FATIMA COLLEGE (AUTONOMOUS)

Re-Accredited with "A++" Grade by NAAC (4th Cycle)
Maryland, Madurai- 625 018, Tamil Nadu, India

NAME OF THE DEPARTMENT : DEPARTMENT OF MCA

NAME OF THE PROGRAMME : MCA

PROGRAMME CODE : MCA

ACADEMIC YEAR : 2022 – 2023

FATIMA COLLEGE (AUTONOMOUS), MADURAI

Minutes of the Board of Studies

Name of the Department : PG Dept. of Computer Applications

To be implemented From : 2022 - 2023 onwards
Venue : SJ 16 -
Convened on : 16.3.2022
Convened at : 10 a.m.

Members Present

S.NO	NAME	DESIGNATION
1.	Ms. S. Mary Helan Felista	Head of the Departmen
2.	Dr. Sivakumar Principal & Assoc. professor CPA College	University Nominee
3.	Dr. A. Meenakshi Head & Assoc. professor Dept. of CSE Kamaraj College of Engg. & Tech. Virudhunagar	Subject Expert
4.	Dr. K. Kavitha Asst. professor Dept. of comp. science Mother Teresa Women's University Research & Extn. Center Madurai	Subject Expert
5.	Mr. Manikumar Senior Software Developer Ericsson India Global pvt. Ltd. Chennai	Industrialist

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NAME	DESIGNATION
6. Ms. R. G. Sobitha Business Manager BSETech, Bangalore	Alumna
7. Ms. Mable Jasmine Shobha	Dean of academic affairs
8. Ms. R. Smeeta Mary	Staff member
9. Ms. S. Jeba Priya	staff member
10. Ms. B. Usha	Staff member
11. Ms. S. Selvarani	Staff member
12. Ms. P. Nancy Vincentina Mary	Staff member

ACTION TAKEN REPORT FOR 2021-2022

S.NO.	Common Suggestions offered in the Previous Board	Action taken for the academic year 2021-2022
1.	Bridge courses to be offered at the beginning of each semester.	Bridge course were planned and offered at the beginning of each semester.
2.	DBMS to be offered as a core paper	Course on RDBMS planned to be offered from the academic year 2022-2023

CHANGE OF COURSE TITLE

NIL

NEW COURSES INTRODUCED

S. NO.	COURSE CODE	COURSE TITLE	RELEVANCE TO L	R	N	G	SCOPE FOR EMP	ENTR	SD	NEED FOR INTRODUCTION
1.	20MCAIDC-01	IT for Management				G1		✓		IT components are vital in business
2.	20MCAIDC-02	Web Analytics				G1		✓		Ecommerce based web analytics is the trend

REVISED COURSES

S. NO.	COURSE CODE	COURSE TITLE	UNITS REVISED	% OF REVISION	NEED FOR REVISION	RELEVANCE TO	SCOPE
1.	20MCA101	Mathematical Foundation of Comp. Science	Unit V Graph Theory	20%	To include GT Concept	Global	Skill Develop.
2.	20MCA102	Software Engineering	Unit I to V	80%	Additional concepts added & realigned	Global	Skill Develop-ment
3.	20MCA104	Programming in Python	Unit IV - Data Modelling, Dictionary	20%	Concepts are detailed	Global	EMP
4.	20MCA302	Software Quality & Testing	Unit I to V	80%	Industry Oriented Techniques are introduced	Global	SD

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5.	20MCA304	Enterprise Application Development	Unit I - V	20%	Topics realigned for easy learning	Global	SD
6.	20MCAAM03	Machine Learning	Unit V	20%	Tools included	Global	SD

Minutes 2022 onwards

1. Updation of Open Educational Resources in the list of references of each course

NIL

2. Revision of Courses

	REVISED COURSES						
S.NO.	Course code	Course Title	Units Revised	% of Revision	Need for Revision	Relevance L/R/N/G	Scope EMP/ ENT/SD
1.	20MCA101	Mathematical Foundation of Comp. Science	Unit V - Trees, Properties Spanning Tree	10%	Trees to be included in Graph Theory	Global	SD
2.	20MCA104	Programming in Python	Unit V - Exception, Constructors	20%	Concepts are more detailed	Global	EMP
3.	20MCA202	Web Technologies	Unit I	20%	Basics moved to bridge course	Global	EMP

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REVISED COURSES

S-NO.	Course Code	Course Title	Units Revised	% of Revision	Need for Revision	Relevance L	Rv	N	G	Scope EMP	ENT	SD
4.	20MCA203	Programming in Java	Unit I & II rearranged	20%	Topics re-aligned for easy learning				Global	EMP		
5.	20MCA304	Enterprise Application Development	Unit II - Spring, Hibernate framework	20%	Topics re-vamped to facilitate learning				Global	EMP		
6.	20MCAGE11	Cloud Computing	Unit I - Unit V	20%	Topics revamped for easy learning				Global			SD

3. New Courses Introduced

NEW COURSES

S.NO.	Course Code	Course Title	Relevance TO				Scope For			Need For Introduction
			L	Rv	N	G	EMP	ENT	SD	
1.	22MCA102	Relational Database Management System				G	✓			RDBMS concep to be offered as core to meet t industry requirem
2.	22MCA302	Software Engineering Principles				G			✓	Principles of advanced softw engineering cas in the industr to be imparted

S.NO.	Course code	Course Title	Relevance To				Scope For			Need for Introduction
			L	R	N	G	EMP	ENTRE	SD	
3.	22MCA401	UIX Design Programming				G			✓	Career opportunities in UIX design rapidly increasing

4. Introduction of purely skill embedded certificate / Diploma / Advanced Diploma value added course

S.NO.	Course code	Course Title	MOU with Industry / Organization	Skills Sharpened	Course Outcome
1.	22PGVAMCA4	Campus To Corporate Training	-	1. Oral and written communication 2. Quantitative & Reasoning Techniques 3. Inter Personal Skills	1. Display competence in oral & written communication 2. To improve aptitude, problem solving & reasoning skills 3. To impart the importance of inter personal skills in the working environment

5. Approval of Ph.D Course Work Syllabus

5.

NIL

6. Rubrics for Internship / Project

Internship / Mini Project / Major Project

Internal / External

External		Internal	
Novelty	10	Literature Review	15
Functionality	10	Modularity	10
System Analysis	10	Coding	15
Presentation	10	Algorithms	10
Queries	10		
Total	50 Marks		50 Marks

DETAILS OF PROPOSED / SIGNED MOU's

1. PG Department of computer application has proposed to extend the Memorandum of understanding with Brick Steel Enterprises Infotech Pvt. Ltd, Bangalore. As per the understanding, the following activities are decided to be carried on in the upcoming year

→ In plant Training

→ Guest Lectures

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→ Placement

→ Faculty Development Programme

→ Curriculum Design

→ Skill Embedded Value Added Course

OTHER SUGGESTIONS

* Title of the course Programming in Java with code 20MCA203 to be changed to "Object Oriented Programming in Java".

* Coures offered in the final semester can be offered in the previous semesters to facilitate project cum placement.

Bridge Courses offered

I Semester → C & C++
→ Computer Organization

II Semester → Core Java
→ HTML & CSS

III Semester → Computer Networks
→ Internet Programming Framework

1. Ms. Mary Helan Felista	S. Mayhn
2. Dr. Sivakumar	Absent
3. Dr. Meenakshi. A	16/3/2022.
4. Dr. K. Kavitha	16/3/2022
5. Mr. Manikumar	Absent
6. Ms. Sobitha R. G.	SHt
7. Ms. Mable Jasmine Shobha	
8. Ms. Smeeta Mary. R	
9. Ms. Jeba Pariya. S	
10. Ms. Usha. B	
11. Ms. Selvarani. S	
12. Ms. Nancy Vincentina Mary	

1. Ms. Mary Helan Felista	S. Mary
2. Dr. Sivakumar	Absent
3. Dr. Meenakshi. A	16/3/2022
4. Dr. K. Kavitha	16/3/2022
5. Mr. Manikumar	Absent
6. Ms. Sobitha R. G.	Sht.
7. Ms. Mable Jasmine Shobha	Mable Jasmine Shobha
8. Ms. Smeeta Mary. R	
9. Ms. Jeba Poiya. S	
10. Ms. Usha. B	
11. Ms. Selvarani. S	
12. Ms. Nancy Vincentina Mary	

VISION

Being women of communion, contemplative and prophetic, empower women and children through faith formation and value-based education for societal equality, harmony and to care for our common home.

MISSION

To energize Women and Children towards Academic excellence through Quality Education. To endow them with character, competence, creativity & commitment. To enkindle in them inclusive love, building fraternal communities and stand for the cause of those at the periphery with compassion.

VISION OF THE DEPARTMENT

To Empower women by providing them unique learning experience with ethical values in computer applications to meet the industrial standards and societal expectations.

MISSION OF THE DEPARTMENT

- Training in the cutting edge technologies to adapt to the Dynamic IT world
- Promoting a learning community in a supportive and caring environment that lead students to successfully complete their goals
- Build up Leadership traits among students
- Craft responsible Computer Professionals with strong Moral Values

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PEO 1	**Subject Proficiency -** Our graduates will be academic, digital and information literates, creative, inquisitive, innovative and desirous for the "more" in all aspects
PEO 2	**Professional Growth -** They will be efficient individual and team performers, exhibiting progress, flexibility, transparency and accountability in their professional work
PEO 3	**Managerial Skills** - The graduates will be effective managers of all sorts of real – life and professional circumstances, making ethical decisions, pursuing excellence within the time framework and demonstrating apt leadership skills
PEO 4	**Needs of the Society-** They will engage locally and globally evincing social and environmental stewardship demonstrating civic responsibilities and employing right skills at the right moment.

PROGRAMME OUTCOMES (PO)

The learners would be able to

PO 1	Apply the knowledge of computing maths and science for the solution of problems and requirements
PO 2	Identify, critically analyze, formulate and develop computer applications using fundamental principles of relevant domain disciplines
PO 3	Design and evaluate solutions for computer based problems to meet the desired needs within realistic constraints such as safety, security and applicability
PO 4	Use research based knowledge to conduct experiments and interpret data to attain well-defined conclusions.
PO 5	Create, select and apply modern computing tools by understanding the limitations, with dexterity.
PO 6	Demonstrate the competency in programming skills as per industry expectations.
PO 7	Understand the impact of system solutions in societal, environmental and cultural issues within local and global contexts for sustainable development
PO 8	Commit to professional ethics and cyber regulations, responsibilities & norms.
PO 9	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary environment to manage projects.
PO 10	Communicate effectively with the society about computing technologies.
PO 11	Demonstrate knowledge and understanding of the management principles and apply these to manage projects.
PO 12	Appreciate the importance of goal setting and to recognize the need for life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSO)

On completion of MCA programme, the graduates would be able to

PSO 1	Ability to design and develop applications in the computing discipline to meet the customer's business objectives.
PSO 2	Ability to Integrate various system components to provide user interactive solutions for various challenges
PSO 3	Ability to test and maintain the software applications with latest computing tools and technologies.
PSO 4	Ability to understand the evolutionary changes in the practices and strategies in software project development.
PSO 5	Ability to enhance teamwork and leadership skills to solve time critical problems

(For those who joined in June 2022 onwards)

MAJOR CORE – 118 CREDITS

PROGRAMME CODE : MCA

DEPARTMENT OF MCA

2022 – 2023

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
22MCA102	Relational Database Management Systems	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

COURSE CODE	COURSE TITLE	HRS / WK	CREDIT	CIA Mks	ESE Mks	TOT. MKs
*	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 – Numerical Aptitude	2	1	25	25	50
SEMESTER - III						
20MCA301	Internship & Mini Project	4	4	50	50	100
22MCA302	Software Engineering Principles	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	2	1	25	25	50

COURSE CODE	COURSE TITLE	HRS / WK	CREDIT	CIA Mks	ESE Mks	TOT. MKs
	Tools					
20MCA308	Soft Skills III – Technical Aptitude	2	1	25	25	50
SEMESTER - IV						
22MCA401	UIX Design Programming	4	2	50	50	100
*	Elective III – Specialization	4	4	50	50	100
20MCA403	Soft Skill IV- Interpersonal Skills for Corporate Readiness	2	2	25	25	50
20MCA402	Project Viva Voce	-	6	50	50	100

ELECTIVES

SPECIALIZATION ELECTIVE – DATA ANALYTICS

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

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

SPECIALIZATION ELECTIVE – AI & MACHINE LEARNING

S.NO	SEMESTER	COURSECODE	COURSETITLE	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

GENERALELECTIVES

S.NO	COURSE CODE	COURSETITLE	HR/ WK	CREDIT	CIA Mks	ESE Mks	TOT. MKs
1.	20MCAGE01	Office Automation Tools	4	4	50	50	100
2.	20MCAGE02	Financial Management And Accounting	4	4	50	50	100
3.	20MCAGE03	Organizational Behavior	4	4	50	50	100
4.	20MCAGE04	E-Commerce	4	4	50	50	100
5.	20MCAGE05	Ethics in Computing	4	4	50	50	100
6.	20MCAGE06	Resource Management Techniques	4	4	50	50	100
7.	20MCAGE07	Entrepreneurship Development	4	4	50	50	100
8.	20MCAGE08	Wireless Sensor Networks	4	4	50	50	100
9.	20MCAGE09	Research Methodology	4	4	50	50	100
10.	20MCAGE10	Digital Image Processing	4	4	50	50	100
11.	20MCAGE11	Cloud Computing	4	4	50	50	100
12.	20MCAGE12	Agile Software Engineering	4	4	50	50	100

REVISION – 10 %

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 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 – Tautologies & Contradictions - Arguments

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 – Newton Raphson Method (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)

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

UNIT V GRAPH THEORY (12 Hours)

Basic concepts of Graphs, Sub Graphs, Matrix Representation of Graphs, Isomorphic graphs, Paths and Circuits – Eularian 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,

WEB REFERENCES:

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

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				

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

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

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 Scholasti	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*

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**

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

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: ϕ Strongly Correlated – **3** ϕ Moderately Correlated – **2**

ϕ Weakly Correlated -**1**

COURSE DESIGNER

Staff Name – B. USHA

Forwarded By

HOD'S Signature

(S. MARY HELAN FELISTA)

I MCA

SEMESTER – I

(For those who join in 2022 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 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 – Tautologies & Contradictions - Arguments

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 – Newton Raphson Method (No derivations)

SELF STUDY: The method of False Position

UNIT – III STATISTICS (12 Hours)

Measures of Central Tendency – Mean – Median-Mode – Karl Pearsons's correlation Coefficient – 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)

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

UNIT- V GRAPH THEORY (12 Hours)

Basic concepts of Graphs, Sub Graphs, Matrix Representation of Graphs, Isomorphic graphs, Paths and Circuits – Eularian Graphs – Hamiltonian Graphs – Planar Graphs – Euler's Formula – Regular & Bipartite Graphs – Trees - Properties of trees - Spanning trees

SELF STUDY: Regular & Bipartite Graphs

REFERENCES:

1. J.K. Sharma, "Discrete Mathematics", Laxmi Publications, 4th Edition , 2018.
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, 19th edition, 2017
4. Dr.S.Arumugam, A.T.Isaac, "Modern Algebra", SciTech Publications India Pvt. Ltd, 2015
5. J.P. Tremblay & R. Manohar, "Discrete Mathematical Structures with applications to Computer Science", McGraw – Hill Education, 1st edition, Reprint 2017.
6. Dr.S.Arumugam, A.T.Isaac, "Numerical Methods", SciTech Publications India Pvt. Ltd, 2nd Edition, 2015.
7. Narsingh Deo, "Graph Theory ". Prentice Hall of India, Reprint 2012.

WEB REFERENCES:

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

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				
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
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	Trees- Properties of trees - Spanning trees	2	Chalk & Talk	Black Board

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*

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**

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

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: ϕ Strongly Correlated – **3** ϕ Moderately Correlated – **2**

ϕ Weakly Correlated -**1**

COURSE DESIGNER **Forwarded By**

B. USHA **HOD'S Signature**

S. Mary Helan Felista

REVISION – 10 %

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 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 (12Hours)

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 – 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. Fundamentals of Python: First Programs - Kenneth Lambert – Course
3. Technology, Cengage Learning, 2012 - ISBN-13: 978-1-111-82270-5
4. Allen B. Downey, "Python for Software Design", 2018.
5. ReemaThareja, "Python Programming Using Probolem Solving Approach", Oxford University Press, 2017
6. Bill Lubanovic, "Introducing Python", O 'Reilly Media Publications, 2015

WEB REFERENCES:

1.http://spoken-tutorial.org/tutorial-search/python

2.https://docs.python.org

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
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

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

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 Scholasti	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*

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**

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

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 C0s 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: ϕ Strongly Correlated – **3** ϕ Moderately Correlated – **2**

ϕ Weakly Correlated -**1**

COURSE DESIGNER:

Staff Name – S. Mary Helan Felista

Forwarded By

HOD'S Signature & Name

S. Mary Helan Felista

I MCA

SEMESTER – I

(For those who join in 2022 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 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 **(12 Hours)**

LIST PROCESSING AND EXCEPTION HANDLING

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 (12Hours)

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 – 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 - Creating an instance of the class - Constructors - Built-in class functions- Built-in class attributes – Inheritance, polymorphism, operator overloading – Abstract classes

REFERENCES:

1. Richard L. Halterman, "Learning To Program with Python", 2013.
2. Kenneth A. Lambert, "Fundamentals of Python: First Programs", Course Technology Inc; 2nd Edition, 2018
3. Allen B. Downey, "Python for Software Design", 2018.
4. ReemaThareja, "Python Programming Using Probolem Solving Approach", Oxford University Press, 2017

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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 FUNCTIONS				
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
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
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	Constructors	2	Lecture	PPT
5.4	Built-in class functions	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
5.9	Inheritance	2	Chalk & Talk	Black Board

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*

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**

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

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: ϕ Strongly Correlated – **3** ϕ Moderately Correlated – **2**

ϕ Weakly Correlated -**1**

COURSE DESIGNER **Forwarded By**

S. Mary Helan Felista **HOD'S Signature & Name**

REVISION – 20 %

I MCA

SEMESTER – II

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDIT
MCA	20MCA202	WEB TECHNOLOGIES	MAJOR CORE	4	4

COURSE DESCRIPTION

This course provides the student with (S. MARY HELAN FELISTA)

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 **REMOVED** **(12Hours)**

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

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 queriesHTML5 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 – III INTRODUCING 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

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 mysql 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

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

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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

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 JavaScript	1	Lecture	PPT
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

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 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

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 Scholasti	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*

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**

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	PSO1 & PSO2
CO 2	Create effective scripts using JavaScript and jQuery to enhance the end user experience.	K2, K3, K4	PSO1 & PSO2
CO 3	Write PHP scripts to handle HTML forms.	K2 , K4	PSO1 & PSO3
CO 4	Test, debug, and deploy web pages containing PHP and MySQL.	K2, K3,K4 & K5	PSO1 & PSO3
CO 5	Implement SQL language, JavaScript, Ajax, Jquery, PHP and CSS in the project.	K2,K3,K4 & K5	PSO4 & PSO5

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 C0s 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: ϕ Strongly Correlated – **3** ϕ Moderately Correlated – **2**

ϕ Weakly Correlated -**1**

COURSE DESIGNER: **Forwarded By**

Staff Name – S. MARY HELAN FELISTA **HOD'S Signature & Name**

S. Mary Helan Felista

I MCA

SEMESTER – II

(For those who join in 2022 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCA202	WEB TECHNOLOGIES	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 JAVASCRIPT **(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

SELF-STUDY: Finding your Elements

UNIT- II JQUERY **(12Hours)**

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: Changing styles

UNIT – III INTRODUCING 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

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 mysql 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

REFERENCES:

1. Richard Blum, "PHP, MySQL & JavaScript All-in-One For Dummies", John Wiley & Sons, 2018
2. Alan Forbes, "The Joy of PHP",BeakCheck LLC; 6th Edition, 2020.
3. Robin Nixon, "PHP, MYSQL, JavaScript & CSS",5th Edition, O'Reilly, 2020
4. Chris Minnick, Eva Holland, "HTML, CSS, & JavaScript for Dummies", John Wiley & Sons,2018

WEB REFERENCES:

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

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 JAVASCRIPT				
1.1	Introducing JavaScript	1	Chalk & Talk	Black Board
1.2	The basics of JavaScript	2	Chalk & Talk	LCD
1.3	Controlling program flow	2	Lecture	PPT & White board
1.4	Working with functions	2	Chalk & Talk	Smart Board
1.5	Advanced JavaScript Coding	2	Discussion	Black Board
1.6	Document Object Model	1	Lecture	Google classroom
1.7	Document Object Model form data	2	Lecture	Google classroom
UNIT - 2 JQUERY				
2.1	Using jQuery	1	Lecture	PPT
2.2	Loading the jQuery library – Functions	2	Chalk & Talk	PPT
2.3	Replacing data – Changing styles	2	Lecture	Smart Board
2.4	Reacting to events with JavaScript and jQuery	1	Lecture	Black Board
2.5	Understanding events	2	Discussion	Google classroom
2.6	Focusing on JavaScript and events	2	Lecture	Black Board
2.7	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
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 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

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*

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**

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 JavaScript to create personal and/or business websites	K2, K4	PSO1 & PSO2
CO 2	Create effective scripts using jQuery to enhance the end user experience.	K2, K3, K4	PSO1 & PSO2
CO 3	Write PHP scripts to handle HTML forms.	K2 , K4	PSO1 & PSO3
CO 4	Test, debug, and deploy web pages containing PHP and MySQL.	K2, K3,K4 & K5	PSO1 & PSO3
CO 5	Implement SQL language, JavaScript, Ajax, Jquery, PHP and CSS in the project.	K2,K3,K4 & K5	PSO4 & PSO5

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 C0s 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 **Forwarded By**

S. MARY HELAN FELISTA **HOD'S Signature & Name**

S. Mary Helan Felista

(S. MARY HELAN FELISTA)

REVISION – 20 %

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 REMOVED (12 Hours)

An overview of Java – Object Oriented Programming – Control Statements - if statement - for loop - Lexical issues - Data types - Primitive types – Literals – Variables - Type conversion and casting - Variables - Arrays - Operators – Arithmetic – Bitwise - Relational – Logical - 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 – Class fundamentals - Declaring Objects – Assigning Object Reference Variables - Introducing Methods – Constructors - this Keyword – Garbage Collection – finalize () method – Stack class – Method Overloading - Recursion - Access Control - Nested and Inner classes – Method Overriding – Constructor Overloading - Inheritance – Using Super - 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 - Default Interface Methods - Static methods in an Interface - Exception Handling fundamentals - Exception Types – Uncaught Exceptions - Using try and catch – Multiple catch – Nested try statements – Built-in Exceptions - Chained Exceptions - Multithreaded Programming – Java Thread Model – Main Thread - Creating a Thread – Implementing Runnable – Extending Thread - Multiple Threads – 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 - Status Window – HTML Applet tag -Passing parameters to Applets - AWT classes – Window fundamentals – Frame windows – Creating Windowed program - Introducing Graphics - Color – Fonts – Using Font Metrics – Control fundamentals - Labels – Buttons – Checkbox – Choice control – Lists – Scroll Bars – Text Area - Layout Managers - Menu Bars and Menus – Dialog box – AWT Components.

SELF STUDY : Working with graphics

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

REFERENCES:

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

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**			

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
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

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*

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**

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

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

I MCA

SEMESTER – II

(For those who join in 2022 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 TO CLASS (12 Hours)

An overview of Java – Object Oriented Programming – Introduction to classes – Class fundamentals - Declaring Objects – Assigning Object Reference Variables - Introducing Methods – Constructors - this Keyword – Garbage Collection – finalize () method – Stack class – Method Overloading - Recursion - Access Control - Nested and Inner classes – Method Overriding – Constructor Overloading - Inheritance – Using Super - Multilevel Hierarchy – Abstract class – Final with Inheritance .

SELF STUDY: Garbage Collection

UNIT - II PACKAGES AND INTERFACES (12 Hours)

Defining Package- Access protection – Importing Packages – Defining Interfaces – Implementing Interfaces – Nested Interface - Default Interface Methods - Static methods in an Interface.

SELF STUDY: Importing Packages

UNIT - III EXCEPTION HANDLING AND THREADS (12 Hours)

Exception Handling fundamentals - Exception Types – Uncaught Exceptions - Using try and catch – Multiple catch – Nested try statements – Built-in Exceptions - Chained Exceptions - Multithreaded Programming – Java Thread Model – Main Thread - Creating a Thread – Implementing Runnable – Extending Thread - Multiple Threads – Thread Priorities – Synchronization – Inter-thread communication.

SELF STUDY: Synchronization

UNIT - IV AWT CLASSES AND CONTROLS (12 Hours)

The Applet class – Architecture – Skeleton – Applet display methods - Status Window – HTML Applet tag -Passing parameters to Applets - AWT classes – Window fundamentals – Frame windows – Creating Windowed program - Introducing Graphics - Color – Fonts – Using Font Metrics – Control fundamentals - Labels – Buttons – Checkbox – Choice control – Lists – Scroll Bars – Text Area - Layout Managers - Menu Bars and Menus – Dialog box – AWT Components.

SELF STUDY: Working with graphics

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

REFERENCES:

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

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 INTRODUCTION TO CLASS				
1.1	An overview of Java – Object Oriented Programming	2	Chalk & Talk	Black Board
1.2	Introduction to classes – Class fundamentals - Declaring Objects	2	Chalk & Talk	Black Board
1.3	Assigning Object Reference Variables - Introducing Methods – Constructors - this Keyword	2	Discussion	Google classroom
1.4	finalize () method – Stack class – Method Overloading	2	Chalk & Talk	Black Board
1.5	Recursion - Access Control - Nested and Inner classes – Method Overriding	1	Discussion	Black Board
1.6	Constructor Overloading - Inheritance – Using Super	1	Lecture	White board
1.7	Multilevel Hierarchy – Abstract class – Final with Inheritance.	2	Lecture	PPT
UNIT - 2 PACKAGES AND INTERFACES				
2.1	Defining Package- Access protection	2	Lecture	PPT
2.2	Importing Packages	2	Chalk & Talk	Black Board
2.3	Defining Interfaces – Implementing Interfaces	2	Lecture	PPT
2.4	Nested Interface	2	Lecture	White board
2.5	Default Interface Methods	2	Discussion	Black Board

2.6	Static methods in an Interface	2	Chalk & Talk	Black Board
UNIT – 3 EXCEPTION HANDLING AND THREADS				
3.1	Exception Handling fundamentals - Exception Types	1	Lecture	White board
3.2	Defining & Implementing Interfaces	1	Chalk & Talk	Black Board
3.3	Uncaught Exceptions - Using try and catch	2	Lecture	PPT
3.4	Multiple catch – Nested try statements – Built-in Exceptions	1	Lecture	White board
3.5	Chained Exceptions - Multithreaded Programming	1	Lecture	PPT
3.6	Java Thread Model – Main Thread	1	Discussion	Google classroom
3.7	Creating a Thread – Implementing Runnable – Extending Thread	2	Chalk & Talk	Black Board
3.8	Multiple Threads – Thread Priorities – Synchronization	2	Lecture	PPT
3.9	Inter-thread communication	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
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

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*

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**

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

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 C0s 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:

P.NANCY VINCENTINA MARY

Forwarded By

HOD'S Signature & Name

S. Mary Helan Felista

REVISION – 20 %

II MCA

SEMESTER – III

(For those who joined in 2020 onwards)

OGRAMME 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

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

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 – Introduction to Full Text Search.

SELF STUDY : Indexing – Searching

UNIT – V DJANGO (12 Hours)

Introduction - Django model layer – View layer - Template layer – Forms — Django security – Django web application tools – Core functionalities – Geographic Framework.

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

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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

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	2	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	2	Lecture	PPT
2.4	Handling form submission	2	Lecture	White board
2.5	Creation of batch service	2	Discussion	PPT
2.6	Securing web applications	2	Chalk & Talk	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
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	2	Lecture	PPT
5.3	Template layer	2	Lecture	PPT
5.4	Forms	1	Lecture	White board
5.5	Django security	2	Lecture	White board
5.6	Django web application tools	1	Lecture	White board
5.7	Core functionalities – Geographic Framework.	2	Discussion	Google classroom

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 Scholasti	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*

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**

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, K4	PSO1& PSO2
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 , K4	PSO4
CO 4	Map Java classes and object associations to relational database tables with Hibernate mapping files	K2, K3,K4 & K5	PSO2 & PSO4
CO 5	Use Django for rapid development, pragmatic, maintainable, clean design, and secures websites.	K2,K3,K4 & K5	PSO3

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: ϕ Strongly Correlated – **3** ϕ Moderately Correlated – **2**

ϕ Weakly Correlated -**1**

COURSE DESIGNER: **Forwarded By**

Staff Name – P.NANCYVINCENTINA MARY **HOD'S Signature & Name**

S. Mary Helan Felista

II MCA

SEMESTER – III

(For those who join in 2022 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 - How to start an ASP.NET MVC application - The folders and files for a new MVC application- Working with Views - Working with controls.

SELF STUDY: Working with Views

UNIT – II SPRING **(12 Hours)**

Web services – Consuming a restful web service - building REST service with spring - Spring framework- Advantages of Spring Framework - Spring Modules-Steps to create spring application-Spring MVC CRUD Example.

SELF STUDY: Advantages of Spring Framework

UNIT – III STRUTS **(12 Hours)**

Struts – Introduction – Features - MVC framework – STRUTS architecture – Request Life cycle– Action class and configuration files – struts.xml tags – Namespace and wild cards – Interceptors – In built interceptors – Custom interceptors.

SELF STUDY: Features

UNIT – IV HIBERNATE **(12 Hours)**

Introduction to Hibernate - Hibernate Framework - Advantages of Hibernate Framework - Hibernate Architecture - Steps to create Hibernate Application HIBERNATE ORM – Hibernate Validator – HIBERNATE OGM – Configuration of tools – HIBERNATE SEARCH – Introduction to Full Text Search.

SELF STUDY: Introduction to Full Text Search.

UNIT – V DJANGO **(12 Hours)**

Introduction - Django model layer – View layer - Template layer – Forms — Django security – Django web application tools – Core functionalities – Geographic Framework.

SELF STUDY: Geographic Framework

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

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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

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	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 Working with controls.	2	Lecture	White board
UNIT - 2 SPRING				
2.1	Web services – Consuming a restful web service	2	Lecture	PPT
2.2	building REST service with spring	2	Chalk & Talk	Black Board
2.3	Spring framework- Advantages of Spring Framework	2	Lecture	PPT
2.4	Spring Modules	2	Lecture	White board
2.5	Steps to create spring application	2	Discussion	PPT

2.6	Spring MVC CRUD Example	2	Chalk & Talk	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	Request Life cycle	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	Interceptors	1	Chalk & Talk	Black Board
3.7	In built interceptors	1	Lecture	PPT
3.8	Custom interceptors	2	Chalk & Talk	Black Board
UNIT - 4 HIBERNATE				
4.1	Introduction to Hibernate - Hibernate Framework	1	Lecture	PPT
4.2	Advantages of Hibernate Framework	1	Lecture	PPT
4.3	Hibernate Architecture	1	Chalk & Talk	Black Board
4.4	Steps to create Hibernate Application	2	Chalk & Talk	Black Board
4.5	HIBERNATE ORM- Hibernate Validator	2	Discussion	Black Board
4.6	HIBERNATE OGM – configuration of tools	2	Lecture	PPT

4.7	HIBERNATE SEARCH	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	2	Lecture	PPT
5.3	Template layer	2	Lecture	PPT
5.4	Forms	1	Lecture	White board
5.5	Django security	2	Lecture	White board
5.6	Django web application tools	1	Lecture	White board
5.7	Core functionalities – Geographic Framework.	2	Discussion	Google classroom

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*

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**

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, K4	PSO1& PSO2
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 , K4	PSO4
CO 4	Map Java classes and object associations to relational database tables with Hibernate mapping files	K2, K3,K4 & K5	PSO2 & PSO4
CO 5	Use Django for rapid development, pragmatic, maintainable, clean design, and secures websites.	K2,K3,K4 & K5	PSO3

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: ϕ Strongly Correlated – **3** ϕ Moderately Correlated – **2**

ϕ Weakly Correlated -**1**

COURSE DESIGNER: **Forwarded By**

P.NANCYVINCENTINA MARY **HOD'S Signature & Name**

S. Mary Helan Felista

REVISION – 20 %

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 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 REMOVED

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.)

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 REMOVED

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.
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

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**			
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
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 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

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 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 Scholasti	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*

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**

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	PS03, PSO4

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: 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

GENERAL ELECTIVE - MCA

(For those who joined in 2022 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 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 Hours)

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

SELF STUDY: Paradigm shift.

UNIT–II CLOUD SERVICES AND APPLICATIONS (12 Hours)

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.

SELF STUDY: Open SaaS and SOA

UNIT–III ABSTRACTION VS. VIRTUALIZATION (12 Hours)

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).

SELF STUDY: Virtual machine types

UNIT–IV (12 Hours)

CLOUD MANAGEMENT AND CLOUD SECURITY

Managing the Cloud - Administrating the Clouds - Management responsibilities - Lifecycle management - Cloud Management Products - 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 : Cloud Management Products

UNIT–V **(12 Hours)**

CLOUD BASED STORAGE AND COMMUNICATING WITH CLOUD

Working with Cloud-Based Storage – Measuring the Digital Universe - 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

SELF STUDY: Virtual storage containers

REFERENCES:

1. Barrie Sosinsky, "Cloud Computing Bible", Wiley India Pvt. Ltd, 2020.
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

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, Cloud Types	1	Chalk & Talk	Black Board
1.2	The NIST model, The Cloud Cube Model	1	PPT	LCD
1.3	Deployment models, Service models	2	Flipped Classroom	LMS tool - Edmodo and LCD
1.4	Examining the Characteristics of Cloud Computing	1	PPT	LMS tool - Edmodo and LCD
1.5	Paradigm shift, Benefits of cloud computing	1	Group Discussion	White Board
1.6	Disadvantages of cloud computing, Understanding Cloud Architecture	2	Flipped Classroom	LMS tool - Edmodo and LCD
1.7	Exploring the Cloud Computing Stack	1	PPT	LMS tool - Edmodo and LCD
1.8	Infrastructure, Platforms	1	Brain Storming and Mind mapping	White Board
1.9	Virtual Appliances, Communication Protocols , Applications	2	Lecture	Presentation 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	Defining Infrastructure as a Service (IaaS)	2	Flipped Classroom	LMS tool - Edmodo and LCD
2.3	IaaS workloads, Pods, aggregation, and silos	2	Flipped Classroom	LMS tool - Edmodo and LCD
2.4	Defining Platform as a Service (PaaS)	2	Flipped Classroom	LMS tool - Edmodo and LCD
2.5	Defining Software as a Service (SaaS)	2	PPT	LMS tool - Edmodo and LCD
2.6	SaaS characteristics	1	PPT	LMS tool - Edmodo and LCD
2.7	Open SaaS and SOA	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
3.6	Understanding Machine	2	PPT	LMS tool -

	Imaging, Porting Applications, The Simple Cloud API, AppZero Virtual Application Appliance			Edmodo and LCD
3.7	Using PaaS Application Frameworks, Drupal	1	Flipped Classroom	LMS tool - Edmodo and LCD
3.8	Using SaaS Application Frameworks, Google App Engine	1	Flipped Classroom	LMS tool - Edmodo and LCD
3.9	Using IaaS Application Frameworks	1	Flipped Classroom	LMS tool - Edmodo and LCD
3.10	Amazon Elastic Compute Cloud (EC2)	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 Products	1	Flipped Classroom	LMS tool - Edmodo and LCD
4.5	Cloud Security	1	PPT	LMS tool - Edmodo and LCD
4.6	Securing the Cloud	1	PPT	LMS tool - Edmodo and LCD
4.7	The security boundary, Security service boundary	2	PPT	LMS tool - Edmodo and LCD
4.8	Security mapping	1	Flipped Classroom	LMS tool - Edmodo and LCD
4.9	Securing Data	1	Flipped	LMS tool -

			Classroom	Edmodo and LCD
4.10	Brokered cloud storage access Storage location and tenancy	1	Flipped Classroom	LMS tool - Edmodo and LCD
4.11	Encryption , Auditing and compliance	1	Lecture	Presentation using PPT
UNIT 5 CLOUD BASED STORAGE AND COMMUNICATING WITH CLOUD				
5.1	Working with Cloud-Based Storage, Measuring the Digital Universe, 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	2	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	2	PPT	LMS tool - Edmodo and LCD
5.5	Cloud backup features ,Cloud Storage Interoperability, Cloud Data Management Interface (CDMI)	2	PPT	LMS tool - Edmodo and LCD
5.6	Open Cloud Computing Interface (OCCI)	2	PPT	LMS tool - Edmodo and LCD
5.7	Communicating with the Cloud	2	PPT	LMS tool - Edmodo and LCD

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 Scholasti	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*

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**

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
CO1	Examine the characteristics of Cloud Computing and the architecture	K2, K4	PSO1
CO2	Define Infrastructure and Identify service models.	K2, K3, K4	PSO2, PSO3
CO3	Relate abstraction and virtualization and cloud computing frameworks.	K2 , K4	PSO3
CO4	Manage and administrate cloud.	K2, K3, K4 & K5	PSO4, PSO5
CO5	Explore cloud based storage and collaboration technologies.	K2, K3, K4 & K5	PSO3, PSO4

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	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2
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
CO 4	2	2	3	3	1	1	2	2	2	2	2	2
CO 5	1	2	3	1	1	3	2	2	2	2	1	2

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

♦ Weakly Correlated -**1**

COURSE DESIGNER

B.USHA

Forwarded By

HOD'S Signature & Name

(S. MARY HELAN FELISTA)