	50	
K1	-	-	-	-	-		-	-
K2	5	2	3	-	10		10	20 %
K3	5	3	4		12		12	24 %
K4	-	5	4	5	14		14	28%
K5	-	-	4	5	9		9	18 %
Non-Scho.							5	10 %
Total	10	10	15	10	45	5	50 mks.	100 %

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Deliver successful software projects that support organization's strategic goals	K1	PSO1& PSO2
CO 2	Match organizational needs to the most effective software development model	K1, K2,	PSO3
CO 3	Plan and manage projects at each stage of the software development life cycle	K1 & K3	PSO5
CO 4	Create project plans that address real-world management challenges	K1, K2, K3 &	PS01 & PSO4
CO 5	Develop the skills for tracking and controlling software deliverables	K2 & K4	PS01 & PS05

COURSE DESIGNER:

Staff Name – B. CHANDIRIKA

Forwarded By

HOD'S Signature & Name

B. Chandirika
(B.CHANDIRIKA)



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SKILL DEVELOPMENT-100%

III MCA

SEMESTER – V

(For those who join in 2019 onwards)

PROGRAM ME CODE	COURSE CODE	COURSE TITLE	CATEGO RY	HRS/WEEK	CREDITS
MCA	19MCA502	MACHINE LEARNING	MAJOR CORE	4	4

COURSE DESCRIPTION

This course provides an introduction to learn Machine Intelligence and Machine Learning Applications algorithms to solve real world problems.

COURSE OBJECTIVE

- ❖ To introduce the fundamentals of Machine Learning and algorithms.
- ❖ To define the classifiers and its associated algorithms
- ❖ To impart the knowledge on supervised and unsupervised learning algorithms used for classification, prediction and clustering.

UNIT - I INTRODUCTION

(12 Hours)

Introduction to machine learning -Learning Problems – Learning System – Issues in machine learning - Concept Learning - Learning Task – General-to-specific Ordering – Specific Hypothesis – Candidate Elimination – Inductive Bias.

SELF STUDY:Choosing the Target Function

UNIT – II DECISION TREE & BAYESIAN LEARNING

(12 Hours)



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Decision Tree Learning - Decision tree representation – Issues in decision tree learning- Bayesian Learning - Bayes Theorem – Bayes Theorem and Concept Learning – Naive Bayes classifier - Bayesian Networks - EM Algorithm

SELF STUDY: Avoiding Overfitting the Data

UNIT - III GENETIC ALGORITHMS

(12 Hours)

Introduction to Instance Based Learning – K-Nearest Neighbor Learning - Radial Basis Function, Case based reasoning - Genetic Algorithms - Hypotheses – Genetic Operators – Hypothesis Space Search – Genetic Programming – Models of Evolution and Learning.

SELF STUDY: Parallelizing Genetic Algorithms

UNIT - IV LEARNING SETS OF RULES

(12 Hours)

Introduction to Learning Sets of Rules - Sequential Covering Algorithms – Learning First order Rules – FOIL – Inverting Resolution - Analytical Learning - PROLOG EBG – Explanation Based learning – Features.

SELF STUDY: Deductive Learning

UNIT - V ANALYTICAL & REINFORCEMENT LEARNING

(12 Hours)

Combining Inductive and Analytical Learning - Approaches – KBANN Algorithm – TANGENTPROP – EBNN – FOCL - Reinforcement Learning - Learning Task – Q Learning – Non deterministic Actions – Temporal Difference Learning – Relationship to Dynamic Programming.

SELF STUDY: Experimentation Strategies



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REFERENCES :

1. Tom M. Mitchell , “Machine Learning”, Tata McGraw-Hill, New Delhi
2. Hastie.T, Tibshirani.R, and Friedman.J, “The Elements of Statistical Learning: Data Mining Inference and Prediction”, Second edition, Springer, 2009
3. Christopher M. Bishop , ”Pattern Recognition and Machine Learning – Information Scienceand Statistics”, Springer, 2007

WEB REFERENCES :

1. <https://machinelearningmastery.com/machine-learning-with-python/>
2. http://ibpsa.fr/jdownloads/Simurex/2015/Presentations/30_03_atelier_datamining.pdf



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 INTRODUCTION				
1.1	Introduction to Machine Learning	1	Chalk & Talk	Black Board
1.2	Learning problems	2	Chalk & Talk	Black Board
1.3	Choosing Representation and Function	2	Lecture	PPT
1.4	Concept Learning Task	2	Chalk & Talk	Black Board
1.5	General-to-specific Ordering	1	Discussion	Black Board
1.6	Specific Hypothesis	1	Lecture	White board
1.7	Candidate Elimination	2	Lecture	PPT
1.8	Inductive Bias	1	Lecture	White board
UNIT -2 DECISION TREE & BAYESIAN LEARNING				
2.1	Decision Tree Learning	1	Lecture	PPT
2.2	Decision tree representation	1	Chalk & Talk	Black Board
2.3	Basic Decision Tree Learning Algorithm	1	Lecture	PPT
2.4	Hypothesis Space Search	1	Lecture	White board
2.5	Inductive bias in Decision Tree Learning	1	Discussion	Black Board
2.6	Bayesian Learning	1	Discussion	Black Board
2.7	Bayes Theorem	1	Chalk & Talk	Black Board



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2.8	Hypotheses and Probabilities	1	Chalk & Talk	Black Board
2.9	Bayes classifier	1	Lecture	White board
2.10	Bayesian Networks	1	Discussion	Black Board
2.11	EM Algorithm	1	Lecture	PPT
2.12	Gibbs algorithm	1	Lecture	PPT
UNIT -3 GENETIC ALGORITHMS				
3.1	Introduction to Instance Based Learning	1	Lecture	White board
3.2	K-Nearest Neighbour Learning	2	Chalk & Talk	Black Board
3.3	Radial Basis Function	1	Lecture	PPT
3.4	Case based reasoning	1	Lecture	White board
3.5	Introduction to Genetic Algorithms	1	Lecture	PPT
3.6	Hypotheses & Genetic Operators	2	Discussion	Google classroom
3.7	Hypothesis Space Search	1	Chalk & Talk	Black Board
3.8	Genetic Programming	2	Lecture	PPT
3.9	Evolution and Learning models	1	Discussion	Black Board
UNIT -4 LEARNING SETS OF RULES				
4.1	Introduction to Learning Sets of Rules	2	Lecture	PPT
4.2	Sequential Covering Algorithms	2	Lecture	PPT
4.3	Learning First-Order Rules : FOIL	1	Chalk & Talk	Black Board



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4.4	Induction as Inverted Deduction	1	Chalk & Talk	Black Board
4.5	Inverting Resolution	1	Discussion	Black Board
4.6	Inductive & Analytical Learning Problems	2	Lecture	PPT
4.7	PROLOG EBG	2	Chalk & Talk	Black Board
4.8	Explanation – Based Learning	1	Discussion	Google classroom
UNIT -5 ANALYTICAL & REINFORCEMENT LEARNING				
5.1	Learning Approaches	1	Lecture	PPT
5.2	KBANN Algorithm	2	Lecture	PPT
5.3	TANGENTPROP	1	Lecture	White board
5.4	EBNN	2	Lecture	White board
5.5	FOCL	1	Lecture	White board
5.6	Reinforcement Learning	1	Lecture	White board
5.7	Q Learning	1	Lecture	White board
5.8	Non deterministic Actions	1	Discussion	Google classroom
5.9	Temporal Difference Learning	1	Chalk & Talk	Black Board
5.10	Relationship to Dynamic Programming.	1		



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Non Scholastic	5
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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Identify the concepts of machine learning	K2	PSO1
CO 2	Demonstrate Decision Tree learning and Bayesian Learning for classification.	K2, K3, K4	PSO2
CO 3	Analyze the logic behind Genetic Algorithms.	K2 & K3	PSO3
CO 4	Compare various set of rules available for Learning.	K2, K3 & K5	PSO2 & PSO4
CO 5	Propose solution for real world problems based on Inductive and Analytical Learning.	K2, K3 & K5	PSO2 & PSO5

COURSE DESIGNER:

Staff Name – S. JEBAPRIYA

Forwarded By

HOD'S Signature & Name

B. Chandirika
(B. CHANDIRIKA)



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EMPLOYABILITY-100%

III MCA

SEMESTER – V

For those who joined in 2019 onwards

PROGRAMM E CODE	COURSE CODE	COURSE TITLE	CATEGOR Y	HRS/WEE K	CREDIT S
MCA	19MCA50 3	ENTERPRISE APPLICATION DEVELOPMEN T	MAJOR CORE	4	4

COURSE DESCRIPTION

This course provides exposure to different frameworks namely, Struts, Hibernate, Spring and Django. This collective information supports the learner for developing advanced enterprise applications.

COURSE OBJECTIVES

- ❖ To know the architectures of Distributed systems, to understand and compare the technologies associated with J2EE and DOTNET.
- ❖ To build lightweight enterprise-ready applications
- ❖ To acquire capability in Python programming and grow true web applications utilizing Django.

UNIT – I CLIENT SERVER ARCHITECTURE

(12 Hours)

2-tier model - 3-tier model - n-tier model -J2EE architecture - DOTNET architecture - MVC architecture.

MVC Architecture - How to start an ASP.NET MVC application - The folders and files for a new MVC application



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SELF STUDY :Working with Views - Working with controls

UNIT – IISPRING

(12 Hours)

Web services – Consuming a restful web service – Java desktop application / JSP, building REST service with spring – Spring security architecture – accessing relational data using JDBC with spring – Handling form submission – Creation of batch service – Securing web applications –Accessing data with mongo DB – Creating asynchronous method -Using web socket to build an interactive web application.

SELF STUDY :Uploading files – Validating form input

UNIT –IIISTRUTS

(12 Hours)

Struts – Introduction – MVC framework – STRUTS architecture – Business service – Parameter passing – Action class and configuration files – struts.xml tags – Namespace and wild cards – Validation – Interceptors – In built interceptors – Custom interceptors

SELF STUDY :Model driven action – Value stack and OGNL

UNIT – IVHIBERNATE

(12 Hours)

HIBERNATE ORM – Persistence – Relational Database – The object relational impedance mismatch – Using native Hibernated APTs and hbm.xml – Using the java persistence API's – Hibernate Validator – HIBERNATE OGM – Configuration of tools – HIBERNATE SEARCH – Enabling full text search capabilities in entities – Introduction to Full Text Search.

SELF STUDY :Indexing – Searching



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UNIT – VDJANGO

(12 Hours)

Introduction - Django model layer – View layer - Template layer – Forms – Automated admin interface – Django security – Django web application tools – Core functionalities – Geographic Framework.

SELF STUDY :Internationalization and localization

REFERENCES:

1. Justin Couch, Daniel H.Steinberg, “J2EE Bible”, Wiley India(P) Ltd, NewDelhi , 2002
2. William S. Vincent, “Django for Beginners: Build websites with Python and Django”, 2018
3. Christian Bauer, Gavin King, and Gary Gregory, “Java Persistence with Hibernate”, Second Edition, Manning Publications Co, 2019
4. Craig Walls, “Spring in Action”, Fifth Edition, Manning Publications,2018
- 5.Sharanam Shah, Vaishali Shah, “Struts 2 for Beginners Struts 2 for Beginners”, 3rd Edition, Arizona Business Alliance,2014

WEB REFERENCES:

1. <https://www.javatpoint.com/spring-tutorial>
2. https://www.tutorialspoint.com/asp.net_mvc/index.htm
3. <https://www.journaldev.com/2134/struts-tutorial-for-beginners#struts-tutorial-8211-result-pages>
4. <https://howtodoinjava.com/hibernate-tutorials/>
5. <https://www.guru99.com/django-tutorial.html>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 Client server architecture				
1.1	2-tier model - 3-tier model	2	Chalk & Talk	Black Board
1.2	n-tier model -J2EE architecture	2	Chalk & Talk	Black Board
1.3	DOTNET architecture - MVC architecture	2	Discussion	Google classroom
1.4	MVC Architecture	2	Chalk & Talk	Black Board
1.5	How to start an ASP.NET MVC application	2	Discussion	Black Board
1.6	The folders and files for a new MVC – application	2	Lecture	White board
UNIT - 2 SPRING				
2.1	Web services – Consuming a restful web service	1	Lecture	PPT
2.2	Java desktop application / JSP, building REST service with spring	2	Chalk & Talk	Black Board
2.3	Spring security architecture – accessing relational data using JDBC with spring	1	Lecture	PPT
2.4	Handling form submission	1	Lecture	White board
2.5	Creation of batch service	2	Discussion	Black Board
2.6	Securing web applications	2	Chalk & Talk	Black Board
2.7	Accessing data with mongo DB –	1	Chalk & Talk	Black Board
2.8	Creating asynchronous method	1	Lecture	PPT



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2.9	Using web socket to build an interactive web application	1	Lecture	PPT
UNIT – 3STRUTS				
3.1	Struts – Introduction	1	Lecture	White board
3.2	MVC framework – STRUTS architecture	2	Chalk & Talk	Black Board
3.3	Business service – parameter passing	2	Lecture	PPT
3.4	Action class and configuration files	2	Lecture	White board
3.5	struts.xml tags –Name space and wild cards	1	Lecture	PPT
3.6	Validation	1	Discussion	Google classroom
3.7	Interceptors	1	Chalk & Talk	Black Board
3.8	In built interceptors	1	Lecture	PPT
3.9	Custom interceptors	1	Chalk & Talk	Black Board
UNIT - 4 HIBERNATE				
4.1	HIBERNATE ORM – Persistence	1	Lecture	PPT
4.2	Relational Database	1	Lecture	PPT
4.3	The object relational impedance mismatch	1	Chalk & Talk	Black Board
4.4	using native Hibernated APTs and hbm.xml	2	Chalk & Talk	Black Board
4.5	Using the java persistence API's – Hibernate Validator	2	Discussion	Black Board
4.6	HIBERNATE OGM – configuration of tools	2	Lecture	PPT



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4.7	HIBERNATE SEARCH – Enabling full text search capabilities in entities	2	Chalk & Talk	Black Board
4.8	Introduction to Full Text Search	1	Discussion	Google classroom
UNIT – 5 DJANGO				
5.1	Introduction - Django model layer	2	Chalk & Talk	Black Board
5.2	View layer	1	Lecture	PPT
5.3	Template layer	1	Lecture	PPT
5.4	Forms	1	Lecture	White board
5.5	Automated admin interface	2	Lecture	White board
5.6	Django security	2	Lecture	White board
5.7	Django web application tools	1	Lecture	White board
5.8	Core functionalities – Geographic Framework.	2	Discussion	Google classroom



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K1	-	-	-	-	-		-	-
K2	5	2	3	-	10		10	20 %
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Total	10	10	15	10	45	5	50 mks.	100 %

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Non Scholastic	5
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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
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C2 – Average of Two Monthly Tests

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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Develop dynamic web applications using MVC	K2	PSO1
CO 2	Use dependency injection & inversion of control in developing Spring project	K2, K3, K4	PSO2
CO 3	Create the Struts classes and use MVC design pattern for creating large web applications	K2 & K3	PSO3
CO 4	Map Java classes and object associations to relational database tables with Hibernate mapping files	K2, K3 & K5	PSO2 & PSO4
CO 5	Use Django for rapid development, pragmatic, maintainable, clean design, and secures websites..	K2,K3 & K5	PSO2 & PSO5

COURSE DESIGNER:

Staff Name – S.MARY HELAN FELISTA

Forwarded By

HOD'S Signature & Name

B. Chandra
(B.CHANDIRIKA)



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SKILL DEVELOPMENT-100%

III MCA

SEMESTER – V

(For those who join in 2019 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	19MCADS03	DATA ANALYTICS USING PIG AND HIVE	SPECIALIZATION ELECTIVE- DATA SCIENCE	4	4

COURSE DESCRIPTION

This course provides knowledge on creating applications to analyze big data.

COURSE OBJECTIVE

- ❖ Learn about the fundamental concepts of Pig and Hive.
- ❖ Provide knowledge on writing scripts through Pig Latin and understanding Hive data model.
- ❖ Perform data definition and data manipulation operations using HiveQL and apply these to perform analytics

UNIT - I

(12 Hours)

DATA ANALYTICS USING PIG

Introduction – Downloading and installing pig – Running Pig – Grunt – Pig's Data model – Types – Schemas.

SELF STUDY:Types

UNIT - II

(12 Hours)



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INTRODUCTION TO PIG LATIN

Preliminary matters - Input and Output – Relational operations – User defined functions-Advanced relational Operations -Integrating Pig with legacy code and map reduce – Controlling execution.

SELF STUDY:Relational operations

UNIT - III

(12 Hours)

DEVELOPING AND TESTING PIG LATIN SCRIPTS

Writing Evaluation and filter functions – Writing load and store functions –

HIVE - INTRODUCTION

Developing Hive – Services in Hive – Understanding Hive Data model.

UNIT - IV

(12 Hours)

HIVEQL: DATA DEFINITION

Databases – Alter database – Create Tables – Alter Tables – Manage Tables – Drop Tables.

HIVEQL: DATA MANIPULATION

Load Data into managed tables – Insert into tables from Queries - Creating Tables and Loading Them in One Query - Exporting Data.

SELF STUDY: Insert into tables from Queries

UNIT - V

(12 Hours)

HIVEQL QUERIES

SELECT ... FROM Clauses –Where Clauses – Group by clauses - Join Statements – ORDER BY and SORT BY- DISTRIBUTE BY with SORT BY- CLUSTER BY – casting - Queries that Sample Data – UNION ALL

HIVEQL VIEWS



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HiveQL: Indexes - Schema Design – Tuning – Functions – Streaming - Customizing

Hive File and Record formats – Security – Locking

SELF STUDY: ORDER BY and SORT BY

REFERENCES:

1. Alan Gates ,“Programming Pig”, First edition, O’Reilly Media, 2011
2. Hanish Bansal, Saurabh Chauhan ,“Apache Hive Cookbook”, Packt publishing, 2016
3. Jason Rutherglen, Dean Wampler, Edward Capriolo , “Programming Hive”, First edition, O’Reilly Media , 2012
4. “Alan Gates & Daniel Dai ,Pig :Data flow Scripting with Hadoop”, O’Reilly Media, 2016
5. BalaswamyVaddeman , “Beginning Apache Pig” , Apress Publications, 2016
6. Dayong Du, “Apache Hive Essentials”, Packet Publishing, 2015

WEB REFERENCES:

1. <https://cognitiveclass.ai/courses/introduction-to-pig/>
2. <https://data-flair.training/blogs/apache-hive-tutorial/>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT 1 DATA ANALYTICS USING PIG				
1.1	Data Analytics using Pig: Introduction	2	Lecture	Black Board
1.2	Downloading and installing pig	2	Chalk & Talk	White board
1.3	Running Pig	2	Lecture	PPT
1.4	Grunt	2	Discussion	PPT
1.5	Pig's Data model	2	Lecture	PPT
1.6	Schemas	2	Chalk & Talk	White board
UNIT 2 INTRODUCTION TO PIG LATIN				
2.1	Introduction to Pig Latin – Preliminary matters	2	Lecture	PPT
2.2	Input and Output	2	Chalk & Talk	Black Board
2.3	User defined function	2	Lecture	PPT
2.4	Advanced relational Operations	2	Lecture	White board
2.5	Integrating Pig with legacy code and map reduce	2	Discussion	Black Board
2.6	Controlling execution	2	Chalk & Talk	Black Board
UNIT 3 DEVELOPING AND TESTING PIG LATIN SCRIPTS& HIVE - INTRODUCTION				
3.1	Developing and Testing Pig Latin Scripts	2	Lecture	White board
3.2	Writing Evaluation and filter	2	Chalk & Talk	Black Board



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	functions			
3.3	Writing load and store functions	2	Lecture	PPT
3.4	Developing Hive	2	Lecture	White board
3.5	Services in Hive	2	Discussion	Black Board
3.6	Understanding Hive Data model	2	Lecture	PPT
UNIT 4 HIVEQL: DATA DEFINITION&HIVEQL: DATA MANIPULATION				
4.1	HiveQL: Data definition – Databases	2	Lecture	PPT
4.2	Alter database – Create Tables	2	Lecture	PPT
4.3	Alter, Manage & Drop Tables.	2	Discussion	Black Board
4.4	HiveQL: Data manipulation	2	Lecture	PPT
4.5	Load Data into managed tables	2	Chalk & Talk	White board
4.6	Creating Tables and Loading Them in One Query-Exporting Data	2	Lecture	White board
UNIT 5 HIVEQL QUERIES&HIVEQL VIEWS				
5.1	HiveQL: Queries – SELECT ... FROM Clauses- Where Clauses – Group by clauses	2	Lecture	PPT
5.2	Join Statements	1	Chalk & Talk	PPT
5.3	DISTRIBUTE BY with SORT BY	2	Lecture	PPT
5.4	CLUSTER BY – casting	1	Discussion	White board
5.5	Queries that Sample Data – UNION ALL	2	Lecture	Black Board
5.6	HiveQL: Views - HiveQL: Indexes - Schema Design	2	Chalk & Talk	Black Board
5.7	Tuning – Functions – Streaming -	2	Chalk & Talk	Black Board



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	Customizing Hive File and Record formats – Security – Locking			



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	W1+ W2 5+5=10	Avg (M1 & M2) 10	Mid-Sem.Test 15	Once in a Sem. 10		5	50	
K1	-	-	-	-	-		-	-
K2	5	2	3	-	10		10	20 %
K3	5	3	4		12		12	24 %
K4	-	5	4	5	14		14	28%
K5	-	-	4	5	9		9	18 %
Non-Scho.							5	10 %
Total	10	10	15	10	45	5	50 mks.	100 %

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ 1 the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :
K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	10	15	10	5	50	50	100

C1 – Sum of Two Weekly Tests

C2 – Average of Two Monthly Tests

C3 - Mid Sem Test

C4 – Once in a semester (Seminar / Assignment)

C5 – Non - Scholastic



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Understand the programming constructs of Pig and database management using HiveQL	K2	PSO1 & PSO2
CO 2	Write scripts using Pig latin and perform various HiveQLqueries by applying RDBMS concepts	K2, K3, K4	PSO1 & PSO2
CO 3	Apply the concepts of Pig and Hive in simple tasks	K2 & K3	PSO1 & PSO3
CO 4	Formulate and analyse different databases for different situations	K2, K3 & K5	PSO1 & PSO4
CO 5	Create real time applications	K2,K3 & K5	PSO1 & PSO5

COURSE DESIGNER:

Staff Name – B. USHA

Forwarded By

HOD'S Signature & Name

B. Chandra
(B.CHANDIRIKA)



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SKILL DEVELOPMENT-100%

III MCA

SEMESTER – V

(For those who join in 2019 onwards)

PROGRAMM E CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WE E K	CREDIT S
MCA	19MCANW O 3	HIGH SPEED NETWORK S	SPECIALIZATIO N ELECTIVE- NETWORKING	4	4

COURSE DESCRIPTION

This course covers the basics, architectures, protocols and technologies for high-speed networks. It includes LANs, Protocols, TCP/IP Suite, Data Networks, high speed LANs, link level flow and error control, transport level traffic control, routing, MPLS switching and Network security.

COURSE OBJECTIVE

- ❖ To highlight the features of different technologies involved in High Speed Networking and their Performance.
- ❖ To facilitate on the basis of ATM and Frame Relay concepts and their applications.
- ❖ To learn about the various high speed digital access and broadband technologies Switching techniques.



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UNIT I

(12 Hours)

HIGH SPEED NETWORKS

Packet Switching Networks – Frame Relay Networks - Asynchronous Transfer Mode - ATM Protocol Architecture - ATM Logical Connections – ATM cell – ATM Service Categories – AAL - Fast Ethernet – Gigabit Ethernet – Fiber Channel – Wireless LANS – Applications – Requirements – Architecture of 802.11 – Services – Protocol layers

SELF STUDY: Asynchronous Transfer Mode

UNIT II

(12 Hours)

QUEUING ANALYSIS, CONGESTION CONTROL IN DATA NETWORKS AND INTERNETS

Queuing analysis – Queuing Models – Single Server Queues – Multi Server Queues Effects of Congestion – Congestion control – Traffic Management – Congestion control in Packet Switching Networks – Frame relay Congestion control

SELF STUDY: Congestion control

UNIT III TCP

(12 Hours)

TCP Flow control – TCP Congestion control – Retransmission – Timer Management – Exponential RTO Hackoff – KARN's Algorithm – Window Management – Performance of TCP over ATM

SELF STUDY: Window Management

UNIT IV

(12 Hours)

INTEGRATED AND DIFFERENTIATED SERVICES



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Integrated Services Architecture – Approach – Components – Services –
Queuing – Discipline – FQ – PS – BRFQ – GPS – WFQ – Random Early Detection –
Differentiated services

SELF STUDY: GPS

UNIT V

(12 Hours)

PROTOCOLS FOR QOS SUPPORT

RSVP – Goals & Characteristics – Data flow – RSVP operations – Protocol
Mechanisms – Multiprotocol Label Switching – operations – Label Stacking and
Protocol details – RTP – Protocol Architecture, Data transfer Protocol, RTCP

SELF STUDY: Data flow

REFERENCES :

1. William Stallings, “HIGH SPEED NETWORKS AND INTERNET”, Pearson Education, Second Edition, 2010
2. Behrouz A Forouzan, “Data Communication and Networking”, 4th Edition, Tata Mc Graw Hill.
3. Harry J. R. Dutton, Harry, Jr. Dutton, Peter Lenhard, “High Speed Networking Technology”, Prentice Hall, 2016.
4. Costa, “Planning and Designing High Speed Networks”, Hewlett-Packard Company, Prentice Hall, 2016.

WEB REFERENCES:

1. <https://www.hi-speed.net.au>
2. <https://sterbenz.org/jpgs/tutorials/hsn>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT 1 -HIGH SPEED NETWORKS				
1.1	Packet Switching Networks – Frame Relay Networks	1	Lecture	Black Board
1.2	ATM Protocol Architecture	1	Lecture	White board
1.3	ATM Logical Connections	1	Lecture	PPT
1.4	ATM cell	1	Lecture	PPT
1.5	ATM Service Categories – AAL - Fast Ethernet	2	Lecture	PPT
1.6	Gigabit Ethernet – Fiber Channel	2	Lecture	White board
1.7	Wireless LANS – Applications	2	Lecture	PPT
1.8	Requirements – Architecture of 802.11	1	Chalk & Talk	Black Board
1.9	Services – Protocol layers	1	Lecture	PPT
UNIT 2 - QUEUING ANALYSIS, CONGESTION CONTROL				
2.1	Queuing analysis – Queuing Models	2	Lecture	PPT
2.2	Single Server Queues	2	Chalk & Talk	Black Board
2.3	Multi Server Queues Effects of Congestion	2	Lecture	PPT
2.4	Traffic Management	2	Lecture	White board
2.5	Congestion control in Packet	2	Discussion	Black Board



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	Switching Networks			
2.6	Frame relay Congestion control	2	Chalk & Talk	Black Board
UNIT 3 - TCP				
3.1	TCP Flow control	2	Lecture	White board
3.2	TCP Congestion control	2	Chalk & Talk	Black Board
3.3	Retransmission	2	Lecture	PPT
3.4	Timer Management	2	Lecture	White board
3.5	Exponential RTO Hackoff – KARN's Algorithm	2	Discussion	Black Board
3.6	Performance of TCP over ATM	2	Lecture	PPT
UNIT 4 - INTEGRATED AND DIFFERENTIATED SERVICES				
4.1	Integrated Services Architecture	2	Lecture	PPT
4.2	Approach – Components – Services	2	Lecture	PPT
4.3	Queuing – Discipline	2	Discussion	Black Board
4.4	FQ – PS – BRFQ	2	Lecture	PPT
4.5	WFQ – Random Early Detection	2	Chalk & Talk	White board
4.6	Differentiated services	2	Lecture	White board
UNIT 5 - PROTOCOLS FOR QOS SUPPORT				
5.1	RSVP – Goals & Characteristics	2	Lecture	PPT
5.2	RSVP operations – Protocol Mechanisms	2	Lecture	PPT
5.3	Protocol Mechanisms- Multiprotocol Label Switching	2	Chalk & Talk	PPT
5.4	operations – Label Stacking and Protocol details – RTP	2	Lecture	PPT



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5.5	Protocol Architecture	2	Discussion	White board
5.6	Data transfer Protocol, RTCP	2	Lecture	Black Board

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	W1+ W2 5+5=10	Avg (M1 & M2) 10	Mid-Sem.Test 15	Once in a Sem. 10		5	50	
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Total	10	10	15	10	45	5	50 mks.	100 %

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
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SCHOLASTIC				NON - SCHOLASTIC	MARKS		
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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Identify the building blocks and operation of high speed networking and ATM.	K2	PSO1 & PSO2
CO 2	Analyze the cause of congestion, traffic slow down and related factors for Quality of Service Identify.	K2, K3, K4	PSO1 & PSO2
CO 3	Apply the concepts learnt in this course to optimize performance of high-speed networks using Flow Control.	K2 & K3	PSO1 & PSO3
CO 4	Compare the different architectures used for HSN.	K2, K3 & K5	PSO1 & PSO4
CO 5	Describe the protocols that are used to design high speed networks.	K2, K3 & K5	PSO1 & PSO5

COURSE DESIGNER:

Staff Name – B. USHA

Forwarded By

HOD'S Signature & Name

B. Chandra
(B. CHANDIRIKA)



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SKILL DEVELOPMENT-100%

III MCA

SEMESTER – V

(For those who join in 2019 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	19MCAAD03	SOFTWARE DEVELOPMENT FRAMEWORKS	SPECIALIZATION ELECTIVE – APPLICATION DEVELOPMENT	4	4

COURSE DESCRIPTION

This course provides an immersive experience in the technical, cultural and social aspects of Agile and DevOps.

COURSE OBJECTIVE

- ❖ To learn the software development process using agile.
- ❖ To comprehend the quality and risk management in software development.
- ❖ To understand the integration between development and operations in software project development.

UNIT I

(12 Hours)

MODERNIZING PROJECT MANAGEMENT

Project management needed a make over – Introducing Agile Project Management.

APPLYING AGILE MANIFESTOS & PRINCIPLES



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Understanding the Agile Manifesto - Outlining the four values of Agile manifesto-
Defining the 12 Agile principles - Agile Benefits.

AGILE APPROACHES:

Overview of lean- Overview of scrum - Overview of Extreme programming.

SELF STUDY :Agile Benefits

UNIT II

(12 Hours)

AGILE PLANNING AND EXECUTION:

Agile planning – Defining the product vision – Creating a product road map – completing the product backlog.

PLANNING RELEASES AND SPRINTS:

Refining requirements and estimates – Release planning – Sprint planning.

SHOWCASING WORK, INSPECTING AND ADAPTING:

The Sprint review – The sprint retrospective – Preparing for release.

SELF STUDY:Sprint planning

UNIT III

(12 Hours)

MANAGING SCOPE AND PROCUREMENT

Managing Agile scope - Managing Agile procurement

MANAGING TIME AND COST

Managing Agile schedule – Managing Agile budgets

MANAGING AGILE TEAM DYNAMICS& COMMUNICATION

Managing Agile Team Dynamics - Managing Agile communication – Managing Agile quality – Managing Agile risk.

SELF STUDY: Managing Agile communication



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UNIT IV FUNDAMENTALS OF DEVOPS

(12 Hours)

The Definition of DevOps – What DevOps is not – Introduction – Traditional Project Setting – Agile Project Setting – Blame Game: Dev vs. Ops – Operations as Bottleneck - DevOps to Rescue – The Essence of DevOps

SELF STUDY Agile Project Setting

UNIT V

(12 Hours)

BUILDING BLOCKS OF DEVOPS

Measurement and Metrics – Improving flow of features – Improve And Accelerate Delivery

QUALITY AND TESTING

What is Quality – Pattern for Improving Quality.

SELF STUDY: Improving flow of features

REFERENCES :

1. Mark C.Layton , Steven J.Ostermiller , “Agile Project Management”, Wiley Publication II edition ,2018
2. MachaelHuttermann, “DevOps for developers”, Apress publication, 2012
3. Joseph joyner, “DevOps for Beginners” Speedy publishing LLC 2015
4. Robert Martin, “Agile software development, Principles patterns and practices” person new international edition, 2013
5. Greene Jennifer, “Learning Agile” Orielly series I edition 2014

WEB REFERENCES:

1. <https://martinfowler.com/agile.html>
2. <https://refactoring.com/>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 AGILE APPROACHES AND AGILE BEHAVIOURS				
1.1	Modernizing Project Management	2	Lecture	PPT
1.2	Introduction	2	Lecture	PPT
1.3	Applying the Agile Manifesto and Principles- Values	2	Lecture	PPT
1.4	Principles - Agile Benefits	2	Lecture	PPT
1.5	Overview of lean- Overview of scrum	2	Lecture	PPT
1.6	Overview of Extreme programming.	2	Lecture	PPT
UNIT 2 - AGILE PLANNING AND EXECUTION				
2.1	Agile planning – Defining the product vision	1	Lecture	PPT
2.2	Creating a product road map	2	Chalk & Talk	Black Board
2.3	completing the product backlog.	2	Lecture	PPT
2.4	Refining requirements and estimates	2	Lecture	White board
2.5	Release planning – Sprint planning.	1	Discussion	Black Board
2.6	The Sprint review – The sprint retrospective	2	Chalk & Talk	Black Board
2.7	Preparing for release.	2	Chalk & Talk	Black Board
UNIT 3 - AGILE MANAGEMENT				
3.1	Managing scope and procurement	2	Lecture	White board



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3.2	Managing Agile scope - Managing Agile procurement	2	Chalk & Talk	Black Board
3.3	Managing time and cost – Managing Agile schedule	2	Lecture	PPT
3.4	Managing Agile budgets – Managing Agile team dynamics	2	Lecture	White board
3.5	Managing Agile communication	2	Discussion	Black Board
3.6	Managing Agile quality – Managing Agile risk.	2	Lecture	PPT
UNIT 4 - FUNDAMENTALS OF DEVOPS				
4.1	The Definition of DevOps – What DevOps is not	2	Lecture	PPT
4.2	Introduction – Traditional Project Setting	2	Discussion	Black Board
4.3	Agile Project Setting – Blame Game	2	Lecture	PPT
4.4	Dev vs. Ops – Operations as Bottleneck	2	Lecture	PPT
4.5	DevOps to Rescue	2	Discussion	Black Board
4.6	The Essence of DevOps	2	Lecture	PPT
UNIT 5 - BUILDING BLOCKS OF DEVOPS				
5.1	Building Blocks Of Devop	2	Discussion	Black Board
5.2	Measurement and Metrics	2	Lecture	PPT
5.3	Improving flow of features	2	Lecture	PPT
5.4	Improve And Accelerate Delivery	2	Lecture	PPT
5.5	Quality And Testing	2	Lecture	PPT



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5.6	What is Quality – Pattern for Improving Quality	2	Lecture	PPT

Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	W1+ W2 5+5=10	Avg (M1 & M2) 10	Mid-Sem.Test 15	Once in a Sem. 10		5	50	
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K2	5	2	3	-	10		10	20 %
K3	5	3	4		12		12	24 %
K4	-	5	4	5	14		14	28%
K5	-	-	4	5	9		9	18 %
Non-Scho.							5	10 %
Total	10	10	15	10	45	5	50 mks.	100 %

CIA	
Scholastic	45
Non Scholastic	5
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- ✓ All the course outcomes are to be assessed in the various CIA components.
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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	10	15	10	5	50	50	100

C1 – Sum of Two Weekly Tests

C2 – Average of Two Monthly Tests

C3 - Mid Sem Test

C4 – Once in a semester (Seminar / Assignment)

C5 – Non - Scholastic



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explain the fundamental principles and practices of the agile development methods.	K1	PSO1& PSO2
CO 2	Analyze the planning and execution of the agile manifesto	K1, K2	PSO3
CO 3	Monitor the management to achieve complete product development.	K1 & K3	PSO5
CO 4	Practice the integration of development and operations in software projects.	K1, K2, K3 &	
CO 5	Present the software project by following the principles that best fit the technical and market demands.	K2 & K4	

COURSE DESIGNER:

Staff Name – B. CHANDIRIKA

**Forwarded By
HOD'S Signature & Name**

B. Chandirika
(B.CHANDIRIKA)



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SKILL DEVELOPMENT-100%

GENERAL ELECTIVE - MCA

(For those who join in 2019 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	19MCAGE01	RESOURCE MANAGEMENT TECHNIQUES	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides solution to problems in different environment that needs decision making using optimization techniques

COURSE OBJECTIVE

- ❖ To provide the concept and an understanding of basic concepts in Operations Research Techniques for Analysis and Modeling in Computer Applications.
- ❖ To understand, develop and solve mathematical model of linear programming problems.
- ❖ To understand, develop and solve mathematical model of Transport and assignment problems.
- ❖ To understand network modeling for planning and scheduling the project activities



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UNIT I Introduction

(12 Hours)

Operations Research – An Introduction- Features- Definition- Scientific Method- Models- Methods for solving OR Models- Methodology of OR- Advantages- Applications and Scope- LPP Model formulation – LPP Graphical Solution.

SELF STUDY: Advantages- Applications and Scope

UNIT II LINEAR PROGRAMMING PROBLEM

(12 Hours)

LPP - Standard form – Definition- Reduction of Feasible solution to a basic feasible solution- Simplex algorithm (Maximization Case) - Simplex algorithm (Minimization Case).

SELF STUDY: Reduction of Feasible solution to a basic feasible solution

UNIT III TRANSPORTATION & ASSIGNMENT PROBLEM

(12 Hours)

Transportation Problem – Initial Basic Feasible solution – North West Corner Method- Least Cost method- Vogel's Approximation Method- MODI Method- Unbalanced Transportation Problem. Assignment Problem – Hungarian Assignment Method

SELF STUDY: Unbalanced Transportation Problem

UNIT IV GAME THEORY

(12 Hours)

Game Theory- Two persons zero sum game- Games with saddle point- Games without saddle point- Graphical Method- LP Method- The rule of dominance

SELF STUDY: LP Method



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UNIT VPERT & CPM

(12 Hours)

Project Management: PERT and CPM – Difference between PERT and CPM- Critical Path analysis- Problems in PERT analysis- Project , Time, Cost Trade off- Resource allocation.

SELF STUDY: Difference between PERT and CPM

REFERENCES :

1. J.K. Sharma , “Operations Research- Problems and Solutions”,Macmillan Publishers India Ltd,3 rd Edition, 2009.
2. KantiSwarup ,P.K.Gupta, Manmohan ,“Operations Research”, 13 th Edition, 2008.
3. S. Kalavathy ,“Operations Research”,Vikas publishing house private Ltd, 4th Edition,2013.
4. R. Paneerselvam, “Operations Research”, PHI learning Pvt Ltd, 2nd Edition, 2012.

WEB REFERENCES:

1. <https://lecturenotes.in/subject/573/operations-research-or>
2. <http://www.cs.toronto.edu/~stacho/public/IEOR4004-notes1.pdf>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT 1 - INTRODUCTION				
1.1	Operations Research – An Introduction	1	Lecture	Black Board
1.2	Features- Definition- Scientific Method-	1	Lecture	White board
1.3	Models- Methods for solving OR Models	1	Lecture	Black Board
1.4	Methodology of OR- Advantages- Applications and Scope	1	Lecture	Black Board
1.5	LPP Model formulation	4	Chalk & Talk	Black Board
1.6	LPP Graphical Solution.	4	Chalk & Talk	Black Board
UNIT 2 - LINEAR PROGRAMMING PROBLEM				
2.1	LPP - Standard form	2	Lecture	Black Board
2.2	Definition- Reduction of Feasible solution to a basic feasible solution	2	Chalk & Talk	Black Board
2.3	Simplex algorithm (Maximization Case)	4	Chalk & Talk	Black Board
2.4	Simplex algorithm (Minimization Case).	4	Chalk & Talk	Black Board
UNIT 3 - TRANSPORTATION & ASSIGNMENT PROBLEM				
3.1	Transportation Problem	1	Lecture	White board
3.2	Initial Basic Feasible solution – North West Corner Method	1	Chalk & Talk	Black Board



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3.3	Least Cost method	1	Chalk & Talk	Black Board
3.4	Vogel's Approximation Method	1	Chalk & Talk	Black Board
3.5	MODI Method	4	Chalk & Talk	Black Board
3.6	Unbalanced Transportation Problem	1	Chalk & Talk	Black Board
3.7	Hungarian Assignment Method	3	Chalk & Talk	Black Board
UNIT 4 -GAME THEORY				
4.1	Game Theory- Two persons zero sum game	1	Lecture	White Board
4.2	Games with saddle point	2	Chalk & Talk	Black Board
4.3	Games without saddle point	2	Chalk & Talk	Black Board
4.4	Graphical Method	2	Chalk & Talk	Black Board
4.5	LP Method	3	Chalk & Talk	Black Board
4.6	The rule of dominance	2	Chalk & Talk	Black Board
UNIT 5 -PERT & CPM				
5.1	Project Management: PERT and CPM	1	Lecture	PPT
5.2	Difference between PERT and CPM	1	Chalk & Talk	Black Board
5.3	Critical Path analysis-	2	Chalk & Talk	Black Board
5.4	Problems in PERT analysis-	3	Chalk & Talk	Black Board
5.5	Project , Time, Cost Trade off	3	Chalk & Talk	Black Board
5.6	Resource allocation	2	Chalk & Talk	Black Board



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	W1+ W2 5+5=10	Avg (M1 & M2) 10	Mid-Sem.Test 15	Once in a Sem. 10		5	50	
K1	-	-	-	-	-		-	-
K2	5	2	3	-	10		10	20 %
K3	5	3	4		12		12	24 %
K4	-	5	4	5	14		14	28%
K5	-	-	4	5	9		9	18 %
Non-Scho.							5	10 %
Total	10	10	15	10	45	5	50 mks.	100 %

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :
K2-Understand, K3-Apply, K4-Analyse, K5 - Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
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C1 – Sum of Two Weekly Tests

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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Identify the applications of Operations Research and methods to solve business problems	K2	PSO1 & PSO2
CO 2	Apply linear programming to solve operational problem with constraints	K2, K3, K4	PSO1 & PSO2
CO 3	Apply transportation and assignment models to find optimal solution in warehousing and Travelling,	K2 & K3	PSO1 & PSO3
CO 4	Prepare project scheduling using PERT and CPM	K2, K3 & K5	PSO1 & PSO4
CO 5	Use optimization concepts in real world problems	K2, K3 & K5	PSO1 & PSO5

COURSE DESIGNER:

Staff Name – B. USHA

Forwarded By

HOD'S Signature & Name

B. Chandra
(B. CHANDIRIKA)



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SKILL DEVELOPMENT-100%

GENERAL ELECTIVE - MCA

(For those who join in 2019 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	19MCAGE02	FINANCIAL MANAGEMENT AND ACCOUNTING	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides an overview of financial concepts, process and operations from a managerial perspective.

COURSE OBJECTIVE

- ❖ To define the set of accounting method and disclosure practices from which firms select when providing information to external parties.
- ❖ The primary emphasis is to assist in developing the skills required to interpret, analyze and evaluate information contained in published financial statements.

UNIT I ACCOUNTING

(12 Hours)

Principles, Basic accounting concepts and conventions, journal, ledger – final accounts.

SELF STUDY: Ledger

UNIT II COSTING

(12 Hours)



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Introduction to costing - cost elements - Classification of costing- Materials - Stock levels – FIFO, LIFO, Simple Average Method, Weighted Average Method (simple problem only)

SELF STUDY: Classification of costing

UNIT III FUND FLOW AND CASH FLOW STATEMENT (12 Hours)

Meaning –objective- preparation of fund flow statement and cash flow statements.

SELF STUDY: Objective

UNIT IV (12 Hours)

BUDGET AND BUDGETARY CONTROL:

Nature and scope, Importance.

MARGINAL COSTING:

Nature, scope and importance, Break-even analysis, Uses and limitations.

SELF STUDY: Uses and limitations

UNIT V TALLY (12 Hours)

Introduction to tally – Accounting Information – Vouchers – Inventory – Purchase/Sales Orders – Invoices – Reports – Important Features of Tally.

SELF STUDY: Invoices

REFERENCES :

1. T.S.Reddy&A.Murthy, “Advanced Accountancy”, Margham Publications , 2nd Revised Edition, 2014.
2. T.S.Reddy&Y.Hari Prasad Reddy, ”Cost Accounting” ,Margham Publications, Fourth Revised Edition, 2015.
3. T.S Reddy &Y.Hari Prasad Reddy, “Management Accounting”, Margham Publications Third Revised Edition- 2014.
4. S. Palanivel, “Tally 9: Accounting Software”, Margham Publications, 2015.



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5. A.K.Nadani, "Simple Tally 9" BPB Publications, 2010.
 6. R.L.Gupta&M.Radhaswamy, "Advanced accountancy", Sultan chand& co, 2014.
 7. S.N.Maheswari "Principles of Management accounting", Sultan Chand & co, 2014.
 8. R.S.N.Pillai& B.Bagavathi,"Cost accounting", Sultan Chand & co, 2014.

WEB REFERENCES:

1. [https:// en.wikipedia.org/wiki/Financial_management](https://en.wikipedia.org/wiki/Financial_management)
2. <https://www.managementstudyguide.com/financial-management.htm>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 - Accounting				
1.1	Principles	2	Lecture	Black Board
1.2	Basic accounting concepts and conventions	3	Lecture	White board
1.3	journal	3	Lecture	Black Board
1.4	Ledger	1	Lecture	PPT
1.5	Final accounts.	3	Lecture	Black Board
UNIT 2 - Costing				
2.1	Introduction to costing - cost elements	2	Lecture	PPT
2.2	Classification of costing	1	Lecture	Black Board
2.3	Materials	2	Chalk & Talk	PPT
2.4	Stock levels	2	Lecture	White board
2.5	FIFO, LIFO	2	Chalk & Talk	Black Board
2.6	Simple Average Method	1	Chalk & Talk	Black Board
2.7	Weighted Average Method (simple problem only)	2	Chalk & Talk	Black Board
UNIT 3 - Fund flow and cash flow statement				
3.1	Meaning	3	Lecture	White board
3.2	objective	2	Chalk & Talk	Black Board



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3.3	preparation of fund flow statement	3	Chalk & Talk	PPT
3.4	cash flow statements	4	Lecture	White board
UNIT 4 -Budget and budgetary control				
4.1	Nature and scope	2	Chalk & Talk	Black Board
4.2	Importance	3	Lecture	PPT
4.3	Nature, scope and importance	2	Chalk & Talk	Black Board
4.4	Break-even analysis	3	Chalk & Talk	PPT
4.5	Uses and limitations.	2	Chalk &Talk	Black Board
UNIT -5-Tally				
5.1	Introduction to tally	2	Lecture	Black Board
5.2	Accounting Information	2	Chalk & Talk	Black Board
5.3	Vouchers	2	Lecture	Black Board
5.4	Inventory – Purchase/Sales Orders	2	Chalk & Talk	Black Board
5.5	Invoices	2	Chalk & Talk	Black Board
5.6	Important Features of Tally	2	Chalk & Talk	Black Board



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K2	5	2	3	-	10		10	20 %
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Scholastic	45
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- ✓ All the course outcomes are to be assessed in the various CIA components.
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COURSE OUTCOMES

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

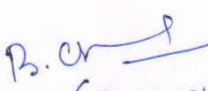
NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Preparation and analysis of balance sheet.	K2	PSO1 & PSO2
CO 2	Predict the Classification of Costing.	K2, K3, K4	PSO1 & PSO2
CO 3	Decide the budget preparation and control of a company.	K2 & K3	PSO1 & PSO3
CO 4	Analyze the flow of funds.	K2, K3 & K5	PSO1 & PSO4
CO 5	Use Tally to implement the needs of financial accounting.	K2, K3 & K5	PSO1 & PSO5

COURSE DESIGNER:

Staff Name – B. USHA

Forwarded By

HOD'S Signature & Name


(B. CHANDIRIKA)



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SKILL DEVELOPMENT-100%

GENERAL ELECTIVE - MCA

(For those who join in 2019 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	19MCAGE03	MANAGEMENT INFORMATION SYSTEMS	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides the concept and the role of management information systems to achieve strategic goals and to gain competitive advantages.

COURSE OBJECTIVE

- ❖ To impart a systematic knowledge of the management information technology.
- ❖ To enlighten the principles and practices of management with the usage of technology.
- ❖ To understand the global and security challenges.

UNIT – I

(12 Hours)

MIS IN DIGITAL FIRM, E-BUSINESS ENTERPRISE, STRATEGY MANAGEMENT

Concept - Definition - Role - Impact - Control System - Support - Effectiveness - MIS for a Digital Firm - E- Business Enterprise - Organization of Business - E-commerce - E-Communication - E-Collaborations - Real Time Enterprise - Technology options for real time enterprise - Corporate Planning - Strategic



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Planning- Types of Strategies – Short range planning – Tools of planning – Strategic Analysis of Business - Strategic Business Planning.

SELF STUDY :Technology of Information Systems

UNIT II

(12 Hours)

DECISION MAKING, INFORMATION, KNOWLEDGE, BUSINESS INTELLIGENCE, SYSTEMS ENGINEERING

Concepts – Process – Analytical modeling – Behavioral concepts – Organizational Decision Making- MIS and Decision Making - Concepts – Classification – Methods of Data and Information collection- Value of the information – Knowledge and Knowledge Management systems – Business Intelligence – MIS and the information and Knowledge - Concepts – Control – Types – Complexity – Classes – General Model – Analysis – Development – SSAD – OOA – OOSAD Development Life Cycle.

SELF STUDY :Data Processing

UNIT III

(12 Hours)

BUSINESS PROCESS RE-ENGINEERING, DECISION SUPPORT SYSTEMS AND KNOWLEDGE MANAGEMENT, ENTERPRISE MANAGEMENT SYSTEM

Business process – Business Process Model – Value Stream Model – Delays - Relevance of IT – MIS and BPR - Concept – GDSS – DSS in E- enterprise – Knowledge management systems – Knowledge based Expert System - EMS – ERP System –Model – Benefits – Product Evaluation – Implementation –SCM – CRM.

SELF STUDY :Database concepts

UNIT IV

(12 Hours)

TECHNOLOGY OF INFORMATION SYSTEMS , UNIFIED COMMUNICATION AND NETWORKS, DATABASE AND CLIENT SERVER ARCHITECTURE



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Data processing – Transaction Processing – Application Processing – Information System Processing – OLAP – TQM - Networks – Topology – Features – Data communication– Examples – Unified Communication - Components – WiMax

Technology - Concepts – Models – Design – RDBMS - Client server architecture - Client server Implementation Strategies – MIS and RDBMS.

SELF STUDY :Database Models

UNIT V

(12 Hours)

DATA WAREHOUSE, E-BUSINESS TECHNOLOGY , SECURITY CHALLENGES

Data in Data warehouse- Architecture – Design – Organization and Management – Implementation – Data Warehouse and MIS - Introduction - Models – Internet – Security – Electronic payment Systems – Web enabled Strategic and Business management – Content management systems- Enterprise portal - MIS in Web - Security threat – Control – Management – Disaster Management – Information Security.

SELF STUDY :Electronic payment Systems

REFERENCES:

1. Waman S Jawadekar, “Management Information Systems”, Tata McGraw Hill, 4th Edition, 2011.
2. James A O’ Brien, George M Marakas, Ramesh Behl, “Management Information Systems ”, Tata McGraw Hill, 9th Edition ,2010.
3. Gordan B. Davis, Margrethe H. Olson, “Management Information Systems”, Tata McGraw Hill, 2nd Edition, 2011.
4. Goyal D. P, “Management Information Systems: Managerial Perspectives”, Vikas Publishing House Pvt. Ltd., 4th Edition, 2014.



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WEB REFERENCES:

1. https://en.wikipedia.org/wiki/Management_information_system
2. <https://www.inc.com/encyclopedia/management-information-systems-mis.html>

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 MIS IN DIGITAL FIRM,E-BUSINESS ENTERPRISE,STRATEGY MANAGEMENT				
1.1	Concept , Definition	1	Chalk & Talk	Black Board
1.2	Role , Impact	1	Chalk & Talk	Black Board
1.3	Control System , Support	1	Lecture	White board
1.4	Effectiveness , MIS for a Digital Firm	1	Chalk & Talk	Black Board
1.5	E- Business Enterprise , Organization of Business	1	Discussion	Black Board
1.6	E-commerce , E-Communication	1	Lecture	White board
1.7	E-Collaborations , Real Time Enterprise	1	Lecture	White board
1.8	Technology options for real time enterprise , Corporate Planning	2	Discussion	Google classroom
1.9	Strategic Planning- Types of Strategies	1	Lecture	PPT
1.10	Short range planning – Tools of planning	1	Chalk & Talk	Black Board
1.11	Strategic Analysis of Business -	1	Lecture	PPT



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	Strategic Business Planning			
UNIT - 2 DECISION MAKING, INFORMATION, KNOWLEDGE, BUSINESS INTELLIGENCE, SYSTEMS ENGINEERING				
2.1	Concepts – Process – Analytical modeling	1	Lecture	PPT
2.2	Behavioral concepts , Organizational Decision Making	1	Chalk & Talk	Black Board
2.3	MIS and Decision Making , Concepts , Classification	1	Lecture	PPT
2.4	Methods of Data and Information collection , Value of the information	1	Lecture	White board
2.5	Knowledge and Knowledge Management systems , Business Intelligence	1	Discussion	Black Board
2.6	MIS and the information and Knowledge , Concepts	1	Chalk & Talk	Black Board
2.7	Control , Types	1	Chalk & Talk	Black Board
2.8	Complexity , Classes	1	Lecture	PPT
2.9	General Model , Analysis	1	Lecture	White board
2.10	Development , SSAD	1	Chalk & Talk	Black Board
2.11	OOA	1	Lecture	PPT
2.12	OOSAD Development Life Cycle	1	Lecture	White board
UNIT – 3 BUSINESS PROCESS RE-ENGINEERING, DECISION SUPPORT SYSTEMS AND KNOWLEDGE MANAGEMENT, ENTERPRISE MANAGEMENT SYSTEM				
3.1	Business process	1	Lecture	White board
3.2	Business Process Model	1	Chalk & Talk	Black Board
3.3	Value Stream Model	1	Lecture	PPT



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3.4	Delays , Relevance of IT	1	Lecture	White board
3.5	MIS and BPR , Concept	1	Discussion	Black Board
3.6	GDSS , DSS in E- enterprise	1	Lecture	PPT
3.7	Knowledge management systems	1	Chalk & Talk	Black Board
3.8	Knowledge based Expert System , EMS	1	Lecture	White board
3.9	ERP System , Model	1	Chalk & Talk	Black Board
3.10	Benefits , Product Evaluation	1	Chalk & Talk	Black Board
3.11	Implementation , SCM	1	Discussion	Black Board
3.12	CRM	1	Lecture	White board
UNIT - 4 TECHNOLOGY OF INFORMATION SYSTEMS , UNIFIED COMMUNICATION AND NETWORKS, DATABASE AND CLIENT SERVER ARCHITECTURE				
4.1	Data processing	1	Lecture	PPT
4.2	Transaction Processing , Application Processing	2	Lecture	PPT
4.3	Information System Processing , OLAP	1	Chalk & Talk	Black Board
4.4	TQM , Networks	1	Chalk & Talk	Black Board
4.5	Topology , Features	1	Discussion	Black Board
4.6	Data communication , Examples	1	Lecture	PPT
4.7	Unified Communication , Components , WiMax Technology	1	Chalk & Talk	Black Board
4.8	Concepts , Models , Design , RDBMS	1	Lecture	PPT
4.9	Client server architecture	1	Lecture	PPT



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4.10	Client server Implementation Strategies	1	Chalk & Talk	Black Board
4.11	MIS and RDBMS	1	Chalk & Talk	Black Board
UNIT – 5 DATA WAREHOUSE, E-BUSINESS TECHNOLOGY , SECURITY CHALLENGES				
5.1	Data in Data warehouse , Architecture	1	Chalk & Talk	Black Board
5.2	Design , Organization and Management	1	Lecture	PPT
5.3	Implementation , Data Warehouse and MIS	1	Lecture	PPT
5.4	Introduction , Models , Internet , Security	1	Lecture	White board
5.5	Electronic payment Systems	1	Lecture	White board
5.6	Web enabled Strategic and Business management	1	Lecture	White board
5.7	Content management systems	1	Lecture	White board
5.8	Enterprise portal , MIS in Web	1	Chalk & Talk	Black Board
5.9	Security threat	1	Chalk & Talk	Black Board
5.10	Control , Management	1	Discussion	Black Board
5.11	Disaster Management	1	Chalk & Talk	Black Board
5.12	Information Security	1	Discussion	Black Board



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	W1+ W2 5+5=10	Avg (M1 & M2) 10	Mid-Sem.Test 15	Once in a Sem. 10		5	50	
K1	-	-	-	-	-		-	-
K2	5	2	3	-	10		10	20 %
K3	5	3	4		12		12	24 %
K4	-	5	4	5	14		14	28%
K5	-	-	4	5	9		9	18 %
Non-Scho.							5	10 %
Total	10	10	15	10	45	5	50 mks.	100 %

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :
K2-Understand, K3-Apply, K4-Analyse, K5 - Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	10	15	10	5	50	50	100

C1 – Sum of Two Weekly Tests

C2 – Average of Two Monthly Tests

C3 - Mid Sem Test

C4 – Once in a semester (Seminar / Assignment)

C5 – Non – Scholastic



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Analyze and synthesize business information needs to facilitate evaluation of strategic alternatives.	K2	PSO1 & PSO2
CO 2	Apply MIS knowledge and skills learned to facilitate development, deployment and management of information systems.	K2, K3, K4	PSO1 & PSO2
CO 3	Predict the use of information technology for business processes.	K2 & K3	PSO1 & PSO3
CO 4	Assess the use of technology of Information Systems for effective management.	K2, K3 & K5	PSO1 & PSO4
CO 5	Identify the security features and global issues in organization and society.	K2, K3 & K5	PSO1 & PSO5

COURSE DESIGNER:

Staff Name – R. SMEETA MARY

Forwarded By

HOD'S Signature & Name

B. Chandirika
(B.CHANDIRIKA)



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ENTREPRENEURSHIP -100%

GENERAL ELECTIVE - MCA

(For those who join in 2019 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	19MCAGE04	E-COMMERCE	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides information on the combination of Internet with E-Commerce, options available for doing business on the Internet, features that helps to build E-Commerce web sites, marketing issues, payment options, security issues and customer service.

COURSE OBJECTIVE

- ❖ To illustrate the management's role and identify strategies involved in an e-commerce model.
- ❖ To provide a fundamental understanding of the different types and key components on business models.
- ❖ To become familiar with state of the art Electronic Model, Payment and Supply Chain Mechanisms..

UNIT – I INTRODUCTION TO ELECTRONIC COMMERCE

(12 Hours)



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Introduction to electronic commerce - What is electronic commerce?, Benefits of electronic commerce, Impact of electronic commerce, Classification of electronic commerce, Application of electronic commerce technologies.

SELF STUDY :Benefits of Electronic Commerce

UNIT II ELECTRONIC COMMERCE: BUSINESS MODELS (12 Hours)

What is business models?, Native content based models -Information content model, Information exchange model, Transplanted content model - Subscription model, Advertising model, Affiliate model, Native transaction models - Digital products merchant model, Web hosting and internet services, Metamediary , Transplanted transaction models - Electronic store model, Brokerage model.

SELF STUDY :Electronic store model

UNIT III (12 Hours)

ELECTRONIC COMMERCE: NETWORK INFRASTRUCTURE

Local area network, Topologies, Transmission media, Wireless transmission, Wide area network, Internet, TCP/IP reference model.

SELF STUDY :Local area network

UNIT IV ELECTRONIC PAYMENT SYSTEMS (12

Hours)Online payment systems, Pre-paid electronic payment systems - Ecash, Mondex, Milicent, Netbill, Post-paid electronic systems - Ikp, Cybercash, SET, Netcheque, First Virtual.

SELF STUDY :Milicent

UNITV SECURING NETWORK TRANSACTION (12 Hours)

Transaction security, security services, Cryptology - Introduction to cryptography, Cryptanalysis, Conventional Encryption Model, Public key Cryptosystems, Comparison of conventional and public key encryption systems, Digital signatures, Electronic mail security.



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SELF STUDY :Electronic mail security

REFERENCES:

1. Bharat Bhaskar, “Electronic Commerce – Framework Technologies and Applications”, Tata McGraw Hill 4th Edition, 2013.
2. Ravi Kalakota & A.B. Whinston, “Electronic Commerce – A Manager’s Guide”, Pearson Education, 2000
3. Agarwala Kamlesh, N and Agarwala Deeksha, “Business on the Net_Introduction to the E-Com”., Macmillan India 2000
4. P. T. Joseph, “E-Commerce: A Managerial Perspective”, PHI, 2004

WEB REFERENCES:

1. <https://en.wikipedia.org/wiki/E-commerce>
2. <https://www.shopify.com/encyclopedia/what-is-ecommerce>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT - 1 INTRODUCTION TO ELECTRONIC COMMERCE				
1.1	Introduction to electronic commerce	2	Chalk & Talk	Black Board
1.2	What is electronic commerce?	2	Chalk & Talk	Black Board
1.3	Benefits of electronic commerce	2	Lecture	White board
1.4	Impact of electronic commerce	2	Chalk & Talk	Black Board
1.5	Classification of electronic commerce	2	Discussion	Black Board
1.6	Application of electronic commerce technologies	2	Lecture	White board
UNIT - 2 Electronic Commerce: Business Models				
2.1	What is business models?	1	Lecture	PPT
2.2	Native content based models	1	Chalk & Talk	Black Board
2.3	Information content model	1	Lecture	PPT
2.4	Information exchange model	1	Lecture	White board
2.5	Transplanted content model	1	Discussion	Black Board
2.6	Subscription model, Advertising model	1	Chalk & Talk	Black Board
2.7	Affiliate model, Native transaction models	2	Chalk & Talk	Black Board



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2.8	Digital products merchant model, Web hosting and internet services	2	Lecture	PPT
2.9	Metamediary , Transplanted transaction models	1	Discussion	Black Board
2.10	Electronic store model, Brokerage model	1	Chalk & Talk	Black Board
UNIT – 3ELECTRONIC COMMERCE: NETWORK INFRASTRUCTURE				
3.1	Local area network	1	Lecture	White board
3.2	Topologies	1	Chalk & Talk	Black Board
3.3	Transmission media	2	Lecture	PPT
3.4	Wireless transmission	2	Lecture	White board
3.5	Wide area network	2	Discussion	Black Board
3.6	Internet	2	Lecture	PPT
3.7	TCP/IP reference model	2	Chalk & Talk	Black Board
UNIT - 4 ELECTRONIC PAYMENT SYSTEMS				
4.1	Online payment systems	1	Lecture	PPT
4.2	Pre-paid electronic payment systems	2	Lecture	PPT
4.3	Ecash	1	Chalk & Talk	Black Board
4.4	Mondex	1	Chalk & Talk	Black Board
4.5	Milicent	1	Discussion	Black Board
4.6	Netbill	1	Lecture	PPT
4.7	Post-paid electronic systems - Ikp	1	Chalk & Talk	Black Board
4.8	Cybercash	1	Lecture	PPT



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4.9	SET	1	Lecture	PPT
4.10	Netchegue	1	Chalk & Talk	Black Board
4.11	First Virtual	1	Chalk & Talk	Black Board
UNIT – 5 SECURING NETWORK TRANSACTION				
5.1	Transaction security	1	Chalk & Talk	Black Board
5.2	security services	1	Lecture	PPT
5.3	Cryptology	1	Lecture	PPT
5.4	Introduction to cryptography	1	Lecture	White board
5.5	Cryptanalysis	1	Lecture	White board
5.6	Conventional Encryption Model	1	Lecture	White board
5.7	Public key Cryptosystems	1	Lecture	White board
5.8	Comparison of conventional and public key encryption systems	2	Chalk & Talk	Black Board
5.9	Digital signatures	2	Chalk & Talk	Black Board
5.10	Electronic mail security	1	Discussion	Black Board



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K1	-	-	-	-	-		-	-
K2	5	2	3	-	10		10	20 %
K3	5	3	4		12		12	24 %
K4	-	5	4	5	14		14	28%
K5	-	-	4	5	9		9	18 %
Non-Scho.							5	10 %
Total	10	10	15	10	45	5	50 mks.	100 %

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :
K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
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C1 – Sum of Two Weekly Tests

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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Gain a comprehensive understanding of the E-Commerce landscape, current and emerging technology and infrastructure underpinnings of the business.	K2	PSO1 & PSO2
CO 2	Analyze the impact of E-commerce on business models and strategy.	K2, K3, K4	PSO1 & PSO2
CO 3	Develop an understanding on how internet can help business grow/ Describe the infrastructure for E-commerce	K2 & K3	PSO1 & PSO3
CO 4	Assess electronic payment systems	K2, K3 & K5	PSO1 & PSO4
CO 5	Gain an understanding on the importance of security, privacy, and ethical issues as they relate to E-Commerce.	K2, K3 & K5	PSO1 & PSO5

COURSE DESIGNER:

Staff Name – R.SMEETA MARY

Forwarded By

HOD'S Signature & Name

B. Chandirika
(B.CHANDIRIKA)



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SKILL DEVELOPMENT-100%

GENERAL ELECTIVE - MCA

(For those who join in 2019 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	19MCAGE05	CYBER FORENSICS	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides the investigation of computer-related crimes with the goal of obtaining evidence to be presented in a court of law.

COURSE OBJECTIVE

- ❖ Understand the definition of computer forensics fundamentals.
- ❖ Describe the types of computer forensics technology.
- ❖ Analyze various computer forensics systems.
- ❖ Learn to duplicate and preserve digital evidence.

UNIT – I COMPUTER FORENSICS FUNDAMENTALS

(12 Hours)

Introduction - Use in Law Enforcement - Assistance to Human Resources - Services - Benefits of Forensics Methodology - Steps Taken by Specialists – Users of Computer Forensic Evidence - Types of Computer Forensics Technology - Military Forensic Technology - Types of Law Enforcement - Types of Business



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Technology - Specialized Forensics Techniques - Hidden Data - Spyware and Adware - Encryption Methods and Vulnerabilities - Protecting Data - Internet Tracing Methods - Security and Wireless Technologies - Avoiding Pitfalls with Firewalls.

SELF STUDY :Biometric Security Systems

UNIT II COMPUTER FORENSICS EVIDENCE AND CAPTURE (12 Hours)

Data Recovery -Definition - Data Backup and Recovery – Data Recovery Solution - Hiding and Recovering Hidden Data - Evidence Collection and Data Seizure – Obstacles - Types - Rules - Volatile Evidence - Methods of Collection - Artifacts - Collection Steps - The Chain of Custody - Reconstructing the Attack – Preservation of Digital Evidence and Digital Crime Scene - Computer Evidence Processing Steps – Legal Aspects - Computer Image - Verification and Authentication- Special Needs of Evidential Authentication.

SELF STUDY :Controlling Contamination, The Chain of Custody

UNIT III COMPUTER FORENSICS ANALYSIS (12 Hours)

Discovery of Electronic Evidence - Electronic Document Discovery: A Powerful New Litigation Tool - Identification of Data - Timekeeping - Forensic Identification and Analysis of Technical Surveillance Devices - Reconstructing Past Events - How to Become a Digital Detective - Useable File Formats - Unusable File Formats - Converting Files - Networks - Network Forensics Scenario - A Technical Approach - Destruction of Email – Damaging Computer Evidence - Tools Needed for Intrusion Response to the Destruction of Data.

SELF STUDY :System Testing

UNIT IV THE IW ARSENAL AND TACTICS OF THE MILITARY (12 Hours)

Overview of Military Tactics - Offensive Ruinous IW Tools and Tactics – Offensive Containment IW Tools and Tactics - Defensive Preventive IW Tools and Tactics –



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Defensive Ruinous IW Tools and Tactics - Defensive Responsive Containment IW Tools and Tactics - Countering Sustained Terrorist IW Tactics - Dealing with Random Terrorist IW - The Future of Information Warfare Arsenal – Weapons of the Future - The Global Positioning System - Snoop, Sniff, and Snuff Tools - Email

Wiretaps Like Carnivore Can Steal Sensitive Correspondence - IW Weapons of the Future.

SELF STUDY :Nanotechnology

UNITV SURVEILLANCE TOOLS FOR IW OF THE FUTURE (12 Hours)

Monitoring Everything - The Cyber Footprint and Criminal Tracking - The Implications of Cookies and Integrated Platforms - Wintel Inside, or How Your Computer Is Watching You - Data Mining - The Internet Is Big Brother - The Wireless Internet: Friend or Foe - Advanced Computer Forensics - Advanced Encryption: The Need to Conceal - Advanced Hacking - Advanced Tracker Hackers - The Problems of the Present.

SELF STUDY :Cyber Surveillance

REFERENCES:

1. John R. Vacca, "Computer Forensics: Computer Crime Scene Investigation", Second Edition , 2005.
2. Kevin Mandia, Chris Prosise, Matt Pepe, "Incident Response and Computer Forensics ", Tata McGraw -Hill, New Delhi, 2014.
3. Nelson Phillips and EnfingerSteuart, "Computer Forensics and4. Investigations",Cengage Learning, New Delhi, 2016.
4. Bill Nelson, Amelia Phillips, Chris Steuart,"Guide to Computer Forensics and Investigations processing Digital Evidence", Fifth Edition, Tata McGraw - Hill, New Delhi, 2016.

WEB REFERENCES:



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1. <https://homelandforensics.com/forensics.htm>
2. https://en.wikipedia.org/wiki/Computer_forensics

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 COMPUTER FORENSICS FUNDAMENTALS				
1.1	Introduction to Computer Forensics Fundamentals	1	Chalk & Talk	Black Board
1.2	Benefits of Forensics Methodology	1	Chalk & Talk	Black Board
1.3	Users of Computer Forensic Evidence	1	Lecture	PPT
1.4	Military Forensic Technology	2	Chalk & Talk	Black Board
1.5	Specialized Forensics Techniques	1	Discussion	Black Board
1.6	Encryption Methods and Vulnerabilities	1	Lecture	White board
1.7	Internet Tracing Methods	1	Lecture	PPT
1.8	Security and Wireless Technologies	2	Lecture	White board
1.9	Biometric Security Systems.	2	Chalk & Talk	Black Board
UNIT - 2 COMPUTER FORENSICS EVIDENCE AND CAPTURE				



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2.1	Data Backup and Recovery	1	Lecture	PPT
2.2	Evidence Collection and Data Seizure	1	Chalk & Talk	Black Board
2.3	Methods of Collection	2	Lecture	PPT
2.4	Collection Steps	2	Lecture	White board
2.5	Controlling Contamination	1	Discussion	Black Board
2.6	Reconstructing the Attack	1	Chalk & Talk	Black Board
2.7	Preservation of Digital Evidence and Digital Crime Scene	1	Chalk & Talk	Black Board
2.8	Computer Evidence Processing Steps	1	Lecture	White board
2.9	Computer Image - Verification and Authentication	1	Discussion	Black Board
2.10	Special Needs of Evidential Authentication	1	Lecture	PPT
UNIT – 3 COMPUTER FORENSICS ANALYSIS				
3.1	Discovery of Electronic Evidence	1	Lecture	White board
3.2	Electronic Document Discovery: A Powerful New Litigation Tool	2	Chalk & Talk	Black Board
3.3	Forensic Identification and Analysis of Technical Surveillance Devices	2	Lecture	PPT



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3.4	How to Become a Digital Detective	1	Lecture	White board
3.5	Useable & Unusable File Formats	1	Lecture	PPT
3.6	Network Forensics Scenario - A Technical Approach	2	Discussion	Google classroom
3.7	Destruction of Email	1	Chalk & Talk	Black Board
3.8	Damaging Computer Evidence	1	Lecture	PPT
3.9	Tools Needed for Intrusion Response to the Destruction of Data	1	Discussion	Google classroom
UNIT - 4 THE IW ARSENAL AND TACTICS OF THE MILITARY				
4.1	Overview of Military Tactics	1	Lecture	PPT
4.2	Offensive Ruinous IW Tools and Tactics	1	Lecture	PPT
4.3	Offensive Containment IW Tools and Tactics	1	Chalk & Talk	Black Board
4.4	Defensive Preventive IW Tools and Tactics	1	Chalk & Talk	Black Board
4.5	Defensive Ruinous IW Tools and Tactics	1	Discussion	Black Board
4.6	Defensive Responsive Containment IW Tools and Tactics	1	Lecture	PPT



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4.7	Weapons of the Future	2	Chalk & Talk	Black Board
4.8	Snoop, Sniff, and Snuff Tools	2	Discussion	Google classroom
4.9	IW Weapons of the Future	2	Discussion	Google classroom
UNIT – 5 SURVEILLANCE TOOLS FOR IW OF THE FUTURE				
5.1	Cyber Surveillance	2	Chalk & Talk	Black Board
5.2	Cyber Footprint and Criminal Tracking	1	Lecture	PPT
5.3	Implications of Cookies and Integrated Platforms	2	Lecture	PPT
5.4	Data Mining	1	Lecture	White board
5.5	The Wireless Internet: Friend or Foe.	2	Lecture	White board
5.6	Advanced Encryption: The Need to Conceal	1	Lecture	White board
5.7	Advanced Hacking	1	Lecture	White board
5.8	Advanced Tracker Hackers	1	Discussion	Google classroom
5.9	The Problems of the Present.	1	Chalk & Talk	Black Board



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	W1+ W2 5+5=10	Avg (M1 & M2) 10	Mid-Sem.Test 15	Once in a Sem. 10		5	50	
K1	-	-	-	-	-		-	-
K2	5	2	3	-	10		10	20 %
K3	5	3	4		12		12	24 %
K4	-	5	4	5	14		14	28%
K5	-	-	4	5	9		9	18 %
Non-Scho.							5	10 %
Total	10	10	15	10	45	5	50 mks.	100 %

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :
K2-Understand, K3-Apply, K4-Analyse, K5 - Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
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C1 – Sum of Two Weekly Tests

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C4 – Once in a semester (Seminar / Assignment)

C5 – Non - Scholastic



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Predict the forensics fundamentals and the various technologies used to avoid computer crimes	K2	PSO1
CO 2	Illustrate different methods to collect and preserve digital evidence and Digital Crime Scene.	K2, K3, K4	PSO2 & PSO4
CO 3	Identify and Analyze Forensic Technical Surveillance Devices.	K2 & K3	PSO3
CO 4	Evaluate the Various tools and tactics followed in military.	K2, K3 & K5	PSO2 & PSO4
CO 5	Demonstrate the Usage of surveillance tools for tracking cyber criminals	K2,K3 & K5	PSO2 & PSO5

COURSE DESIGNER:

Staff Name – S. JEBAPRIYA

Forwarded By

HOD'S Signature & Name

B. Chandra
(B.CHANDIRIKA)



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SKILL DEVELOPMENT-100%

GENERAL ELECTIVE - MCA

(For those who join in 2019 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	19MCAGE06	ETHICS IN COMPUTING	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides the basis for ethical decision-making and the methodology for reaching ethical decisions concerning computing matters.

COURSE OBJECTIVE

- ❖ To construct defensible arguments from an ethical point of view concerning the issue of computer hacking.
- ❖ To have an overview knowledge of protective measures against computer crime.
- ❖ To comprehend relevant legislation and international initiatives for equal rights.
- ❖ To compare knowledge of different existing ethics frameworks and professional ethics standards for computer professionals.

UNIT – I INTRODUCTION

(12 Hours)



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Computer Ethics- an overview- Identifying an ethical issue – Ethics and the law – Ethical theories – Professional Codes of conduct – An ethical dilemma – Framework for ethical decision making - Computer Hacking– Introduction –

Definitions – Destructive Programs – Hacker Ethics – Legal constraints – Professional Constraints – Ethical positions on hacking – Ethical Dilemma.

SELF STUDY :Activities: Ethics and the law - Arguments against hacking

UNITII INTERNET CRIME AND IPR

(12 Hours)

Aspects of Internet Crime - Introduction – What is Computer Crime – computer Security Measures – The Computer misuse Act – Professional duties and obligations - Intellectual property rights - Introduction - The nature of intellectual property - Intellectual property legislation - The extent and nature of software piracy - Ethical and professional issues - Free software and open source code - An ethical dilemma.

SELF STUDY :Researching a computer crime case

UNIT III INTERNET TECHNOLOGIES AND PRIVACY (12 Hours)

Regulating Internet content - Introduction - In defence of freedom of expression - Censorship - Laws upholding free speech - Free speech and the Internet - Ethical and professional issues - An ethical dilemma - Personal privacy and computer technologies Introduction - Valuing privacy – Internet technologies and privacy - Privacy legislation - The Data Protection Act, 1998 -Professional and ethical issues - An ethical dilemma

SELF STUDY :Internet Technologies and free expression

UNIT IV EMPOWERING COMPUTERS IN THE WORKPLACE

(12

Hours)Computer technologies: accessibility issues - Introduction - Principle of



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equal access - Obstacles to access for individuals - Legislation - Enabling the disabled - Professional responsibility - An ethical dilemma - Empowering computers in the workplace - Introduction - Computers and employment -

Computers and the quality of work - Computerised monitoring in the workplace - Telecommuting.

SELF STUDY : Obstacles to equal access - Monitoring illegal activities

UNIT V TOWARDS THE FUTURE

(12 Hours)

The failure of IT projects - Introduction - The problems of producing successful IT projects - How the profession is addressing the problem of IT failure - The relationship between professional codes of conduct and IT projects - An overview of national legislation - Towards the future: some ethical and social questions - Introduction - The database society - Restricting choice: digital rights management - Review of the ethical dilemmas - The pace of change.

SELF STUDY : Inferring personal information.

REFERENCES

1. Penny Duquenoy, Simon Jones, Barry G Blundell , “Ethical, Legal and Professional Issues in Computing”, Middlesex University Press, 2008
2. George Reynolds, “Ethics in Information Technology”, 2nd Edition, Thomson CourseTechnology.
3. Charles P .Pfleeger, Shari Lawrence Pfleeger, “Security in Computing” ,4th Edition, Pearson Prentice Hall.

WEB REFERENCES:

1. http://www.infosectoday.com/Articles/Intro_Computer_Ethics.htm
2. http://www.tutorialspoint.com/professional_ethics/



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 INTRODUCTION				
1.1	Introduction to Computer Ethics	2	Chalk & Talk	Black Board
1.2	Ethics and the law	2	Chalk & Talk	Black Board
1.3	Ethical theories	2	Lecture	PPT
1.4	Framework for ethical decision making	1	Chalk & Talk	Black Board
1.5	Computer Hacking	1	Discussion	Black Board
1.6	Destructive Programs	1	Lecture	White board
1.7	Hacker Ethics	1	Lecture	PPT
1.8	Ethical positions on hacking	2	Lecture	White board
UNIT - 2 INTERNET CRIME AND IPR				
2.1	What is Computer Crime	1	Lecture	PPT
2.2	Computer Security Measures	1	Chalk & Talk	Black Board
2.3	The Computer misuse Act	2	Lecture	PPT
2.4	Professional duties and obligations	2	Lecture	White board
2.5	Nature of intellectual property	1	Discussion	Black Board



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2.6	Intellectual property legislation	1	Chalk & Talk	Black Board
2.7	The extent and nature of software piracy	1	Chalk & Talk	Black Board
2.8	Ethical and professional issues	1	Lecture	White board
2.9	Free software and open source code	2	Discussion	Black Board
UNIT - 3 INTERNET TECHNOLOGIES AND PRIVACY				
3.1	Regulating Internet content	1	Lecture	White board
3.2	Defence of freedom of expression	2	Chalk & Talk	Black Board
3.3	Censorship & Laws upholding free speech	2	Lecture	PPT
3.4	Free speech and the Internet	2	Lecture	White board
3.5	Internet technologies and privacy legislation	2	Lecture	PPT
3.6	The Data Protection Act	2	Discussion	Google classroom
3.7	Professional and ethical issues	1	Chalk & Talk	Black Board
UNIT - 4 EMPOWERING COMPUTERS IN THE WORKPLACE				
4.1	Accessibility Issues In Computer Technologies	2	Lecture	PPT
4.2	Principle of equal access	1	Lecture	PPT



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4.3	Obstacles to access for individuals	2	Chalk & Talk	Black Board
4.4	Enabling the disabled	1	Chalk & Talk	Black Board
4.5	Professional responsibility	1	Discussion	Black Board
4.6	Computers and employment	1	Lecture	PPT
4.7	Computers and the quality of work	1	Chalk & Talk	Black Board
4.8	Computerised monitoring in the workplace	2	Discussion	Google classroom
4.9	Telecommuting	1	Discussion	Google classroom
UNIT – 5 TOWARDS THE FUTURE				
5.1	The failure of IT projects	2	Chalk & Talk	Black Board
5.2	The problems of producing successful IT Projects	2	Lecture	PPT
5.3	Addressing the problem of IT failure	2	Lecture	PPT
5.4	Relationship between professional codes of conduct and IT projects	1	Lecture	White board
5.5	Overview of national legislation	1	Lecture	White board
5.6	Ethical and social questions towards the Future	1	Lecture	White board



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5.7	Advanced Hacking	1	Lecture	White board
5.8	The database society	2	Discussion	Black Board

Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	W1+ W2 5+5=10	Avg (M1 & M2) 10	Mid-Sem.Test 15	Once in a Sem. 10		5	50	
K1	-	-	-	-	-		-	-
K2	5	2	3	-	10		10	20 %
K3	5	3	4		12		12	24 %
K4	-	5	4	5	14		14	28%
K5	-	-	4	5	9		9	18 %
Non-Scho.							5	10 %
Total	10	10	15	10	45	5	50 mks.	100 %

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :
K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	10	15	10	5	50	50	100

C1 – Sum of Two Weekly Tests

C2 – Average of Two Monthly Tests

C3 - Mid Sem Test

C4 – Once in a semester (Seminar / Assignment)

C5 – Non - Scholastic



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Predict the relationship between the law, ethics and computer technology	K2	PSO1
CO 2	Outline the philosophical and ethical debates with the ideas and the nature of intellectual creativity.	K2, K3, K4	PSO2 & PSO4
CO 3	Design the impact of computer technology on free speech.	K2 & K3	PSO3
CO 4	Formulate the ethical and legal issues of the impact that computing technologies had on workplace.	K2, K3 & K5	PSO2 & PSO4
CO 5	Develop a personal standpoint in relation to DataBase society and the usage of biometric data	K2,K3 & K5	PSO2 & PSO5

COURSE DESIGNER:

Staff Name – S. JEBAPRIYA

Forwarded By

HOD'S Signature & Name

B. Chandra
(B. CHANDIRIKA)



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ENTREPRENEURSHIP-100%

GENERAL ELECTIVE - MCA

(For those who join in 2019 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	19MCAGE07	ENTREPRENEURSHIP DEVELOPMENT	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides the skills necessary to succeed as an entrepreneur. It includes the fundamentals of starting and operating a business, developing a business plan, obtaining financing, marketing a product or service and developing an effective accounting system

COURSE OBJECTIVE

- ❖ Understand the need of entrepreneurial discipline.
- ❖ To let the entrepreneur set or reset the objectives of his business and work individually and along with his group.
- ❖ Analyze the environment set up relating to small industry and business.

UNIT – I ENTREPRENEUR

(12 Hours)

Introduction – Evolution of the Concept of Entrepreneur – Characteristics of Successful Entrepreneurs – The Charms of Becoming an Entrepreneur – The Entrepreneurial Decision Process – Functions of Entrepreneur – Need for an



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Entrepreneur- Types of Entrepreneurs- Distinction between an Entrepreneur and a manager –Entrepreneur – Social Entrepreneur.

SELF STUDY :Social Entrepreneur

UNIT II ENTREPRENEURIAL COMPETENCIES

(12 Hours)

Meaning of Entrepreneurial Competency – Major Entrepreneurial Competencies – Developing Entrepreneurial Competencies - Factors Affecting Entrepreneurship Growth: Factors Affecting Entrepreneurship- Economic Factors – Non- economic Factors – Government Actions.

SELF STUDY :Government Actions.

UNIT III WOMEN ENTREPRENEURSHIP

(12 Hours)

Concept of Women Entrepreneur – Functions of Women Entrepreneurs – Growth of Women Entrepreneurship in India – Problems of Women Entrepreneurs – Developing Women Entrepreneurship.

SELF STUDY :Problems of Women Entrepreneurs

UNIT IV EDPs, INSTITUTIONAL FINANCE TO ENTREPRENEURS(12 Hours)

Meaning of EDP – Need for EDPs – Objectives of EDPs – Entrepreneurship Development Programmes (EDPs) in India: A Historical Perspective – Course Contents and Curriculum of EDPs – Phases of EDP- Evaluation of EDPs – Problems of EDPs - Need for Institutional Finance – Institutional Finance- Commercial Banks – Other Financial Institutions.

SELF STUDY :Other Financial Institutions

UNIT V

(12 Hours)

PROJECT APPRAISAL ,FORMULATION OF BUSINESS PLANS

Concept of Project Appraisal – Methods of Project Appraisal – Economic Analysis – Financial Analysis – Market Analysis – Technical Feasibility – Managerial



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Competence – Environmental Clearance for SMEs – Environmental Restrictions for SSI Sector – The Environmental clearance Process - Meaning of Business Plan- Contents of Business Plan – Significance of Business Plan – Formulation of Business Plan – Planning Commission’s Guidelines for Formulating Project Report – Network Analysis – Business Plan Formulation.

SELF STUDY :The Environmental clearance Process

REFERENCES:

1. S S Khanka , “Entrepreneurial Development”, S. Chand Publishing Revised edition ,2012
2. S Anil Kumar, “Entrepreneurship Development” new age international publishers edition, 2003
3. Janakiram B, “Entrepreneurship Development: Text and Cases” Excel Books India, 2011

WEB REFERENCES:

1. https://www.tutorialspoint.com/entrepreneurship_development/entrepreneurship_development_tutorial.pdf
2. https://www.macmillanihe.com/resources/sample-chapters/9781137430359_sample.pdf



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT - 1 ENTREPRENEUR				
1.1	Introduction , Evolution of the Concept of Entrepreneur	1	Chalk & Talk	Black Board
1.2	Characteristics of Successful Entrepreneurs	2	Chalk & Talk	Black Board
1.3	The Charms of Becoming an Entrepreneur	1	Lecture	White board
1.4	The Entrepreneurial Decision Process , Functions of Entrepreneur	1	Chalk & Talk	Black Board
1.5	Need for an Entrepreneur	2	Discussion	Black Board
1.6	Types of Entrepreneurs	2	Lecture	White board
1.7	Distinction between an Entrepreneur and a manager	1	Lecture	White board
1.8	Entrepreneur , Social Entrepreneur	2	Discussion	Google classroom
UNIT - 2 ENTREPRENEURIAL COMPETENCIES				
2.1	Meaning of Entrepreneurial	2	Lecture	PPT



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	Competency			
2.2	Major Entrepreneurial Competencies	2	Chalk & Talk	Black Board
2.3	Developing Entrepreneurial Competencies	2	Lecture	PPT
2.4	Factors Affecting Entrepreneurship	2	Lecture	White board
2.5	Economic Factors	2	Discussion	Black Board
2.6	Non- economic Factors	1	Chalk & Talk	Black Board
2.7	Government Actions	1	Chalk & Talk	Black Board
UNIT – 3WOMEN ENTREPRENEURSHIP				
3.1	Concept of Women Entrepreneur	2	Lecture	White board
3.2	Functions of Women Entrepreneurs	2	Chalk & Talk	Black Board
3.3	Growth of Women Entrepreneurship in India	3	Lecture	PPT
3.4	Problems of Women Entrepreneurs	3	Lecture	White board
3.5	Developing Women Entrepreneurship	2	Discussion	Black Board
UNIT - 4 EDPs, INSTITUTIONAL FINANCE TO ENTREPRENEURS				
4.1	Meaning of EDP , Need for EDPs	2	Lecture	PPT
4.2	Objectives of EDPs	2	Lecture	PPT



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4.3	Entrepreneurship Development Programmes (EDPs) in India: A Historical Perspective	2	Chalk & Talk	Black Board
4.4	Course Contents and Curriculum of EDPs , Phases of EDP	3	Chalk & Talk	Black Board
4.5	Evaluation of EDPs , Problems of EDPs	1	Discussion	Black Board
4.6	Need for Institutional Finance , Institutional Finance	1	Lecture	PPT
4.7	Commercial Banks , Other Financial Institutions	1	Chalk & Talk	Black Board
UNIT – 5 PROJECT APPRAISAL , FORMULATION OF BUSINESS PLANS				
5.1	Concept of Project Appraisal , Methods of Project Appraisal	1	Chalk & Talk	Black Board
5.2	Economic Analysis , Financial Analysis	1	Lecture	PPT
5.3	Market Analysis , Technical Feasibility	1	Lecture	PPT
5.4	Managerial Competence , Environmental Clearance for SMEs	1	Lecture	White board
5.5	Environmental Restrictions for SSI Sector	1	Lecture	White board
5.6	The Environmental clearance	1	Lecture	White board



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	Process			
5.7	Meaning of Business Plan- Contents of Business Plan	1	Lecture	White board
5.8	Significance of Business Plan	1	Chalk & Talk	Black Board
5.9	Formulation of Business Plan	1	Chalk & Talk	Black Board
5.10	Planning Commission's Guidelines for Formulating Project Report	1	Discussion	Black Board
5.11	Network Analysis	1	Chalk & Talk	Black Board
5.12	Common Errors in Business Plan Formulation	1	Discussion	Black Board



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	W1+ W2 5+5=10	Avg (M1 & M2) 10	Mid-Sem.Test 15	Once in a Sem. 10		5	50	
K1	-	-	-	-	-		-	-
K2	5	2	3	-	10		10	20 %
K3	5	3	4		12		12	24 %
K4	-	5	4	5	14		14	28%
K5	-	-	4	5	9		9	18 %
Non-Scho.							5	10 %
Total	10	10	15	10	45	5	50 mks.	100 %

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :
K2-Understand, K3-Apply, K4-Analyse, K5 - Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	10	15	10	5	50	50	100

C1 – Sum of Two Weekly Tests

C2 – Average of Two Monthly Tests

C3 - Mid Sem Test

C4 – Once in a semester (Seminar / Assignment)

C5 – Non - Scholastic



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Highlight the salient characteristics of successful entrepreneur	K2	PSO1 & PSO2
CO 2	Enumerate the competencies relevant for Entrepreneurial development.	K2, K3, K4	PSO1 & PSO2
CO 3	Delineate the growth of women Entrepreneurship in India.	K2 & K3	PSO1 & PSO3
CO 4	Identify the major problems faced in conducting EDPs.	K2, K3 & K5	PSO1 & PSO4
CO 5	Discuss the methods of project appraisal used for small scale enterprises.	K2, K3 & K5	PSO1 & PSO5

COURSE DESIGNER:

Staff Name – R. SMEETA MARY

Forwarded By
HOD'S Signature & Name

B. Chandra
(B.CHANDIRIKA)



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SKILL DEVELOPMENT-100%

GENERAL ELECTIVE - MCA

(For those who join in 2019 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	19MCAGE21	RESEARCH METHODOLOGY	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides an overview of various methods employed in quantitative and qualitative research.

COURSE OBJECTIVE

- ❖ Understand the basic concepts of research and its methodologies.
- ❖ Identify a research problem stated in a study.
- ❖ Prepare a conventional research report / thesis.

UNIT I INTRODUCTION

(12 Hours)

Meaning of research – Objective of research – Motivation in research – Types of research – Research approaches – Significance of research – Research methods versus Methodology – Research and scientific method – Importance of knowing how research is done – Research process – Criteria of good research – Problems encountered by researchers in India

SELF STUDY:Types of Research

UNIT II DEFINING THE RESEARCH PROBLEM

(12 Hours)



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What is research problem? – Selecting the problem – Necessity of defining the problem - Research Design: Meaning of research design – Need for research design –Features of a good design – Important concepts relating to research design – Different research designs – Basic principles of experimental designs.

SELF STUDY: Research problem

UNIT II MEASUREMENT AND SCALING TECHNIQUES (12 Hours)

Measurement in research – Measurement scales – Sources of error in measurement – Tests of sound measurement – Technique of developing measurement tools – scaling – Meaning of scaling – Scale classification bases- Important scaling techniques – Scale construction techniques - Methods of Data Collection: Collection of primary data – Observation method – Interview method – Collection of data through schedules – Difference between Questionnaires and schedules – Some other methods of data collection – Collection of secondary data – Selection of appropriate method for data collection – Case study method

SELF STUDY: Case study method

UNIT IV PROCESSING AND ANALYSIS OF DATA (12 Hours)

Processing operations – Some problems in processing – Elements/Types of Analysis- Statistics in research – Measures of central tendency – Measures of dispersion – Measures of Asymmetry – Measures of relationship – Simple regression analysis – Multiple correlation and regression – Partial correlation – Association in case of attributes

UNIT V TESTING OF HYPOTHESES (12 Hours)

What is a Hypothesis? – Basic concepts concerning testing of Hypotheses - Procedure for Hypothesis testing – Measuring the power of a Hypothesis testing – Tests of Hypotheses- Important parametric tests – Hypothesis testing of means – Hypothesis testing for differences between means - Interpretation and report



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writing: Meaning of interpretation – Why interpretation? – Technique of interpretation – Precaution in interpretation – Significance of report writing –

Different steps in writing report – Layout of the research report – Types of reports – Oral Presentation – Mechanics of writing a research report – Precautions for writing research reports

SELF STUDY: Types of reports

REFERENCES :

1. Kothari, C.R (2013), “Research Methodology – Methods and Techniques”, 2ND Edition. Wiley Eastern Limited
2. R. Panneerselvam, “Research Methodology”, 4th Edition. Prentice Hall India Learning Private Limited, 2014
3. Ranjit Kumar, “Research Methodology – A step- by-step guide for beginners”, 3rd Edition. Pearson Education, 2011
4. Deepak Chawla and NeenaSondh , “Research Methodology, Concepts and Cases”, VikasPublishingHousePvt. Ltd., 2011

WEB REFERENCES:

1. https://edutechwiki.unige.ch/en/Research_methodology_resources
2. <https://csus.libguides.com/>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1		INTRODUCTION		
1.1	Introduction	1	Lecture	PPT
1.2	Meaning of research	1	Lecture	PPT
1.3	Objective of research	1	Lecture	PPT
1.4	Motivation in research	1	Lecture	PPT
1.5	Types of research	1	Lecture	PPT
1.6	Research approaches	1	Lecture	PPT
1.7	Significance of research	1	Lecture	PPT
1.8	Research methods versus Methodology	1	Chalk & Talk	Black Board
1.9	Importance of knowing how research is done	1	Chalk & Talk	Black Board
1.10	Research process	1	Lecture	White board
1.11	Criteria of good research	1	Chalk & Talk	Black Board
1.12	Problems encountered by	1	Lecture	White board



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	researchers in India			
UNIT - 2 DEFINING THE RESEARCH PROBLEM				
2.1	Defining the research problem	1	Lecture	PPT
2.2	What is research problem?	2	Chalk & Talk	Black Board
2.3	Selecting the problem	2	Lecture	PPT
2.4	Necessity of defining the problem.	2	Lecture	White board
2.5	Meaning of research design, Need for research design	1	Discussion	Black Board
2.6	Features of a good design, Important concepts relating to research design	1	Chalk & Talk	Black Board
2.7	Different research designs	1	Chalk & Talk	Black Board
2.8	Basic principles of experimental designs	2	Lecture	PPT
UNIT - 3 MEASUREMENT AND SCALING TECHNIQUES				
3.1	Measurement in research – Measurement scales – Sources of error in measurement	1	Lecture	White board
3.2	Tests of sound measurement – Technique of developing measurement tools	1	Chalk & Talk	Black Board
3.3	Scaling – Meaning of scaling – Scale classification bases	1	Lecture	PPT



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3.4	Important scaling techniques – Scale construction techniques	2	Lecture	White board
3.5	Methods of Data Collection: Collection of primary data – Observation method –	1	Discussion	Black Board
3.6	Interview method – Collection of data through schedules	2	Lecture	PPT
3.7	Difference between Questionnaires and schedules – Some other methods of data collection	1	Chalk & Talk	Black Board
3.8	Collection of secondary data – Selection of appropriate method for data collection	1	Chalk & Talk	Black Board
3.9	Case study method	2	Chalk & Talk	Black Board
UNIT - 4 PROCESSING AND ANALYSIS OF DATA				
4.1	Processing operations – Some problems in processing	2	Lecture	PPT
4.2	Elements/Types of Analysis- Statistics in research	2	Lecture	White board
4.3	Measures of central tendency – Measures of dispersion	2	Discussion	Black Board
4.4	Measures of Asymmetry – Measures of relationship	2	Chalk & Talk	Black Board



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4.5	Simple regression analysis – Multiple correlation and regression	2	Discussion	Black Board
4.6	Partial correlation – Association in case of attributes	2	Lecture	PPT
UNIT – 5 TESTING OF HYPOTHESES				
5.1	What is a Hypothesis? – Basic concepts concerning testing of Hypotheses – Procedure for Hypothesis testing	2	Chalk & Talk	Black Board
5.2	Measuring the power of a Hypothesis testing – Tests of Hypotheses- Important parametric tests	2	Lecture	PPT
5.3	Hypothesis testing of means – Hypothesis testing for differences between means	2	Lecture	PPT
5.4	Interpretation and report writing: Meaning of interpretation – Why interpretation? – Technique of interpretation	2	Lecture	White board
5.5	Precaution in interpretation – Significance of report writing – Different steps in writing report	2	Lecture	White board
5.6	Layout of the research report – Types of reports – Oral Presentation	1	Lecture	White board



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5.7	Mechanics & Precautions for writing research reports	1	Lecture	White board

Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	W1+ W2 5+5=10	Avg (M1 & M2) 10	Mid-Sem.Test 15	Once in a Sem. 10		5	50	
K1	-	-	-	-	-		-	-
K2	5	2	3	-	10		10	20 %
K3	5	3	4		12		12	24 %
K4	-	5	4	5	14		14	28%
K5	-	-	4	5	9		9	18 %
Non-Scho.							5	10 %
Total	10	10	15	10	45	5	50 mks.	100 %

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :
K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Predict the different stages of research process.	K2	PSO1 & PSO2
CO 2	Apply methods to collect best data.	K2, K3, K4	PSO1 & PSO2
CO 3	Assess the suitable research design & work.	K2 & K3	PSO1 & PSO3
CO 4	Compare categorical and continuous measures.	K2, K3 & K5	PSO1 & PSO4
CO 5	Analyze the process of various reports writing.	K2, K3 & K5	PSO1 & PSO5

COURSE DESIGNER:

Staff Name – B. CHANDIRIKA

Forwarded By

HOD'S Signature & Name

B. Ch
(B. CHANDIRIKA)



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SKILL DEVELOPMENT-100%

GENERAL ELECTIVE - MCA

(For those who join in 2019 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
MCA	19MCAGE22	DATA MINING AND DATA WAREHOUSING	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides the basic concepts, principles, methods, implementation techniques and applications of data mining.

COURSE OBJECTIVE

- ❖ To know the scope and necessity of Data mining & Data warehousing for the Society.
- ❖ To understand & analyze the various algorithms for Knowledge Extraction.
- ❖ To be familiar with the outcome of a real time scenario.

UNIT I

(12 Hours)

INTRODUCTION:



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Why Data Mining?, What is Data Mining, What kinds of Data Can be Mined?, What kinds of Patterns can be Mined?, Which Technologies are used?, Which kinds of Applications Are Targeted?, Major Issues in Data Mining.

GETTING TO KNOW YOUR DATA:Data Objects and Attribute types.

DATA PRE-PROCESSING:Data Pre-processing an Overview.

SELF STUDY:Applications

UNIT II

(12 Hours)

DATA WAREHOUSING AND ONLINE ANALYTICAL PROCESSING

Data Warehouse: Basic Concepts, Data Warehouse Modeling: Data Cube & OLAP, Data Warehouse Design & Usage, Data Warehouse Implementation, Data Generalization by attribute oriented induction.

SELF STUDY:Data Warehouse: Basic Concepts

UNIT III

(12 Hours)

MINING FREQUENT PATTERNS, ASSOCIATIONS AND CORRELATIONS: BASIC CONCEPTS & METHODS:

Basic Concepts, Frequent Itemset Mining Methods

ADVANCED PATTERN MINING:

Pattern Mining – a Road Map, Pattern Mining in Multilevel, Multidimensional Space.

UNIT IV

(12 Hours)

CLASSIFICATION:Basic Concepts, Decision tree Induction, Bayes Classification Methods,

CLUSTER ANALYSIS- BASIC CONCEPTS &METHODS:Cluster Analysis, Partitioning Methods.

OUTLIER DETECTION:Outliers and Outlier Analysis, Outlier Detection Methods.

SELF STUDY: Cluster Analysis



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UNIT V DATA MINING TRENDS AND RESEARCH FRONTIERS (12 Hours)

Mining Complex Data types, Other Methodologies of Data Mining, Data Mining Applications, Data Mining and Society, Data Mining Trends.

SELF STUDY : Data Mining Applications

REFERENCES :

1. Jiawei Han, Micheline Kamber, Jian Pei , “Data mining Concepts and Techniques”, Third Edition, Morgan Kaufman Publishers, 2012.
2. Bharat Bhushan Agarwal, Sumit Prakash Tayal, “Data Mining and Data Warehousing”, Laxmi Publications, Ltd., 2009
3. Margaret H Dunham , “Data Mining: Introductory And Advanced Topics” Pearson Education India, 2006
4. Usama M.Farrad, Geogory Piatetsky – Shapiro, Padhraí Smyth and Ramasamy Uthurusamy, “ Advances in Knowledge Discovery and Data Mining”, The M.I.T. Press 1996.
5. Ralph Kimball, “The Data Warehouse Life Cycle Toolkit”, John Wiley & Sons Inc., 1998.

WEB REFERENCES:

1. https://www.tutorialspoint.com/data_mining
2. <https://www.guru99.com/data-warehouse-architecture.htm>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 INTRODUCTION				
1.1	Why Data Mining?, What is Data Mining	2	Lecture	PPT
1.2	What kinds of Data Can be Mined?, What kinds of Patterns can be Mined?	2	Lecture	PPT
1.3	Which Technologies are used?	2	Lecture	PPT
1.4	Which kinds of Applications Are Targeted?,	2	Lecture	PPT
1.5	Major Issues in Data Mining.	1	Lecture	PPT
1.6	Data Objects and Attribute types.	1	Lecture	PPT
1.7	Data Pre-processing an Overview.	2	Lecture	PPT
UNIT 2 - DATA WAREHOUSING AND ONLINE ANALYTICAL PROCESSING				
2.1	Data Warehouse: Basic Concepts	2	Lecture	PPT
2.2	Data Warehouse Modeling	2	Chalk & Talk	Black Board
2.3	Data Cube & OLAP	2	Lecture	PPT
2.4	Data Warehouse Design & Usage	2	Lecture	White board



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2.5	Data Warehouse Implementation	2	Discussion	Black Board
2.6	Data Generalization	2	Chalk & Talk	Black Board
UNIT 3 - MINING FREQUENT PATTERNS, ASSOCIATIONS AND CORRELATIONS				
3.1	Basic Concepts	2	Lecture	White board
3.2	Frequent Itemset Mining Methods	2	Chalk & Talk	Black Board
3.3	Pattern Mining	2	Lecture	PPT
3.4	A Road Map	2	Lecture	PPT
3.5	Pattern Mining in Multilevel	2	Lecture	White board
3.6	Multidimensional Space.	2	Discussion	Black Board
UNIT 4 – CLASSIFICATION , CLUSTER ANALYSIS				
4.1	Basic Concepts	1	Lecture	PPT
4.2	Decision tree Induction	2	Lecture	White board
4.3	Bayes Classification Methods	2	Lecture	PPT
4.4	Cluster Analysis	1	Lecture	PPT
4.5	Partitioning Methods	2	Lecture	White board
4.6	Outliers and Outlier Analysis	2	Lecture	PPT
4.7	Outlier Detection Methods.	2	Lecture	White board
UNIT 5 - DATA MINING TRENDS AND RESEARCH FRONTIERS				
5.1	Mining Complex Data types	2	Lecture	PPT



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5.2	Other Methodologies of Data Mining	2	Lecture	PPT
5.3	Data Mining Applications	2	Lecture	PPT
5.4	Data Mining	2	Lecture	PPT
5.5	Society	2	Lecture	PPT
5.6	Data Mining Trends.	2	Lecture	PPT



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CIA	
Scholastic	45
Non Scholastic	5
	50

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COURSE OUTCOMES

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NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Practice the pre-processing operations of data.	K2	PSO1 & PSO2
CO 2	Compare & contrast OLTP, OLAP and Data mining as techniques for extracting knowledge from a Data Warehouse.	K2, K3, K4	PSO1 & PSO2
CO 3	Perform Association Rule Mining for Market Basket Analysis.	K2 & K3	PSO1 & PSO3
CO 4	Design & deploy the appropriate Classification and Clustering techniques.	K2, K3 & K5	PSO1 & PSO4
CO 5	Explore the recent trends in data mining.	K2, K3 & K5	PSO1 & PSO5

COURSE DESIGNER:

Staff Name – B. CHANDIRIKA

Forwarded By
HOD'S Signature & Name

B. Ch — P
(B. CHANDIRIKA)



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SKILL DEVELOPMENT-100%

GENERAL ELECTIVE - MCA

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	19MCAGE23	DIGITAL IMAGE PROCESSING	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides an introduction to the basic concepts, methodologies and algorithms of digital image processing focusing image enhancement, image analysis and object recognition.

COURSE OBJECTIVES

- ❖ To study the image fundamental principles and mathematical transforms necessary for image processing.
- ❖ To learn the image enhancement, restoration techniques used in digital image processing.
- ❖ To understand about color images and compression techniques

UNIT I

(12 Hours)

INTRODUCTION AND DIP FUNDAMENTALS

DIP Definition - Origin of DIP- Fundamental steps in DIP - Elements of Visual Perception- Image sampling and Quantization



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SELF STUDY: Some basic Relationships between pixels

UNIT II (12 Hours)

INTENSITY TRANSFORMATION AND SPATIAL FILTERING

Background- Smoothing spatial filters- Sharpening spatial filters.

SELF STUDY: basic intensity transformation

UNIT III (12 Hours)

IMAGE RESTORATION AND RECONSTRUCTION

Model - Restoration in the process of noise only Spatial filtering - mean filters- Order statistic filters- Adaptive filters - Periodic noise reduction by Frequency domain filtering- Band Reject filters - Band pass filter - Notch Filter- Optimum Notch Filtering.

SELF STUDY: Noise Models

UNIT IV (12 Hours)

COLOR IMAGE PROCESSING

Color Fundamentals - Color Models - Pseudo color image processing- Basis of full color image processing- Color Transformations - Smoothing and Sharpening Image segmentation based on Color - Noise in color images - Color image compression.

SELF STUDY: Color components

UNIT V (12 Hours)

IMAGE COMPRESSION

Huffmann Coding- LZW coding- Run Length coding- Digital Image Watermarking.

SELF STUDY: Arithmetic Coding.



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REFERENCES

1. Rafael C. Gonzalez, Richard E., "Digital Image Processing", 3rd Edition- Woods Pearson India Education Pvt. Ltd.- 2016
2. Scott Umbaugh, "Computer Vision and Image Processing- a practical approach using CVIP tools"
3. Anil K.Jain, "Fundamentals of Digital Image Processing", Person Education, 2003

WEB REFERENCES

1. <https://imagej.net/Welcome>
2. <https://imagej.nih.gov/ij/docs/examples/index.html>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 Introduction and DIP Fundamentals				
1.1	DIP Definition - Origin of DIP	2	Chalk & Talk	Black Board
1.2	Fundamental steps in DIP	2	Chalk & Talk	LCD
1.3	Elements of Visual Perception	4	Lecture	PPT & White board
1.4	Image sampling and Quantization	2	Lecture	Smart Board
1.5	Some basic Relationships between pixels	2	Lecture	Black Board
UNIT -2Intensity Transformation and spatial filtering				
2.1	Background	2	Chalk & Talk	Black Board
2.2	some basic intensity transformation Functions	2	Chalk & Talk	LCD
2.3	Smoothing spatial filters	4	Lecture	PPT & White board
2.4	Sharpening spatial filters	1	Lecture	Smart Board
2.8	Cell Fundamentals – Frequency Reuse	1	Discussion	Black Board



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2.9	Signal to Interference Ratio Calculation.	2	Lecture	Black Board
UNIT –3Image Restoration and Reconstruction				
3.1	Model – Noise Models	1	Chalk & Talk	Black Board
3.2	Restoration in the process of noise only Spatial filtering	1	Chalk & Talk	LCD
3.3	mean filters- Order statistic filters	4	Lecture	PPT & White board
3.4	Adaptive filters	1	Lecture	Smart Board
3.5	Periodic noise reduction by Frequency domain filtering	1	Lecture	Black Board
3.6	Band Reject filters - Band pass filter	1	Discussion	Google classroom
3.7	Notch Filter	2	Lecture	Black Board
3.8	Optimum Notch Filtering	1	Discussion	Black Board
UNIT –4Color Image Processing				
4.1	Color Fundamentals	1	Chalk & Talk	Black Board
4.2	Color Models	1	Chalk & Talk	LCD
4.3	Pseudo color image processing	4	Lecture	PPT & White board
4.4	Basis of full color image processing	1	Lecture	Smart Board



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4.5	Color Transformations	1	Lecture	Black Board
4.6	Smoothing and Sharpening Image segmentation based on ColorCellular Systems	1	Discussion	Google classroom
4.7	Noise in color images	2	Lecture	Black Board
4.8	Color image compression.	1	Discussion	Black Board
UNIT -5Image Compression				
5.1	Huffmann Coding	2	Chalk & Talk	Black Board
5.2	Arithmetic Coding	2	Chalk & Talk	LCD
5.3	LZW coding	4	Lecture	PPT & White board
5.4	Run Length coding	2	Lecture	Smart Board
5.5	Digital Image Watermarking.	2	Lecture	Black Board



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Non-Scho.							5	10 %
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SCHOLASTIC				NON - SCHOLASTIC	MARKS		
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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	To review the fundamental concepts of a digital image processing system.	K2	PSO1 & PSO2
CO 2	To examine various types of images, their intensity transformations and spatial filtering.	K2, K3, K4	PSO1 & PSO2
CO 3	To analyze the different types of noises and the filters used to restore and reconstruct the images.	K2 & K3	PSO1 & PSO3
CO 4	To create color images and pseudo images with smoothing and sharpening techniques.	K2, K3 & K5	PSO1 & PSO4
CO 5	To compare the various lossy and lossless compression mechanisms.	K2, K3 & K5	PSO1 & PSO5

COURSE DESIGNER:

Staff Name – S. SELVARANI

Forwarded By,

HOD'S Signature & Name

B. Chandra
(B. CHANDIRIKA)



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SKILL DEVELOPMENT-100%

GENERAL ELECTIVE - MCA

(For those who join in 2019 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	19MCAGE2 4	ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides the basic principles of artificial intelligence. It will cover problem solving paradigms, constraint propagation and search strategies in the areas of applications including knowledge representation, natural language processing, expert systems, vision and robotics.

COURSE OBJECTIVE

- ❖ To learn the methods of solving problems using Artificial Intelligence.
- ❖ To have an understanding of the basic issues of knowledge representation, blind and heuristic search.
- ❖ To have a basic proficiency in a traditional AI language and ability to write simple to intermediate programs in expert systems.

UNIT – I AI PROBLEMS AND PROBLEM CHARACTERISTICS (12 Hours)

The AI Problems – The underlying assumption - AI techniques – The level of the model – Criteria for success - Problems , Problem space and search – Defining the problem as a state space search – Production Systems – Problem



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characteristics – Production system characteristics – Issues in the design of search programs- Additional problems.

SELF STUDY : Problem characteristics

UNIT II SEARCH TECHNIQUES

(12 Hours)

Heuristic search techniques – Generate and test – Hill climbing – Best first search – Problem reduction – Constraint satisfaction – Means ends analysis. Knowledge Representation Issues- Representations and Mappings- Approaches to Knowledge Representation – Issues in Knowledge Representation – The Frame Problem.

SELF STUDY : Constraint satisfaction

UNIT III USING PREDICATE LOGIC

(12 Hours)

Using predicate logic – Representing simple facts in logic – Representing instance and ISA relationship – Computable functions and predicates – Resolution – Natural deduction – Representing knowledge – Using rules – Procedural versus declarative knowledge – Logic programming – forward versus backward reasoning – Matching – Control knowledge.

SELF STUDY : Natural deduction

UNIT IV FILLER STRUCTURE AND GAME PLAYING

(12 Hours)

Weak Slot and Filler Structure: Semantic Nets- Frames. Strong Slot and Filler Structure: Conceptual Dependency- Scripts-CYC. Game playing- The minimax search procedure- Adding alpha beta cutoffs- additional refinements- Iterative Deepening.

SELF STUDY : Scripts

UNIT V AI LEARNING AND EXPERT SYSTEMS

(12 Hours)

What is Learning – ROTE Learning - Learning by Taking Advice – Learning in Problem solving – Learning from Examples: Induction – Explanation-based



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Learning - Discovery – Analogy – Formal Learning Theory - Expert Systems –
Representing and using domain knowledge – Expert System Shells – Explanation –
Knowledge Acquisition.

SELF STUDY :Knowledge Acquisition

REFERENCES:

1. Elaine Rich, Kevin Knight, “Artificial Intelligence”, McGraw Hill Education Pvt Ltd, III Edition.
2. Mishra Ravi Bhushan, “Artificial Intelligence”, PHI learning Pvt. Ltd, 2011
3. Kaushik saroj, “Artificial Intelligence” , Cengage learning India Pvt. Ltd, 2011.

WEB REFERENCES:

1. [1.http://en.wikipedia.org/wiki/Artificial_intelligence](http://en.wikipedia.org/wiki/Artificial_intelligence)
2. [2. .http://www.cce.hw.ac.uk/~alison/ai3notes/subsection2_6_2_3.html](http://www.cce.hw.ac.uk/~alison/ai3notes/subsection2_6_2_3.html)
3. [3. 3.http://starbase.trincoll.edu/~ram/cpsc352/notes/heuristics.html](http://starbase.trincoll.edu/~ram/cpsc352/notes/heuristics.html)



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 AI PROBLEMS AND PROBLEM CHARACTERISTICS				
1.1	The AI Problems , The underlying assumption	2	Chalk & Talk	Black Board
1.2	AI techniques, The level of the model	2	Chalk & Talk	Black Board
1.3	Criteria for success ,Problems , Problem space and search	2	Lecture	White board
1.4	Defining the problem as a state space search ,Production Systems	2	Chalk & Talk	Black Board
1.5	Problem characteristics , Production system characteristics	2	Discussion	Black Board
1.6	Issues in the design of search programs, Additional problems.	2	Lecture	White board
UNIT - 2 SEARCH TECHNIQUES				
2.1	Heuristic search techniques , Generate and test	2	Lecture	PPT
2.2	Hill climbing , Best first search, Problem reduction	2	Chalk & Talk	Black Board



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2.3	Constraint satisfaction , Means ends analysis. Knowledge Representation Issues	2	Lecture	PPT
2.4	Representations and Mappings, Approaches to Knowledge Representation	3	Lecture	White board
2.5	Issues in Knowledge Representation , The Frame Problem.	3	Discussion	Black Board
UNIT – 3 USING PREDICATE LOGIC				
3.1	Using predicate logic , Representing simple facts in logic	1	Lecture	White board
3.2	Representing instance and ISA relationship	1	Chalk & Talk	Black Board
3.3	Computable functions and predicates	1	Lecture	PPT
3.4	Resolution , Natural deduction	1	Lecture	White board
3.5	Representing knowledge , Using rules	1	Discussion	Black Board
3.6	Procedural versus declarative knowledge	2	Lecture	PPT
3.7	Logic programming	1	Chalk & Talk	Black Board
3.8	forward versus backward reasoning	2	Lecture	White board



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3.9	Matching	1	Chalk & Talk	Black Board
3.10	Control knowledge	1	Chalk & Talk	Black Board
UNIT - 4 FILLER STRUCTURE AND GAME PLAYING				
4.1	Weak Slot and Filler Structure: Semantic Nets	1	Lecture	PPT
4.2	Frames.	2	Lecture	PPT
4.3	Strong Slot and Filler Structure: Conceptual Dependency	1	Chalk & Talk	Black Board
4.4	Scripts, CYC.	2	Chalk & Talk	Black Board
4.5	Game playing	1	Discussion	Black Board
4.6	The minimax search procedure	2	Lecture	PPT
4.7	Adding alpha beta cutoffs, additional refinements	2	Chalk & Talk	Black Board
4.8	Iterative Deepening.	1	Lecture	PPT
UNIT - 5 AI LEARNING AND EXPERT SYSTEMS				
5.1	What is Learning , ROTE Learning	2	Chalk & Talk	Black Board
5.2	Learning by Taking Advice , Learning in Problem solving	1	Lecture	PPT
5.3	Learning from Examples: Induction	1	Lecture	PPT
5.4	Explanation, based Learning ,	1	Lecture	White board



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	Discovery			
5.5	Analogy , Formal Learning Theory	2	Lecture	White board
5.6	Expert Systems	1	Lecture	White board
5.7	Representing and using domain knowledge	2	Lecture	White board
5.8	Expert System Shells	1	Chalk & Talk	Black Board
5.9	Explanation , Knowledge Acquisition	1	Chalk & Talk	Black Board



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	W1+ W2 5+5=10	Avg (M1 & M2) 10	Mid-Sem. Test 15	Once in a Sem. 10		5	50	
K1	-	-	-	-	-		-	-
K2	5	2	3	-	10		10	20 %
K3	5	3	4		12		12	24 %
K4	-	5	4	5	14		14	28%
K5	-	-	4	5	9		9	18 %
Non-Scho.							5	10 %
Total	10	10	15	10	45	5	50 mks.	100 %

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	10	15	10	5	50	50	100

C1 – Sum of Two Weekly Tests

C2 – Average of Two Monthly Tests

C3 - Mid Sem Test

C4 – Once in a semester (Seminar / Assignment)

C5 – Non - Scholastic



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Identify problems that are amenable to solution by AI methods.	K2	PSO1 & PSO2
CO 2	Formulate search problems and implement search algorithms using admissible heuristics.	K2, K3, K4	PSO1 & PSO2
CO 3	Design and carry out an empirical evaluation of different algorithms on a predicate logic and state the conclusions that the evaluation supports.	K2 & K3	PSO1 & PSO3
CO 4	Analyze games playing as adversarial search problems and implement optimal and efficient solutions.	K2, K3 & K5	PSO1 & PSO4
CO 5	Apply the concepts of Expert Systems in machine learning.	K2, K3 & K5	PSO1 & PSO5

COURSE DESIGNER:

Staff Name – R. SMEETA MARY

Forwarded By

HOD'S Signature & Name

B. Chandra
(B. CHANDIRIKA)



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SKILL DEVELOPMENT-100%

GENERAL ELECTIVE - MCA

(For those who join in 2019 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	19MCAGE25	SOFT COMPUTING	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides the principal constituents of soft computing that is fuzzy logic, neural network theory and probabilistic reasoning. The course explores the features that are employed in various associated techniques.

COURSE OBJECTIVE

- ❖ To master the various fundamental models of artificial neural networks.
- ❖ To cater the knowledge of Neural Networks and use these for controlling real time systems.
- ❖ To use the fuzzy logic and neural network for application related to design and manufacture.

UNIT – I FUNDAMENTALS OF NEURAL NETWORKS

(12 Hours)

Basic Concepts of Neural Networks – Human Brain - Model of An Artificial Neuron – Neural Network Architectures –Single Layer Feedforward Network – Multilayer Feedforward Network – Recurrent Networks - Learning Methods – Taxonomy of



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Neural Network Architectures –History of Neural Networks Research-Early Neural Networks Architectures – Rosenblatt's Perception – ADALINE Network – MADELINE Networks.

SELF STUDY :Single Layer Feedforward Network

UNIT II BACK PROPAGATION NETWORKS

(12 Hours)

Architecture of back propagation network – The Perceptron Model – The Solution – Single Layer Artificial Neural Network – Model for Multilayer Perceptron - Back Propagation Learning – Input Layer Computation – Hidden Layer Computation – Output Layer Computation – Calculation of Error – Training of Neural Network – Method of Steepest Descent – Effect of Learning Rate – Adding a Momentum Term – Backpropagation Algorithm - Applications – Design of Journal Bearing – Classification of Soil – Hot Extrusion of Steel - Selection Of Various Parameters in BPN – Number of Hidden Nodes – Momentum Coefficient – Sigmoidal Gain – Local Minima – Learning Coefficient.

SELF STUDY :Single Layer Artificial Neural Network

UNIT III ADAPTIVE REASONANCE THEORY

(12 Hours)

Introduction –Cluster Structure – Vector Quantization – Classical ART Networks – Simplified SRT Architecture - ART 1 – Architecture of ART1 – Special Features of ART1 Models – ART1 Algorithm - ART2 – Architecture – ART2 Algorithm - Applications –Character Recognition Using ART1 – Classification of Soil – Prediction of Load from Yield Line Patterns of Elastic Plastic Clamped Square Plate - Sensitivities of ordering of data.

SELF STUDY :Vector Quantization

UNIT IV

(12 Hours)

FUZZY LOGIC PRINCIPLES, CLASSICAL SETS AND FUZZY SETS



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The Case for Imprecision - A Historical Perspective - The Utility of Fuzzy Systems - Limitations of Fuzzy Systems - The Illusion: Ignoring Uncertainty and Accuracy - Uncertainty and Information - The Unknown - Fuzzy Sets and Membership - Chance Versus Fuzziness - Sets as Points in Hypercubes - Classical Sets –

Operations on Classical Sets - Properties of Classical (Crisp) Sets - Mapping of Classical Sets to Functions - Fuzzy Sets - Fuzzy Set Operations - Properties of Fuzzy Sets - Alternative Fuzzy Set Operations.

SELF STUDY :Limitations of Fuzzy Systems

UNIT V

(12 Hours)

CLASSICAL RELATIONS AND FUZZY RELATIONS, PROPERTIES OF MEMBERSHIP FUNCTIONS, FUZZIFICATION, AND DEFUZZIFICATION

Cartesian Product - Crisp Relations - Cardinality of Crisp Relations - Operations on Crisp Relations - Properties of Crisp Relations - Composition - Fuzzy Relations - Cardinality of Fuzzy Relations - Operations on Fuzzy Relations - Properties of Fuzzy Relations - Fuzzy Cartesian Product and Composition - Tolerance and Equivalence Relations - Crisp Equivalence Relation - Crisp Tolerance Relation .

Features of the Membership Function - Various Forms - Fuzzification - Defuzzification to Crisp Sets - λ -Cuts for Fuzzy Relations - Defuzzification to Scalars.

SELF STUDY :Cartesian Product.

REFERENCES:

1. Rajasekaran. S., Vijayalakshmi Pai. G.A. "Neural Networks, Fuzzy Logic and Genetic Algorithms", Prentice Hall of India Private Limited, 2003
2. Timothy J. Ross, "Fuzzy logic with Engineering Applications", McGraw Hill, 1995



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3. Klir.G, Yuan B.B. "Fuzzy sets and Fuzzy Logic Prentice Hall of India private limited, 1997.
4. LauranceFausett, "Fundamentals of Neural Networks", Prentice hall, 1992.
5. Gen, M. and Cheng R. "Genetic Algorithm and Engineering Design", john wiley 1997.

WEB REFERENCES:

1. http://en.wikipedia.org/wiki/Neural_network
2. http://en.wikipedia.org/wiki/Fuzzy_logic
3. <https://books.google.co.in/books?isbn=8120321863>

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 FUNDAMENTALS OF NEURAL NETWORKS				
1.1	Basic Concepts of Neural Networks , Human Brain	1	Chalk & Talk	Black Board
1.2	Model of An Artificial Neuron , Neural Network Architectures	2	Chalk & Talk	Black Board
1.3	Single Layer Feedforward Network , Multilayer Feedforward Network	1	Lecture	White board
1.4	Recurrent Networks , Learning Methods	1	Chalk & Talk	Black Board



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1.5	Taxonomy of Neural Network Architectures	2	Discussion	Black Board
1.6	History of Neural Networks Research	2	Lecture	White board
1.7	Early Neural Networks Architectures , Rosenblatt's Perception	1	Lecture	White board
1.8	ADALINE Network , MADELINE Networks	2	Discussion	Google classroom
UNIT - 2 BACK PROPAGATION NETWORKS				
2.1	Architecture of back propagation network , The Perceptron Model , The Solution	1	Lecture	PPT
2.2	Single Layer Artificial Neural Network , Model for Multilayer Perceptron	2	Chalk & Talk	Black Board
2.3	Back Propagation Learning , Input Layer Computation , Hidden Layer Computation	2	Lecture	PPT
2.4	Output Layer Computation , Calculation of Error , Training of Neural Network	1	Lecture	White board



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2.5	Method of Steepest Descent , Effect of Learning Rate	1	Discussion	Black Board
2.6	Adding a Momentum Term , Backpropagation Algorithm , Applications	1	Chalk & Talk	Black Board
2.7	Design of Journal Bearing , Classification of Soil , Hot Extrusion of Steel	2	Chalk & Talk	Black Board
2.8	Selection Of Various Parameters in BPN , Number of Hidden Nodes , Momentum Coefficient	1	Lecture	PPT
2.9	Sigmoidal Gain , Local Minima , Learning Coefficient	1	Lecture	PPT
UNIT – 3ADAPTIVE REASONANCE THEORY				
3.1	Introduction , Cluster Structure	1	Lecture	White board
3.2	Vector Quantization , Classical ART Networks	1	Chalk & Talk	Black Board
3.3	Simplified SRT Architecture , ART 1 , Architecture of ART1	2	Lecture	PPT
3.4	Special Features of ART1 Models , ART1 Algorithm	2	Lecture	White board
3.5	ART2 , Architecture , ART2	2	Discussion	Black Board



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	Algorithm , Applications			
3.6	Character Recognition Using ART1 , Classification of Soil	2	Lecture	PPT
3.7	Prediction of Load from Yield Line Patterns of Elastic Plastic Clamped Square Plate	1	Chalk & Talk	Black Board
3.8	Sensitivities of ordering of data	1	Lecture	White board
UNIT - 4 Fuzzy Logic Principles, Classical Sets And Fuzzy Sets				
4.1	The Case for Imprecision , A Historical Perspective	2	Lecture	PPT
4.2	The Utility of Fuzzy Systems , Limitations of Fuzzy Systems	2	Lecture	PPT
4.3	The Illusion: Ignoring Uncertainty and Accuracy	1	Chalk & Talk	Black Board
4.4	Uncertainty and Information , The Unknown , Fuzzy Sets and Membership	1	Chalk & Talk	Black Board
4.5	Chance Versus Fuzziness , Sets as Points in Hypercubes	1	Discussion	Black Board
4.6	Classical Sets , Operations on Classical Sets	1	Lecture	PPT
4.7	Properties of Classical (Crisp) Sets , Mapping of Classical Sets to	1	Chalk & Talk	Black Board



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	Functions			
4.8	Fuzzy Sets , Fuzzy Set Operations	1	Lecture	PPT
4.9	Properties of Fuzzy Sets , Alternative Fuzzy Set Operations	2	Lecture	PPT
UNIT – 5 Classical Relations And Fuzzy Relations, Properties of Membership Functions, Fuzzification, And Defuzzification				
5.1	Cartesian Product , Crisp Relations	1	Chalk & Talk	Black Board
5.2	Cardinality of Crisp Relations , Operations on Crisp Relations	1	Lecture	PPT
5.3	Properties of Crisp Relations , Composition	1	Lecture	PPT
5.4	Fuzzy Relations , Cardinality of Fuzzy Relations	1	Lecture	White board
5.5	Operations on Fuzzy Relations , Properties of Fuzzy Relations	2	Lecture	White board
5.6	Fuzzy Cartesian Product and Composition	1	Lecture	White board
5.7	Tolerance and Equivalence Relations , Crisp Equivalence Relation	1	Lecture	White board
5.8	Crisp Tolerance Relation . Features of the Membership Function	1	Chalk & Talk	Black Board



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5.9	Various Forms , Fuzzification	1	Chalk & Talk	Black Board
5.10	Defuzzification to Crisp Sets , λ -Cuts for Fuzzy Relations	1	Discussion	Black Board
5.11	Defuzzification to Scalars	1	Chalk & Talk	Black Board



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	W1+ W2 5+5=10	Avg (M1 & M2) 10	Mid-Sem. Test 15	Once in a Sem. 10		5	50	
K1	-	-	-	-	-		-	-
K2	5	2	3	-	10		10	20 %
K3	5	3	4		12		12	24 %
K4	-	5	4	5	14		14	28 %
K5	-	-	4	5	9		9	18 %
Non-Scho.							5	10 %
Total	10	10	15	10	45	5	50 mks.	100 %

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	10	15	10	5	50	50	100

C1 – Sum of Two Weekly Tests

C2 – Average of Two Monthly Tests

C3 - Mid Sem Test

C4 – Once in a semester (Seminar / Assignment)

C5 – Non – Scholastic



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explore the functional components of artificial neural networks..	K2	PSO1 & PSO2
CO 2	Examine the principles of back propagation networks.	K2, K3, K4	PSO1 & PSO2
CO 3	Expose the students to the concepts of predicting the functionalities of ART.	K2 & K3	PSO1 & PSO3
CO 4	Analyze the logic principle of classical sets and fuzzy set operations in fuzzy set theory.	K2, K3 & K5	PSO1 & PSO4
CO 5	Identify the concept of fuzzification and defuzzification involved in various systems.	K2,K3 & K5	PSO1 & PSO5

COURSE DESIGNER:

Staff Name – R. SMEETA MARY

Forwarded By

HOD'S Signature & Name

B. Chandra
(B. CHANDIRIKA)



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SKILL DEVELOPMENT-100%

GENERAL ELECTIVE - MCA

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	19MCAGE26	CLOUD COMPUTING	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides a comprehensive study of cloud concepts and capabilities across the various Cloud service models including Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS), and Identity as a Service (IDaaS).

COURSE OBJECTIVES

- ❖ To introduce the broad perceptive of cloud architecture and model
- ❖ To Gain knowledge on the concept of Virtualization and design of cloud Services
- ❖ To understand the issues on cloud storage & security.

UNIT –I

(12 HRS.)

BASICS OF CLOUD COMPUTING AND CLOUD ARCHITECTURE

Defining Cloud Computing - Cloud Types - The NIST model - The Cloud Cube Model Deployment models Service models -Examining the Characteristics of Cloud Computing - Paradigm shift Benefits of cloud computing Disadvantages of cloud computing - Assessing the Role of Open Standards



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Understanding Cloud Architecture - Exploring the Cloud Computing Stack - Infrastructure - Platforms - Virtual Appliances - Communication Protocols - Applications

SELF STUDY :Connecting to Cloud - The Jolicloud Netbook OS - Chromium OS

UNIT -II CLOUD SERVICES AND APPLICATIONS (12 HRS.)

Understanding Services and Applications by Type - Defining Infrastructure as a Service (IaaS) - IaaS workloads - Pods, aggregation, and silos - Defining Platform as a Service (PaaS) - Defining Software as a Service (SaaS) - SaaS characteristics - Open SaaS and SOA - Salesforce.com and CRM SaaS

SELF STUDY :Defining Identity as a Service (IDaaS) - IDaaS interoperability - User authentication and Authorization

UNIT -III ABSTRACTION VS. VIRTUALIZATION (12 HRS.)

Understanding Abstraction and Virtualization - Using Virtualization Technologies - Load Balancing and Virtualization - Advanced load balancing - The Google cloud - Understanding Hypervisors -Virtual machine types - VMware vSphere - Understanding Machine Imaging - Porting Applications - The Simple Cloud API - AppZero Virtual Application Appliance

Using PaaS Application Frameworks - Drupal - Using SaaS Application Frameworks - Google App Engine - Using IaaS Application Frameworks - Amazon Elastic Compute Cloud (EC2) - Windows Azure.

SELF STUDY :Virtualization Practicum

UNIT -IV CLOUD MANAGEMENT AND CLOUD SECURITY (12 HRS.)



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Managing the Cloud - Administrating the Clouds - Management responsibilities - Lifecycle management - Cloud Management Product - Emerging Cloud Management Standards - Cloud Security - Securing the Cloud - The security boundary - Security service boundary - Security mapping - Securing Data - Brokered cloud storage access - Storage location and tenancy - Encryption - Auditing and compliance

SELF STUDY :DMTF cloud management standards - Cloud Commons and SMI

UNIT –V

(12 HRS.)

CLOUD BASED STORAGE AND COMMUNICATING WITH CLOUD

Working with Cloud-Based Storage -- Cloud storage in the Digital Universe - Cloud storage definition - Provisioning Cloud Storage - Unmanaged cloud storage - Managed cloud storage - Creating cloud storage systems - Virtual storage containers -Exploring Cloud Backup Solutions - Backup types -Cloud backup features - Cloud attached backup - Cloud Storage Interoperability - Cloud Data Management Interface (CDMI) -Open Cloud Computing Interface (OCCI) - Communicating with the Cloud - Exploring Instant Messaging - Instant messaging clients - Instant messaging interoperability - Micro-blogs or Short Message Services - Exploring Collaboration Technologies

SELF STUDY :Using Social Networks - Features - List of social networking sites - Privacy and security - Interaction and interoperability

REFERENCES:

1. Barrie Sosinsky, "Cloud Computing Bible", Wiley India Pvt. Ltd, 2013.
2. John W.RittingHouse, James F.Ransome, "Cloud Computing Implementation, Management and Security", CRC Press, 2013.
3. Kris Jamsa, Jones & Bartlett, "Cloud Computing", Learning Publishers 2014.
4. Anthony T. Velte, Toby J. Velte, RoberElsenpeter, "Cloud Computing – A Practical Approach", Mc Graw Hill publications, 2013.



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5. Rajkumarbuyya, James Broberg, Andrzej Goscinski, “ Computing Principles & Paradigms”, Wiley India Pvt. Ltd., 2013.

WEB REFERENCES :

1. <https://lecturenotes.in/subject/366/cloud-computing-cc>
2. <https://www.guru99.com/cloud-computing-for-beginners.html>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 BASICS OF CLOUD COMPUTING AND CLOUD ARCHITECTURE				
1.1	Defining Cloud Computing and its types	1	Chalk & Talk	Black Board
1.2	The NIST model	1	PPT	LCD
1.3	The Cloud Cube Model	2	Flipped Classroom	LMS tool - Edmodo and LCD
1.4	Characteristics of Cloud Computing	1	PPT	LMS tool - Edmodo and LCD
1.5	Assessing the Role of Open Standards	1	Group Discussion	White Board
1.6	Cloud Architecture	2	Flipped Classroom	LMS tool - Edmodo and LCD
1.7	Cloud Computing Stack	1	PPT	LMS tool - Edmodo and LCD
1.8	Infrastructure - Platforms , Virtual Appliances, Communication Protocols, Applications	2	Brain Storming and Mind mapping	White Board
1.9	Connecting to the Cloud - The Jolicloud Netbook OS - Chromium	1	Lecture	Presentation



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	OS			using PPT
UNIT -2 CLOUD SERVICES AND APPLICATIONS				
2.1	Understanding Services and Applications by Type	2	Flipped Classroom	LMS tool - Edmodo and LCD
2.2	Infrastructure as a Service (IaaS)	2	Flipped Classroom	LMS tool - Edmodo and LCD
2.3	Platform as a Service (PaaS)	2	Flipped Classroom	LMS tool - Edmodo and LCD
2.4	Software as a Service (SaaS)	2	Flipped Classroom	LMS tool - Edmodo and LCD
2.5	Open SaaS and SOA	2	PPT	LMS tool - Edmodo and LCD
2.6	Salesforce.com and CRM SaaS	1	PPT	LMS tool - Edmodo and LCD
2.7	Identity as a Service (IDaaS)	1	Lecture	Presentation using PPT
UNIT -3 ABSTRACTION VS. VIRTUALIZATION				
3.1	Understanding Abstraction and Virtualization	1	Flipped Classroom	LMS tool - Edmodo and LCD
3.2	Using Virtualization Technologies	1	Flipped	LMS tool -



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			Classroom	Edmodo and LCD
3.3	Load Balancing and Virtualization - Advanced load balancing	2	PPT	LMS tool - Edmodo and LCD
3.4	The Google cloud	1	PPT	LMS tool - Edmodo and LCD
3.5	Understanding Hypervisors - Virtual machine types - VMware vSphere	1	Chalk and Talk	Blackboard
3.6	Understanding Machine Imaging - Porting Applications - The Simple Cloud API - AppZero Virtual Application Appliance	2	PPT	LMS tool - Edmodo and LCD
3.7	PaaS Application Frameworks – Drupal	1	Flipped Classroom	LMS tool - Edmodo and LCD
3.8	SaaS Application Frameworks - Google App Engine –	1	Flipped Classroom	LMS tool - Edmodo and LCD
3.9	IaaS Application Frameworks - Amazon Elastic Compute Cloud (EC2) , Windows Azure	1	Flipped Classroom	LMS tool - Edmodo and LCD
3.10	Virtualization Practicum	1	Lecture	Presentation using PPT
UNIT - 4 CLOUD MANAGEMENT AND CLOUD SECURITY				
4.1	Managing the Cloud - Administrating the Clouds	1	Chalk and Talk	Blackboard



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4.2	Management responsibilities	1	Chalk and Talk	Blackboard
4.3	Lifecycle management	1	Chalk and Talk	Blackboard
4.4	Cloud Management Product	1	Flipped Classroom	LMS tool - Edmodo and LCD
4.5	Emerging Cloud Management Standards	1	PPT	LMS tool - Edmodo and LCD
4.6	Cloud Security - Securing the Cloud	1	PPT	LMS tool - Edmodo and LCD
4.7	The security boundary - Security service boundary - Security mapping	2	PPT	LMS tool - Edmodo and LCD
4.8	Securing Data	1	Flipped Classroom	LMS tool - Edmodo and LCD
4.9	Brokered cloud storage access - Storage location and tenancy	1	Flipped Classroom	LMS tool - Edmodo and LCD
4.10	Encryption - Auditing and compliance	1	Flipped Classroom	LMS tool - Edmodo and LCD
4.11	DMTF cloud management standards - Cloud Commons and SMI	1	Lecture	Presentation using PPT
UNIT - 5 CLOUD BASED STORAGE AND COMMUNICATING WITH CLOUD				
5.1	Working with Cloud-Based Storage -- Cloud storage in the	1	Flipped	LMS tool - Edmodo and



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	Digital Universe		Classroom	LCD
5.2	Cloud storage definition - Provisioning Cloud Storage - Unmanaged cloud storage - Managed cloud storage	1	Flipped Classroom	LMS tool - Edmodo and LCD
5.3	Creating cloud storage systems - Virtual storage containers	1	Flipped Classroom	LMS tool - Edmodo and LCD
5.4	Exploring Cloud Backup Solutions - Backup types -Cloud backup features - Cloud attached backup	2	PPT	LMS tool - Edmodo and LCD
5.5	Cloud Storage Interoperability - Cloud Data Management Interface (CDMI) -Open Cloud Computing Interface (OCCI)	2	PPT	LMS tool - Edmodo and LCD
5.6	Communicating with the Cloud - Exploring Instant Messaging - Instant messaging clients	2	PPT	LMS tool - Edmodo and LCD
5.7	Instant messaging interoperability - Micro-blogs or Short Message Services	1	PPT	LMS tool - Edmodo and LCD
5.8	Exploring Collaboration Technologies	1	PPT	LMS tool - Edmodo and LCD
5.9	Using Social Networks - Features - List of social networking sites - Privacy and security - Interaction and interoperability	1	Lecture	Presentation using PPT



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Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	W1+ W2 5+5=10	Avg (M1 & M2) 10	Mid-Sem. Test 15	Once in a Sem. 10		5	50	
K1	-	-	-	-	-		-	-
K2	5	2	3	-	10		10	20 %
K3	5	3	4		12		12	24 %
K4	-	5	4	5	14		14	28%
K5	-	-	4	5	9		9	18 %
Non-Scho.							5	10 %
Total	10	10	15	10	45	5	50 mks.	100 %

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :

K2-Understand, K3-Apply, K4-Analyse, K5 – Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	10	15	10	5	50	50	100

C1 – Sum of Two Weekly Tests

C2 – Average of Two Monthly Tests

C3 - Mid Sem Test

C4 – Once in a semester (Seminar / Assignment)

C5 – Non - Scholastic



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Examine the characteristics of Cloud Computing and the architecture	K1	PSO1
CO 2	Define Infrastructure and Identify service models.	K1, K2	PSO2, PSO3
CO 3	Relate abstraction and virtualization and cloud computing frameworks.	K1 & K3	PSO3
CO 4	Manage and administrate cloud.	K1, K2, K3	PSO4, PSO5
CO 5	Explore cloud based storage and collaboration technologies.	K2 & K4	PSO3, PSO4

COURSE DESIGNER:

Dr.D.Jeya Mala

Forwarded By

HOD'S Signature & Name

B. Chandirika
(B.CHANDIRIKA)



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SKILL DEVELOPMENT-100%

GENERAL ELECTIVE - MCA

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
MCA	19MCAGE27	ADVANCED DBMS TECHNIQUES	GENERAL ELECTIVE	4	4

COURSE DESCRIPTION

This course provides knowledge on the advanced topics of DBMS including query optimization, concurrency, complex queries, transaction management, organization of database systems and advanced indexing.

COURSE OBJECTIVES

- ❖ To learn the concept of data models and the advanced relational designs.
- ❖ To understand the internal storage structures using different file and indexing techniques which will help in physical DB design.
- ❖ To have an introductory knowledge about the storage, query processing techniques, transaction processing, and concurrency control and recovery procedures.

UNIT I ADVANCED DESIGN AND QUERY LANGUAGES

(12 Hours)



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Advanced Relational Database Design – Multivalued Dependencies – Theory – Rules – Dependency Preservation – Join Dependencies – Definition – Project Join Normal Form Domain Key Normal Form – Domain Declaration – Key Declarations – General Constraints

SELF STUDY: Relational Operations

UNIT II DATABASE MODELS

(12 Hours)

Network Model - Basic Concepts – Data Structure Diagrams - The Database Task Group (DBTG) CODASYL Model – Data Retrieval – Update Facility – Set Processing Facility – Mapping of Networks to Files – Hierarchical Model – Basic Concepts – Tree Structure Diagrams – Data-Retrieval – Update Facility – Virtual Records – Mapping of Hierarchy to Files.

SELF STUDY: Relational Operations

UNIT III

(12 Hours)

DATA STORAGE AND QUERYING (IMPLEMENTATION TECHNIQUES)

Storage – Physical Storage Media– File Organization – Indexing Basic Concepts – Ordered Indices – Multiple Key Access – Multiple Single Key Indices – Indices on Multiple Keys – Covering Indices – Static Hashing – Hash Functions – Bucket Overflow – Hash Indices – Dynamic Hashing – Data Structures – Queries and Updates – Static Vs Dynamic Hashing.

SELF STUDY: RAID

UNIT IV TRANSACTION MANAGEMENT

(12 Hours)

Transaction Concept – Simple Transaction Protocol – Transaction Atomicity Durability – Transaction Isolation – Serializability – Concurrency Control – Lock Based Protocols – Timestamp Based Protocols — Recovery System – Recovery and Atomicity – Recovery Algorithm – Buffer Management.

SELF STUDY: Validation Based Protocols



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UNIT VADVANCED DATABASES

(12 Hours)

Parallel Databases – I/O Parallelism – Interquery parallelism – Intraquery parallelism Distributed Databases – Homogenous Databases – Heterogeneous Databases – Cloud Based Databases – Specialty Databases – Object Based Databases – Structured types and Inheritance in SQL - Reference Types.

SELF STUDY: Complex Data types

REFERENCES :

1. Abraham Silberschatz, Henry F. Korth, S.Sudarshan, “Database System Concepts”, Tata McGraw Hill publishers, 6th Edition, 2015.
2. R. Elmasri, S.B. Navathe, “Fundamentals of Database Systems”, Addison-Wesley, 2011.
3. Raghu Ramakrishnan, “Database Management Systems”, 4th Edition, McGraw-Hill College Publications, 2015.

WEB REFERENCES :

1. <https://tutorialspoint.com/dbms/>
2. <https://wileyindia.com/advanced-database-management-systemm.html>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 ADVANCES DESIGN AND QUERY LANGUAGES				
1.1	Advanced Relational Database Design	1	Chalk & Talk	Black Board
1.2	Multivalued Dependencies	1	Chalk & Talk	LCD
1.3	Theory – Rules	4	Lecture	PPT & White board
1.4	Dependency Preservation	1	Lecture	Smart Board
1.5	Join Dependencies	1	Lecture	Black Board
1.6	Definition – Project Join Normal Form Domain Key Normal Form	1	Discussion	Google classroom
1.7	Domain Declaration – Key Declarations	2	Lecture	Black Board
1.8	General Constraints	1	Lecture	Black Board
UNIT –2Database Models				
2.1	Network Model	1	Chalk & Talk	Black Board
2.2	Basic Concepts – Data Structure	1	Chalk &	LCD



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	Diagrams		Talk	
2.3	The Database Task Group (DBTG) CODASYL Model	4	Lecture	PPT & White board
2.4	Data Retrieval – Update Facility	1	Lecture	Smart Board
2.5	Set Processing Facility – Mapping of Networks to Files	1	Lecture	Black Board
2.6	Hierarchical Model – Basic Concepts	1	Discussion	Google classroom
2.7	Tree Structure Diagrams – Data-Retrieval	2	Lecture	Black Board
2.8	Update Facility – Virtual Records	1	Discussion	Black Board
2.9	Mapping of Hierarchy to Files.	1	Lecture	Black Board
UNIT –3Data Storage and Querying (Implementation Techniques)				
3.1	Storage – Physical Storage Media	1	Chalk & Talk	Black Board
3.2	RAID – File Organization	1	Chalk & Talk	LCD
3.3	Indexing Basic Concepts – Ordered Indices	4	Lecture	PPT & White board
3.4	Multiple Key Access – Multiple Single Key Indices	1	Lecture	Smart Board
3.5	Indices on Multiple Keys-Covering	1	Lecture	Black



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	Indices			Board
3.6	Static Hashing – Hash Functions	1	Discussion	Google classroom
3.7	Bucket Overflow – Hash Indices	2	Lecture	Black Board
3.8	Dynamic Hashing – Data Structures	1	Discussion	Black Board
3.9	Queries and Updates – Static Vs Dynamic Hashing.	2	Discussion	Google classroom
UNIT –4Transaction Management				
4.1	Transaction Concept	1	Chalk & Talk	Black Board
4.2	Simple Transaction Protocol	1	Chalk & Talk	LCD
4.3	Transaction Atomicity Durability- Transaction Isolation	4	Lecture	PPT & White board
4.4	Serializability- Concurrency Control	1	Lecture	Smart Board
4.5	Lock Based Protocols – Timestamp Based Protocols	1	Lecture	Black Board
4.6	Validation Based Protocols – Recovery System	1	Discussion	Google classroom
4.7	Recovery and Atomicity	2	Lecture	Black Board
4.8	Recovery Algorithm – Buffer Management.	1	Discussion	Black Board



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UNIT –5Advanced Databases				
5.1	Parallel Databases – I/O Parallelism	1	Chalk &Talk	Black Board
5.2	Interquery parallelism	1	Chalk & Talk	LCD
5.3	Intraquery parallelism Distributed Databases	4	Lecture	PPT & White board
5.4	Homogenous Databases – Heterogeneous Databases	1	Lecture	Smart Board
5.5	Cloud Based Databases – Specialty Databases.	1	Lecture	Black Board
5.6	Object Based Databases – Complex Data types	1	Lecture	Black Board
5.7	Structured types and Inheritance in SQL	2	Lecture	PPT & White board
5.8	Object Identity and Reference Types in SQL	1	Lecture	Black Board



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K2	5	2	3	-	10		10	20 %
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K4	-	5	4	5	14		14	28%
K5	-	-	4	5	9		9	18 %
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Non Scholastic	5
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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Design the basic concepts of the advanced database design and dependencies.	K2	PSO1 & PSO2
CO 2	Compare the different data models	K2, K3, K4	PSO1 & PSO2
CO 3	Compile the implementation concepts of storage structures	K2 & K3	PSO1 & PSO3
CO 4	Analyze on the advanced transaction management techniques	K2, K3 & K5	PSO1 & PSO4
CO 5	Discuss on the advanced databases	K2, K3 & K5	PSO1 & PSO5

COURSE DESIGNER:

Staff Name – S. SELVARANI

Forwarded By

HOD'S Signature & Name

B. Chandirika
(B. CHANDIRIKA)



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SKILL DEVELOPMENT-100%

III MCA

SEMESTER – V

(For those who join in 2019 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	19MCA504	LAB IX- PYTHONFOR MACHINE LEARNING	MAJOR LAB	6	3

COURSE DESCRIPTION

This course provides experiential learning and implementation of machine learning concepts using python

COURSE OBJECTIVE

- ❖ To Acquire knowledge and Skills for creation of Web applications.
- ❖ To implement Regression and Classification using Python

LAB LIST

1. Exercise to develop simple web applications in Python
2. Exercise to manipulate data using different queries
3. Exercises to handle Exceptions, Multithreading
4. Exercise to extract features from datasets
5. Exercise to implement Regression



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6. Exercise to implement Classification
7. Exercise to implement Clustering
8. Exercises for Model selection and evaluation
9. Exercises to Build a data pipeline.

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Demonstrate the concept of classification & clustering in Python	K2	PSO1, PSO2 & PSO3
CO 2	Analyse and Evaluate the models built.	K2, K3, K4	PSO1 & PSO2
CO 3	Create classification and clustering models	K2, K3& K5	PSO4 & PSO5

COURSE DESIGNER:

Staff Name – S. JEBAPRIYA

Forwarded By

HOD'S Signature & Name

B. Chandirika
(B.CHANDIRIKA)



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EMPLOYABILITY-100%

III MCA SEMESTER – V

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
MCA	19MCA505	LAB X – ENTERPRISE APPLICATION DEVELOPMENT	MAJOR LAB	6	3

COURSE DESCRIPTION

This lab course provides the experience in creating, debugging, testing & deploying dynamic web applications. It also gives thorough coverage of the use of MVC for creating web applications.

COURSE OBJECTIVE

- ❖ To design applications using J2EE, Struts and Hibernate.
- ❖ To develop a web application with n-tier architecture.
- ❖ To develop a simple application using Spring MVC.



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LAB LIST

1. Create a program to connect with database and manipulate the records in the database using ADO.NET
2. Develop a car showroom inventory web application with 2-tier architecture
3. Develop a real estate web application with n-tier architecture
4. Develop a simple Spring MVC application that take user input and checks the input using standard validation annotations
5. Design a student identity management web application using struts framework. The application should be able to provide an identity such as student id, access to department assets with department id, access to lab assets with lab id.
6. Create a simple online bookstore using Django as a back end.
7. Creating a Java Application using Hibernate technology.
8. Example for Basic Hibernate CRUD operations.
9. Example for Spring Dependency Injection and Types
10. Example for Simple spring JDBC program



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Perform Database operations for web applications using MVC	K2	PSO1
CO 2	Develop database application using Spring JDBC/Struts with CURD functionality.	K2, K3, K4	PSO2
CO 3	Enable multilingual websites by using its built-in internationalization system	K2 & K3	PSO3

COURSE DESIGNER:

Staff Name – S. MARY HELAN FELISTA

Forwarded By
HOD'S Signature &Name

B. Chandra
(B. CHANDIRIKA)



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SKILL DEVELOPMENT-100%

III MCA

SEMESTER – V

(For those who join in 2019 onwards)

PROGRAMM E CODE	COURSE CODE	COURSE TITLE	CATEGOR Y	HRS/WEE K	CREDIT S
MCA	19MCA50 6	SKILL BASED LAB V - R PROGRAMMIN G	SKILL BASED LAB	2	1

COURSE DESCRIPTION

This course provides an in-depth knowledge on the basic constructs and statistical analysis in R.

COURSE OBJECTIVE

- ❖ Understand the basic constructs of R Programming.
- ❖ Analyze the statistical operations using R.

LAB LIST

1. Exercises to understand the R basics.
2. Exercises to understand the programming constructs of R
3. Exercises to draw a scatter diagram and charts.
4. Exercises to implement statistical operations in R
5. Exercises to implement concepts of probability and distributions in R



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Demonstrate the practical application of R programming tool.	K1	PSO1& PSO2
CO 2	Emphasize the implementation of statistical operations in R	K1, K2,	PSO3

COURSE DESIGNER:

Staff Name – B. USHA

Forwarded By
HOD'S Signature & Name

B. Chandra
(B. CHANDIRIKA)



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SKILL DEVELOPMENT-100%

III MCA

SEMESTER -V

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
MCA	19MCA507	SOFT SKILLS V - INTERPERSONAL SKILLS FOR CORPORATE READINESS	SOFT SKILLS	2	1

COURSE DESCRIPTION

This course provides the skills needed to find a job and also the skills needed to excel at the time of entering a career.

COURSE OBJECTIVES

- ❖ To impart the importance of Interpersonal skills in the working environment

UNIT- I Simulating an Interview

Telephone Interviews

- d. How to dress
- e. Body language
- f. Case Interview



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UNIT - II Team Skills Development

- f. Quick plan exercise
- g. Group connections activity
- h. Coded team communication activity
- i. Personality tree exercise
- j. Management and leadership training

UNIT – III Time Management Skills

- c. Individual Target achievement activity
- d. Group Target activity



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 Simulating an Interview				
1.1	Telephone Interviews	1	Chalk & Talk	Black Board
1.2	How to dress	1	Chalk & Talk	LCD
1.3	Body language	4	Lecture	PPT & White board
1.4	Case Interview	1	Lecture	Smart Board
UNIT -2 Team Skills Development				
2.1	Quick plan exercise	1	Lecture	Green Board Charts
2.2	Group connections activity	2	Chalk & Talk	Green Board
2.3	Coded team communication activity	1	Lecture	Smart Board
2.4	Personality tree exercise	1	Lecture	Black Board
2.5	Management and leadership training	2	Discussion	Google classroom



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2.1	Quick plan exercise	1	Lecture	Green Board Charts
2.2	Group connections activity	2	Chalk & Talk	Green Board
2.3	Coded team communication activity	1	Lecture	Smart Board
2.4	Personality tree exercise	1	Lecture	Black Board
2.5	Management and leadership training	2	Discussion	Google classroom
UNIT -3Time Management Skills				
3.1	Individual Target achievement activity	5	Discussion	Google classroom
3.2	Group Target activity	4	Discussion	Google classroom



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COURSE OUTCOMES

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Develop skills for producing high quality etiquettes at the time of interviews	K2	PSO1, PSO2 & PSO3
CO 2	Exhibit competencies expected by employers	K2, K3, K4	PSO1 & PSO2
CO 3	Demonstrate emotional intelligence and inter cultural competencies and to be ready to work in teams	K2, K3 & K5	PSO4 & PSO5

COURSE DESIGNER:

Staff Name - S. SELVARANI

Forwarded By

HOD'S Signature & Name

B. Chandra
(B. CHANDIRIKA)



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SKILL DEVELOPMENT-100%

III MCA

SEMESTER – VI

(For those who join in 2019 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	19MCA602	INTERNET OF THINGS	MAJOR CORE	-	4

COURSE DESCRIPTION

This course provides the knowledge required to design an IOT system to connect embedded sensors.

COURSE OBJECTIVE

- ❖ Learn the fundamentals of IoT
- ❖ Understand the design methodology of IoT applications
- ❖ Design IoT applications using Raspberry Pi

UNIT – IFUNDAMENTALS OF IOT

(12 Hours)

Introduction-Characteristics-Physical design – Things in IoT - Protocols – Logical design of IoT – Functional blocks – communication models – communication API s – IoT Enabling technologies – IoT Levels and deployment templates.

SELF STUDY: Characteristics



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UNIT - II DOMAIN SPECIFIC IOTs

(12 Hours)

Domain Specific IoTs – Introduction – Home Automation – Cities – Environment – Energy – Retail – Logistics – Agriculture – Industry – Health and Life style
IoT and M2M – Introduction – M2M – Difference between IoT and M2M – SDN and NFV for IoT.

SELF STUDY: Home Automation

UNIT – III IOT PLATFORMS DESIGN METHODOLOGY

(12 Hours)

Introduction – IoT Design Methodology-IOT physical devices and Endpoints – IoT Device – Raspberry Pi – Linux on Raspberry Pi – Raspberry Pi interfaces – Programming Raspberry Pi with Python.

SELF STUDY: IoT Device

UNIT – IV IOT PHYSICAL SERVERS AND CLOUD OFFERINGS

(12 Hours)

Introduction to cloud storage models and communication APIs – Python web application framework – Django – Designing a RESTful web API – Amazon web services for IoT

SELF STUDY: Introduction to cloud storage

UNIT – V CASE STUDIES ILLUSTRATING IOT DESIGN

(12 Hours)

Introduction – Home automation – Cities – Environment – Agriculture – Productivity Applications.

SELF STUDY: Agriculture



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REFERENCES:

1. ArshdeepBahga, Vijay Madiseti, "Internet of Things – A hands-on approach", Hyderabad Universities Press, 2015
2. HonboZhou, "The Internet of Things in the Cloud : A Middleware Perspective", Newyork : CRC Press , 2012
3. Dieter Uckelmann; Mark Harrison; Florian Michahelles (Eds.) "Architecting the Internet of Things", Germany: Springer, 2011.
4. David Easley and Jon Kleinberg, " Networks, Crowds, and Markets: Reasoning About a Highly Connected World" United Kingdom: Cambridge University Press, 2010
5. Olivier Hersent, Omar Elloumi and David Boswarthick, "The Internet of Things: Applications to the Smart Grid and Building Automation", United States : Wiley Publishing Inc, 2012

WEB REFERENCES:

1. <https://lecturenotes.in/subject/370/internet-of-things-iot>
2. <http://www.cs.ust.hk/~qianzh/FYTGS5100/spr2013/notes/Chapter1-IoT.pdf>



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COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 Fundamentals of IOT				
1.1	Introduction	1	Lecture	Black Board
1.2	Physical design	1	Lecture	White board
1.3	Things in IoT- Protocols	1	Lecture	PPT
1.4	Logical design of IoT	1	Lecture	PPT
1.5	Functional blocks	2	Lecture	PPT
1.6	communication models	1	Lecture	White board
1.7	communication API s	2	Lecture	PPT
1.8	IoT Enabling technologies	2	Chalk & Talk	Black Board
1.9	IoT Levels and deployment templates	1	Chalk & Talk	Black Board
UNIT 2 - Domain Specific IoTs				
2.1	Domain Specific IoTs	1	Lecture	PPT
2.2	Introduction	2	Chalk & Talk	Black Board
2.3	Cities – Environment	1	Lecture	PPT
2.4	Energy – Retail	2	Lecture	White board
2.5	Logistics	1	Discussion	Black Board
2.6	Agriculture – Industry	1	Chalk & Talk	Black Board
2.7	IoT and M2M	1	Chalk & Talk	Black Board



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2.8	Introduction – M2M	1	Lecture	PPT
2.9	Difference between IoT and M2M	1	Chalk & Talk	Black Board
2.10	SDN and NFV for IoT.	1	Chalk & Talk	Black Board
UNIT 3 - IOT platforms design methodology				
3.1	Introduction	1	Lecture	White board
3.2	IoT Design Methodology	2	Chalk & Talk	Black Board
3.3	IOT physical devices and Endpoints	1	Lecture	PPT
3.4	Raspberry Pi	2	Lecture	White board
3.5	Linux on Raspberry Pi	2	Discussion	Black Board
3.6	Raspberry Pi interfaces	2	Lecture	PPT
3.7	Programming Raspberry Pi with Python	2	Chalk & Talk	Black Board
UNIT 4 - IoT physical servers and cloud offerings				
4.1	Communication API s	2	Lecture	PPT
4.2	Python web application framework	2	Lecture	PPT
4.3	Django	3	Lecture	Black Board
4.4	Designing a RESTful web API	3	Lecture	PPT
4.5	Amazon web services for IoT	2	Lecture	White board
UNIT -5 Case Studies illustrating IoT design				
5.1	Introduction	1	Lecture	PPT
5.2	Home automation	3	Lecture	PPT
5.3	Cities	3	Lecture	PPT
5.4	Environment	3	Lecture	PPT



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5.5	Productivity Applications	2	Lecture	PPT

Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	W1+ W2 5+5=10	Avg (M1 & M2) 10	Mid-Sem.Test 15	Once in a Sem. 10		5	50	
K1	-	-	-	-	-		-	-
K2	5	2	3	-	10		10	20 %
K3	5	3	4		12		12	24 %
K4	-	5	4	5	14		14	28%
K5	-	-	4	5	9		9	18 %
Non-Scho.							5	10 %
Total	10	10	15	10	45	5	50 mks.	100 %

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ All the course outcomes are to be assessed in the various CIA components.
- ✓ The levels of CIA Assessment based on Revised Bloom's Taxonomy for MCA are :
K2-Understand, K3-Apply, K4-Analyse, K5 - Evaluate



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EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	10	15	10	5	50	50	100

C1 – Sum of Two Weekly Tests

C2 – Average of Two Monthly Tests

C3 - Mid Sem Test

C4 – Once in a semester (Seminar / Assignment)

C5 – Non - Scholastic



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COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Identify the Fundamentals of Internet of Things.	K2	PSO1 & PSO2
CO 2	Design a portable IoT using relevant protocols.	K2, K3, K4	PSO1 & PSO2
CO 3	Analyze applications of IoT in real time scenario.	K2 & K3	PSO1 & PSO3
CO 4	Develop web services to access/control IoT devices.	K2, K3 & K5	PSO1 & PSO4
CO 5	Deploy an IoT application and connect to the cloud.	K2, K3 & K5	PSO1 & PSO5

COURSE DESIGNER:

Staff Name – B. USHA

Forwarded By

HOD'S Signature & Name

B. Chandirika
(B.CHANDIRIKA)