DEPARTMENT OF MCA

MCA – (2021 – 2022)

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

COURSE CODE	COURSE TITLE	HRS / WK	CREDIT	CIA Mks	ESE Mks	TOT. MKs
	Programming					
20MCA207	Soft Skills II – Aptitude Training	2	1	25	25	50
SEMESTER - III						
20MCA301	Internship & Mini Project	4	4	50	50	100
20MCA302	Software Quality & Testing	4	4	50	50	100
20MCA303	Mobile Application Development	4	4	50	50	100
20MCA304	Enterprise Application Development	4	4	50	50	100
	Elective II – Specialization	4	4	50	50	100
	Elective III - General	4	4	50	50	100
20MCA305	Lab V - Mobile Application Development	4	2	50	50	100
20MCA306	Lab VI- Enterprise Application Development	4	2	50	50	100
20MCA307	Skill Based Lab III- Computer Aided Software Engineering Tools	2	1	25	25	50
20MCA308	Soft Skills III – Interpersonal Skills for Corporate Readiness	2	1	25	25	50
SEMESTER - IV						
20MCA401	Lab VII - UIX Design Programming	4	2	50	50	100
*	Elective III – Specialization	4	4	50	50	100
20MCA402	Project *Viva Voce*	-	6	50	50	100
SEMESTER - V						
19MCA501	Software Project Management	4	4	50	50	100

COURSE CODE	COURSE TITLE	HRS / WK	CREDIT	CIA Mks	ESE Mks	TOT. MKs
19MCA502	Machine Learning	4	4	50	50	100
19MCA503	Enterprise Application Development	4	4	50	50	100
	Elective VII – Specialization	4	4	50	50	100
	Elective VIII - General	4	4	50	50	100
19MCA504	Lab IX - Python for Machine Learning	6	3	50	50	100
19MCA505	Lab X - Enterprise Application Development	6	3	50	50	100
19MCA506	Skill Based Lab V –R Programming	2	1	25	25	50
19MCA507	Soft Skills V – Interpersonal Skills for Corporate Readiness	2	1	25	25	50
SEMESTER - VI						
19MCA601	Major Project		12	100	100	200
19MCA602	Internet of Things – Self Learning Course		5	50	50	100
19MCAAL01	Human Computer Interaction (Self - Learning Extra Credit course For Advanced Learners)		4	50	50	100

ELECTIVES – I MCA

SPECIALIZATION ELECTIVE – DATAANALYTICS

S.NO	SEMESTER	COURSE CODE	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 – DISTRUIBUTED SYSTEM SECURITY

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

GENERALELECTIVES

S.NO	COURSE CODE	COURSETITLE	HRS /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 Behaviour	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

ELECTIVES – III MCA

SPECIALIZATION ELECTIVE – DATA SCIENCE

SEMESTER	SUBJECT CODE	SUBJECT TITLE
V	19MCADS03	Data Analytics Using Pig & Hive

SPECIALIZATION ELECTIVE – NETWORKING

SEMESTER	SUBJECT CODE	SUBJECT TITLE
V	19MCANW03	High Speed Networks

SPECIALIZATION ELECTIVE – APPLICATION DEVELOPMENT

SEMESTER	SUBJECT CODE	SUBJECT TITLE
V	19MCAAD03	Software Development Frameworks

GENERAL ELECTIVES

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

INTERDISCIPLINARY COURSES

S.NO	SEMESTER	COURSE CODE	COURSE TITLE	HRS / WK	CREDIT	CIA Mks	ESE Mks	TOT. MKs
1.	II	21MCA2SL	INFORMATION TECHNOLOGY FOR MANAGEMENT	-	4	50	50	100
2.	IV	21MCA4SL	WEB ANALYTICS	-	4	50	50	100

UNIT IV & V COMBINED

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

SELF STUDY: Bi conditional statements - Negation of Bi Conditional Statements

UNIT- II (12 Hours)

THE SOLUTION OF NUMERICAL ALGEBRAIC AND TRANSCENDENTAL EQUATIONS

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

SELF STUDY: Themethod 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 – Elements of a set – Standard Sets and Symbols – Set Description – Roaster method – Set Builder method – 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

SELF STUDY: Standard Sets and Symbols – Set Description, Types of Sets - Venn – Euler diagram

UNIT – V MATRICES (12 Hours)

Introduction – Algebra of Matrices – Types of Matrices- Rank of a Matrix – Inverse of Matrix - Elementary Transformations – Simultaneous Linear Equations – Cayley Hamilton - Eigen Values and Eigen Vectors (Only Problems)

SELF STUDY: Algebra of Matrices – Types of Matrices- Elementary Transformations

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.

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	1	Chalk & Talk	Black Board
3.3	Median	1	Chalk & Talk	Black Board
3.4	Mode	1	Chalk & Talk	Black Board
3.5	Karl Pearsons's coefficient	2	Chalk & Talk	Black Board
3.6	Derivations from assumed mean	1	Chalk & Talk	Black Board
3.7	Correlation of Bi-variate grouped Data	2	Chalk & Talk	Black Board
3.8	Rank Correlation Coefficient	2	Chalk & Talk	Black Board
UNIT 4 -Set Theory				
4.1	Introduction – Set and its elements	2	Lecture	PPT
4.2	Elements of a set – Standard Sets and Symbols	2	Lecture	Black Board
4.3	Set Description – Roaster method – Set Builder method	2	Chalk & Talk	Black Board
4.4	Cardinal number of a set 4 – Types of Sets - Venn – Euler diagram	2	Chalk & Talk	Black Board

4.5	Set Operations and Laws of Set Theory – Union of Sets – Intersection of Sets	2	Chalk & Talk	Black Board
4.6	Disjoint Sets – Difference of Two Sets – Complement of a Set –	2	Chalk & Talk	Black Board
4.7	Distributive Laws			
UNIT -5 Matrices				
5.1	Introduction – Algebra of Matrices	1	Chalk & Talk	Black Board
5.2	Types of Matrices- Rank of a Matrix	2	Chalk & Talk	Black Board
5.3	Inverse of Matrix	2	Chalk & Talk	Black Board
5.4	Elementary Transformations	2	Chalk & Talk	Black Board
5.5	Simultaneous Linear Equations	2	Chalk & Talk	Black Board
5.6	Cayley Hamilton-Eigen Values and Eigen Vectors	3	Chalk & Talk	Black Board

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

CIA	
Scholastic	45
Non 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	10	15	10	5	50	50	100

C1 – Sum of Two Weekly Tests

C2 – Average of Two Monthly Tests

C3 - Mid Sem Test

C4 – Once in a semester (Seminar / Assignment)

C5 – Non – Scholastic

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	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 & K3	PSO1 & PSO3
CO 4	Explain the set theory logic	K2, K3 & K5	PSO1 & PSO4
CO 5	Utilize the Knowledge of matrices for designing and solving problems	K2,K3 & K5	PSO1 & PSO5

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

COURSE DESIGNER:

Staff Name – B. USHA

Forwarded By
HOD'S Signature & Name

(S. MARY HELAN FELISTA)

REVISION 20%

I MCA

SEMESTER – I

(For those who join in 2021 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.
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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 20%

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

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

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

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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	2	Chalk & Talk	Black

	of Matrices – Types of Matrices- Rank of a Matrix			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: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER **Forwarded By**

Staff Name – B. USHA **HOD'S Signature**

S. Mary Helan Felista

REVISION

I MCA

SEMESTER – I

(For those who joined in 2020 onwards)

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

COURSE DESCRIPTION

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

COURSE OBJECTIVES

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

UNIT – I PROCESS AND PROCESS MODELS (12 Hours)

Software Engineering a Layered Technology- Process Framework – The Capability Maturity Model Integration (CMMI) - Process Models - Prescriptive Models – The Waterfall Model – Incremental Process Models – Evolutionary Process Models The Unified Process.

SELF STUDY: Specialized Process Models

UNIT - II **(12 Hours)**

SOFTWARE ENGINEERING PRACTICE AND ANALYSIS

Software Engineering Practice – Communication Practices - Planning Practices - Modeling Practices – Construction Practice – Deployment - Building the Analysis Model - Requirement Analysis - Data Modeling Concepts –Scenario Based Modeling – Flow Oriented Modeling – Class-based Modeling – Creating a Behavioral Model.

SELF STUDY: Object Oriented Analysis.

UNIT- III DESIGN ENGINEERING **(12 Hours)**

Design - Process and Quality - Concepts – Design Model – Design Elements – Pattern Based Design – Usage of Patterns – Frameworks - Software Architecture – Data Design – Architectural Level – Component Level - Transform Flow and Mapping – Transaction Flow and Mapping .

SELF STUDY: Refining the Design

UNIT – IV **(12 Hours)**

MODELING COMPONENTS AND PROJECT MANAGEMENT

Component – Views - Class-Based Components – Principles – Guidelines – Cohesion – Coupling – Project - Management Spectrum – The People – Software Team - The Product – Scope – Decomposition – The Process - Modeling – The Project – Approaches.

SELF STUDY:W5HH Principles.

UNIT – V **20%** **(12 Hours)**

ESTIMATION AND SCHEDULING OF PROJECTS

Estimation – Observation – Project Planning Process - Software Scope and Feasibility – Resources – Human – Reusable – Environmental –

Decomposition Techniques – sizing – Problem Based – LOC Based – FP Based - Empirical Estimation Models – Structure .

SELF STUDY: COCOMO II Model.

REFERENCES:

1. Roger S. Pressman, "Software Engineering (A Practitioner's Approach)", Tata McGraw-Hill Companies, 6th Edition, 2014.
   Unit I, II, III, IV and V
2. Jibitesh Mishra, Ashok Mohanty, "Software Engineering", Pearson Education, 1st Edition, 2011.
3. D. Jeya Mala, S. Geetha, "Object Oriented Analysis and Design Using UML", Tata McGraw-Hill Publishers, 2013.
4. Muthuramachandran, Zaigham,. Mohammed, "Software Engineering in the Era of Cloud Computing, Springer Publishers, 2019.
5. PankajJalote, "An Integrated approach to Software Engineering", 3rd Edition, Narosa Publications, 2011.
6. Stephen Schach, "Software Engineering", McGraw publication, 7th Edition, 2012.
7. Ali Behforroz, Frederick J.Hudson, "Software Engineering Fundamentals", Oxford Indian Reprint, 2012.
8. Sommerville, "Software Engineering", 10th Edition, Pearson, 2015.

WEB REFERENCES:

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

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 Process and Process Models				
1.1	Software Engineering a Layered Technology- Process Framework	1	Chalk & Talk	Black Board
1.2	The Capability Maturity Model Integration (CMMI)	1	Chalk & Talk	LCD
1.3	Process Models	4	Lecture	PPT
1.4	Prescriptive Models	1	Lecture	Smart Board
1.5	Process Overview – Process Scheduling	1	Lecture	Black Board
1.6	The Waterfall Model	1	Discussion	Google classroom
1.7	Incremental Process Models - Evolutionary Process Models	2	Lecture	Black Board
1.8	Specialized Process Models – The Unified Process.	1	Discussion	Black Board
UNIT –2 Software Engineering Practice and Analysis				
2.1	Software Engineering Practice	1	Chalk & Talk	Black Board
2.2	Communication Practices - Planning Practices	1	Chalk & Talk	LCD

2.3	Modeling Practices – Construction Practice	3	Lecture	PPT
2.4	Deployment	1	Lecture	Smart Board
2.5	Building the Analysis Model	1	Lecture	BlackBoard
2.6	Requirement Analysis - Data Modeling Concepts	1	Discussion	Google classroom
2.7	Object Oriented Analysis	2	Lecture	Black Board
2.8	Scenario Based Modeling – Flow Oriented Modeling	1	Discussion	Black Board
2.9	Class-based Modeling – Creating a Behavioral Model	1	Lecture	Black Board
UNIT –3 Design Engineering				
3.1	Design - Process and Quality	1	Chalk & Talk	Black Board
3.2	Concepts – Design Model	1	Chalk & Talk	LCD
3.3	Design Elements – Pattern Based Design – Usage of Patterns	4	Lecture	PPT & White board
3.4	Frameworks - Software Architecture	1	Lecture	Smart Board
3.5	Data Design – Architectural Level	1	Lecture	Black Board
3.6	Component Level - Transform Flow and Mapping	1	Discussion	Google classroom
3.7	Transaction Flow and Mapping	2	Lecture	Black Board
3.8	Refining the Design.	1	Discussion	Black

				Board
UNIT –4 Modeling Components and Project Management				
4.1	Component – Views	1	Chalk & Talk	Black Board
4.2	Class-Based Components	1	Chalk & Talk	LCD
4.3	Principles – Guidelines	3	Lecture	PPT
4.4	Cohesion – Coupling	1	Lecture	Smart Board
4.5	Project - Management Spectrum	1	Lecture	Black Board
4.6	The People – Software Team	1	Discussion	Google classroom
4.7	The Product – Scope	2	Lecture	Black Board
4.8	Decomposition – The Process – Modeling	1	Discussion	Black Board
4.9	The Project – Approaches-W5HH Principles.	1	Lecture	Black Board
UNIT –5 Estimation and Scheduling of Projects				
5.1	Estimation – Observation	1	Chalk & Talk	Black Board
5.2	Project Planning Process - Software Scope and Feasibility	1	Chalk & Talk	Black Board
5.3	Human – Reusable – Environmental	3	Lecture	PPT & White board

5.4	Decomposition Techniques – sizing	1	Lecture	Smart Board
5.5	Problem Based – LOC Based	1	Lecture	Black Board
5.6	FP Based	1	Discussion	Google classroom
5.7	Empirical Estimation Models	2	Lecture	Black Board
5.8	Structure	1	Discussion	Black Board
5.9	COCOMO II Model.	1	Lecture	Black Board

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

CIA	
Scholastic	45
Non 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*

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Compare the different domains and process models.	K2	PSO1 & PSO2
CO 2	Identify the data, class and flow oriented modelling concepts.	K2, K3, K4	PSO1 & PSO2
CO 3	Analyse on the design oriented concepts	K2 & K3	PSO1 & PSO3
CO 4	Identify the managerial aspects of Software development.	K2, K3 & K5	PSO1 & PSO4
CO 5	Generate project schedule for different activities of software development.	K2,K3 & K5	PSO1 & PSO5

Mapping of COs with Pos

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

COURSE DESIGNER:

Staff Name - S. SELVARANI

Forwarded By

HOD'S Signature & Name

S. Mary Helan Felista

REVISION 80%

I MCA

SEMESTER – I

(For those who joined in 2021 onwards)

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

COURSE DESCRIPTION

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

COURSE OBJECTIVES

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

UNIT – I **20%** **(12 Hours)**

PROCESS AND PROCESS MODELS

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

SELF STUDY: Unified Process Model

UNIT – II **(12 Hours)**

SOFTWARE COST AND SCHEDULE ESTIMATION

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

SELF STUDY:COCOMO II Model.

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

SOFTWARE REQUIREMENTS ANALYSIS

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

SELF STUDY: Class based modeling

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

SOFTWARE DESIGN

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

SELF STUDY:Data Design Concepts.

UNIT – V **20%** **(12 Hours)**

SOFTWARE IMPLEMENTATION

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

SELF STUDY: Software Configuration Management.

REFERENCES:

1. Roger S.Pressman, "Software Engineering (A Practitioner's Approach)", Tata McGraw-Hill Publishers, 6th Edition, 2014.
   Unit I, II, III, IV and V
2. Bob Hughes and Mike Cotterell, Software Project Management, Fifth Edition,Tata McGraw-Hill Edition 2015
   Unit II
3. D. Jeya Mala, S. Geetha, "Object Oriented Analysis and Design Using UML", Tata McGraw-Hill Publishers, 2013.
   Unit III – Object Oriented Analysis and Design Models
   Unit IV – Object Oriented Design Patterns
4. Muthuramachandran, Zaigham,. Mohammed, "Software Engineering in the Era of Cloud Computing, Springer Publishers, 2019.
5. PankajJalote, "An Integrated approach to Software Engineering", 3rd Edition, Narosa Publications, 2011.

6. Stephen Schach, "Software Engineering", McGraw publication, 7th Edition, 2012.
7. Ali Behforroz, Frederick J.Hudson, "Software Engineering Fundamentals", Oxford Indian Reprint,2012.
8. Sommerville, "Software Engineering", 10th Edition, Pearson, 2015.

WEB REFERENCES:

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

COURSE CONTENTS & LECTURE SCHEDULE:

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

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

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

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	Compare the different domains and process models.	K2, K4	PSO1 & PSO2
CO 2	Estimate the cost and time estimations to develop a project	K2, K3, K4	PSO1 & PSO2
CO 3	Identify the different types of requirements analysis techniques	K2 , K4	PSO2
CO 4	Analyse the design oriented concepts	K2, K3,K4 & K5	PSO3& PSO5
CO 5	Investigate the software implementation metrics and configuration management activities	K2,K3,K4 & K5	PSO3& PSO4

Mapping COs Consistency with PSOs

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

Mapping of COs with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

Staff Name - Dr.D.Jeya Mala

Forwarded By

HOD'S Signature & Name

S. Mary Helan Felista

REVISION

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 **(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 **(12 Hours)**

Strings - String Traversal – String slices – Searching – Looping and Counting –IN operator – String Comparison - Tuples - Tuple Assignment –

Variable –Length Argument Tuples - Lists and Tuples – Dictionaries and tuples - Comparing Tuples - File Handling – Reading and Writing – Filenames and Paths – Catching Exceptions – Databases – Writing Modules - Debugging.

SELF STUDY: String Methods, Format Operator

UNIT -V OBJECT ORIENTED FEATURES **(12 Hours)**

Classes and Objects – User-defined Types – Attributes – Rectangles - Objects are mutable – Copying - Classes and Functions – Time – Modifiers – Prototyping Vs Planning - Classes and Methods – Object-Oriented Features – Printing Objects – Init, str Method, Operator Overloading – Polymorphism - Inheritance – Class Attributes – Card Objects – Decks – Inheritance - Class Diagrams.

REFERENCES:

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

WEB REFERENCES:

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

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	2	Lecture	White board

	Function			
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	String Methods	1	Lecture	PPT
4.3	Tuple Assignment	1	Chalk & Talk	Black Board
4.4	Lists and Tuples	2	Chalk & Talk	Black Board

4.5	Dictionaries and tuples	2	Discussion	Black Board
4.6	Reading and Writing in File	2	Lecture	PPT
4.7	Filenames and Paths	1	Chalk & Talk	Black Board
4.8	Databases	1	Discussion	Google classroom
4.9	Writing Modules	1	Discussion	Black Board
UNIT – 5 OBJECT ORIENTED FEATURES				
5.1	Classes and Objects	1	Chalk & Talk	Black Board
5.2	User-defined Types	1	Lecture	PPT
5.3	Objects are mutable	1	Lecture	PPT
5.4	Classes and Functions	2	Lecture	White board
5.5	Pure Function	1	Lecture	White board
5.6	Prototyping Vs Planning	1	Lecture	White board
5.7	Classes and Methods	2	Lecture	White board
5.8	Object-Oriented Features	1	Discussion	Google classroom
5.9	Operator Overloading	1	Chalk & Talk	Black Board
5.10	Polymorphism	1	Chalk & Talk	Black Board

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

CIA	
Scholastic	45
Non 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	10	15	10	5	50	50	100

C1 – Sum of Two Weekly Tests

C2 – Average of Two Monthly Tests

C3 - Mid Sem Test

C4 – Once in a semester (Seminar / Assignment)

C5 – Non – Scholastic

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	PSO1
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	PSO1& PSO2
CO 3	Use and manipulate Lists and python exception handling model to develop robust programs.	K2, K4	PSO1&PSO3
CO 4	Formulate solutions for String, tuples and File operations.	K2, K3 & K5	PSO1&PSO4
CO 5	Apply object-oriented programming concepts to develop dynamic interactive Python applications.	K2, K3 & K5	PSO1&PSO5

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

COURSE DESIGNER:

Staff Name – S. JEBAPRIYA

Forwarded By

HOD'S Signature & Name

S. Mary Helan Felista

REVISION 20%

I MCA

SEMESTER – I

(For those who join in 2021 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 10% (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 **10%** **(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 Technology, Cengage Learning, 2012 - ISBN-13: 978-1-111-82270-5
3. Allen B. Downey, "Python for Software Design", 2018.
4. ReemaThareja, "Python Programming Using Probolem Solving Approach", Oxford University Press, 2017
5. 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: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

Staff Name – S. Mary Helan Felista

Forwarded By

HOD'S Signature & Name

S. Mary Helan Felista

REVISION

II MCA

SEMESTER – III

(For those who join in 2020 onwards)

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

COURSE DESCRIPTION

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

COURSE OBJECTIVE

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

UNIT – I Fundamentals of software Testing: (12 Hours)

Definition – Approaches - Popular definitions-Testing during development life cycle- Requirement Traceability Matrix- Essentials-

Important features- Principles- Salient features of good testing- Test planning- Challenges in testing- Test team Approach- Cost aspect of testing- Categories of defect- Testing Process.

Software verification and validation:

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

SELF STUDY: Test Planning, types of review

UNIT – II V Test Model: **(12 Hours)**

V model for software – testing during proposal stage – testing during requirement stage – testing during test planning phase – testing during design , coding – VV model.

Defect Management – Defect Classification – Defect Life cycle – Defect template – Defect Management Process- Techniques for finding defects – Reporting Defects.

SELF STUDY : Defect Classification

UNIT – III: Levels of Testing: **(12 Hours)**

Introduction – Proposal Testing – Requirement Testing- Design Testing- Code Review – Unit testing – Module Testing – Integration testing – Big – Bang Testing- System testing- Testing stages.

Special Tests – Complexity Testing – GUI Testing – Compatibility Testing – Security Testing – Performance Testing , Volume Testing and Stress Testing – Recovery Testing- Installation Testing -Regression testing – Manual Support Testing – Smoke Testing – Adhoc Testing – Compliance Testing – Usability Testing – Decision Table Testing.

SELF STUDY : Module Testing, GUI Testing

UNIT – IV Introduction to Quality: **(12 Hours)**

What is quality- Definition- Core Components- Quality view- Financial Aspect of quality- Definitions of quality- TQM- Quality Principles- Quality management through statistical process control, Cultural changes- Continual improvement cycle- Quality in different areas- Benchmarking and Metrics

Software Quality: Quality and Productivity relationship- Requirement of a product- Organization culture- Type of products- Software quality management.

UNIT – V Software Testing tools an Overview: **(12 Hours)**

A type of Enumeration - Counting Labeled Trees - Polya's Counting Theorem. Need for automated Testing tools- Taxonomy of Testing tools- Functional/ Regression testing tools- Performance Testing Tools- Testing Management tools- Source code testing tools- How to select a testing tool.

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

SELF STUDY: Need for automated Testing tools

REFERENCES:

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

WEB REFERENCES:

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

COURSE CONTENTS & LECTURE SCHEDULE:

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

	validation			Board
1.7	Software development verification and validation activities.	2	Chalk & Talk	Black Board
UNIT - 2 V Test Model				
2.1	V model for software – testing during proposal stage	1	Lecture	PPT
2.2	testing during requirement stage	2	Chalk & Talk	Black Board
2.3	testing during test planning phase – testing during design , coding – VV model.	2	Lecture	PPT
2.4	Defect Classification	1	Lecture	White board
2.5	Defect Life cycle – Defect template	2	Discussion	Black Board
2.6	Defect Management Process	2	Chalk & Talk	Black Board
2.7	Techniques for finding defects	1	Chalk & Talk	Black Board
2.9	Reporting Defects.	1	Chalk & Talk	Black Board
UNIT – 3 Levels of Testing				
3.1	Introduction – Proposal Testing	1	Lecture	White board
3.2	Requirement Testing- Design Testing	1	Chalk & Talk	Black Board
3.3	Code Review – Unit testing – Module Testing	2	Lecture	PPT
3.4	Integration testing – Big – Bang Testing- System testing- Testing	2	Lecture	White board

	stages.			
3.5	Complexity Testing – GUI Testing – Compatibility Testing – Security Testing	2	Discussion	PPT
3.6	Performance Testing , Volume Testing and Stress Testing – Recovery Testing- Installation Testing -Regression testing	2	Lecture	PPT
3.7	Manual Support Testing – Smoke Testing – Adhoc Testing – Compliance Testing – Usability Testing – Decision Table Testing.	2	Lecture	PPT
UNIT - 4 Introduction to Quality				
4.1	What is quality- Definition- Core Components- Quality view- Financial Aspect of quality- Definitions of quality	2	Lecture	PPT
4.2	TQM- Quality Principles- Quality management through statistical process control, Cultural changes	2	Lecture	PPT
4.3	Continual improvement cycle- Quality in different areas- Benchmarking and Metrics	2	Chalk & Talk	Black Board
4.4	Quality and Productivity relationship	2	Chalk & Talk	Black Board
4.5	Requirement of a product	1	Discussion	Black Board
4.6	Organization culture	1	Lecture	PPT

4.7	Type of products- Software quality management	2	Chalk & Talk	Black Board
UNIT – 5 Software Testing tools an Overview:				
5.1	Need for automated Testing tools- Taxonomy of Testing tools	2	Chalk & Talk	Black Board
5.2	Functional/ Regression testing tools- Performance Testing Tools	2	Lecture	PPT
5.3	Testing Management tools- Source code testing tools	3	Lecture	PPT
5.4	Selenium- Introduction- Selenium IDE and RC	3	Lecture	White board
5.5	Selenium web driver introduction.	2	Lecture	White board

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

CIA	
Scholastic	**45**
Non 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	10	15	10	5	50	50	100

C1 – Sum of Two Weekly Tests

C2 – Average of Two Monthly Tests

C3 - Mid Sem Test

C4 – Once in a semester (Seminar / Assignment)

C5 – Non – Scholastic

COURSE OUTCOMES

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

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

Mapping of COs with Pos

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

COURSE DESIGNER:

Staff Name – P.NANCY VINCENTINA MARY

Forwarded By

HOD'S Signature & Name

(S. MARY HELAN FELISTA)

REVISION 80%

II MCA

SEMESTER – III

(For those who join in 2021 onwards)

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

COURSE DESCRIPTION

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

COURSE OBJECTIVE

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

UNIT – I Fundamentals of software Testing: 20& (12 Hours)

Definition– Approaches - Testing during development life cycle- Requirement Traceability Matrix- Salient features of good testing- Test planning- Challenges in testing- Test team Approach- Cost aspect of testing - **Software verification and validation -** Verification – methods of verification – types of review– Validation – Levels of validation – acceptance testing - Verification and validation activities.

SELF STUDY: Test Planning, types of review

UNIT – II Testing Model and Defect Management 20% (12 Hours)

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

SELF STUDY : Defect Classification

UNIT – III: Types of Testing and Test case Design: 20% (12 Hours)

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

SELF STUDY : Module Testing, GUI Testing

UNIT – IV Introduction to Quality: 20% (12 Hours)

Definition- Core Components- TQM- Quality Principles- Quality management through statistical process control – Cause Effect

Graphing - **Software Quality**: Quality and Productivity relationship- Requirement of a product- Organization culture- Type of products- Software quality management.

UNIT – V Software Testing tools **20%** **(12 Hours)**

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

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

SELF STUDY: Need for automated Testing tools

REFERENCES:

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

WEB REFERENCES:

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

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 Fundamentals of software Testing				
1.1	Definition, Approaches	1	Lecture	Black Board
1.2	Testing during development life cycle, Requirement Traceability Matrix	1	Lecture	White board
1.3	Salient features of good testing-Test planning	1	Lecture	PPT
1.4	Challenges in testing	1	Lecture	PPT
1.5	Test team Approach, Cost aspect of testing	2	Lecture	PPT
1.6	Verification , methods of verification	1	Lecture	White board
1.7	types of review, Validation	2	Lecture	PPT
1.8	Levels of validation , acceptance testing	2	Chalk & Talk	Black Board
1.9	Verification and validation activities	1	Chalk & Talk	Black Board
UNIT 2 - Testing Model and Defect Management				
2.1	V model for software Testing	1	Lecture	PPT
2.2	Testing during requirement stage ,	2	Chalk & Talk	Black Board
2.3	testing during test planning phase	1	Lecture	PPT

2.4	testing during design and coding , VV model	2	Lecture	White board
2.5	Defect Classification	1	Discussion	Black Board
2.6	Defect Life cycle	1	Chalk & Talk	Black Board
2.7	Defect template	1	Chalk & Talk	Black Board
2.8	Defect Management Process	1	Lecture	PPT
2.9	Techniques for finding defects	1	Chalk & Talk	Black Board
2.10	Reporting Defects	1	Chalk & Talk	Black Board
UNIT 3 - Types of Testing and Test case Design				
3.1	White Box Testing	1	Lecture	White board
3.2	Testing Techniques in White Box Testing, Black Box Testing	2	Chalk & Talk	Black Board
3.3	Testing techniques in Black Box Testing ,Test case design	1	Lecture	PPT
3.4	GUI Testing , Compatibility Testing	2	Lecture	White board
3.5	Security Testing, Performance Testing , Stress Testing	2	Discussion	Black Board
3.6	Recovery Testing, Regression testing	2	Lecture	PPT
3.7	Smoke Testing, Adhoc Testing	1	Chalk & Talk	Black Board
3.8	Usability Testing	1	Chalk & Talk	Black Board

UNIT 4 - Introduction to Quality				
4.1	Definition, Core Components	1	Lecture	PPT
4.2	TQM, Quality Principles	2	Lecture	PPT
4.3	Quality management through statistical process control, Cause Effect Graphing	2	Lecture	Black Board
4.4	Quality and Productivity relationship	1	Lecture	PPT
4.5	Requirement of a product	2	Lecture	White board
4.6	Organization culture	1	Lecture	PPT
4.7	Type of products	1	Lecture	PPT
4.8	Software quality management	2	Lecture	Black Board
UNIT -5 Software Testing tools				
5.1	Need for automated Testing tools, Taxonomy of Testing tools	1	Lecture	PPT
5.2	Functional, Regression testing tools	3	Lecture	PPT
5.3	Performance Testing Tools, Testing Management tools	3	Lecture	PPT
5.4	Source code testing tools Software tool: Selenium, Introduction	3	Lecture	PPT
5.5	Selenium IDE and RC, Selenium web driver introduction.	2	Lecture	PPT

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

CIA	
Scholastic	45
Non Scholastic	5
	50

- ✓ **All the course outcomes are to be assessed in the various CIA components.**
- ✓ **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	Identify the Fundamentals of concepts of Software testing and Software Quality Management.	K2, K4	PSO1 & PSO2
CO 2	Implement process that ensures the Software is developed with quality standards	K2, K3, K4	PSO1& PSO2
CO 3	Use the latest tools that help in Software testing and quality assurance	K2 , K4	PSO3 & PSO5
CO 4	Develop quality management methods to effectively organize staff	K2, K3,K4 & K5	PSO3& PSO4
CO 5	Deploy a successful development of the Software product	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	1	1	2	1	3
CO4	1	1	3	2	1
CO5	1	1	1	3	2

Mapping of C0s with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER: **Forwarded By**

Staff Name – DR.D.JEYA MALA **HOD'S Signature & Name**

REVISION

II MCA

SEMESTER – III

(For those who joined in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCA304	ENTERPRISE APPLICATION DEVELOPMENT	MAJOR CORE	4	4

COURSE DESCRIPTION

This course provides exposure to different frameworks namely, Struts, Hibernate, Spring and Django. This collective information supports the learner for developing advanced enterprise applications.

COURSE OBJECTIVES

- To know the architectures of Distributed systems, to understand and compare the technologies associated with J2EE and DOTNET.
- To build lightweight enterprise-ready applications
- To acquire capability in Python programming and grow true web applications utilizing Django.

UNIT – I CLIENT SERVER ARCHITECTURE (12 Hours)

2-tier model - 3-tier model - n-tier model -J2EE architecture - DOTNET architecture - MVC architecture.

MVC Architecture - How to start an ASP.NET MVC application - The folders and files for a new MVC application

SELF STUDY : Working with Views - Working with controls

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 – Accessing data with mongo DB – Creating asynchronous method -Using web socket to build an interactive web application.

SELF STUDY : Uploading files – Validating form input

UNIT – III STRUTS **(12 Hours)**

Struts – Introduction – MVC framework – STRUTS architecture – Business service – Parameter passing – Action class and configuration files – struts.xml tags –Namespace and wild cards – Validation – Interceptors – In built interceptors – Custom interceptors

SELF STUDY : Model driven action – Value stack and OGNL

UNIT – IV HIBERNATE **(12 Hours)**

HIBERNATE ORM – Persistence – Relational Database – The object relational impedance mismatch – Using native Hibernated APTs and hbm.xml – Using the java persistence API's – Hibernate Validator – HIBERNATE OGM – Configuration of tools – HIBERNATE SEARCH – Enabling full text search capabilities in entities – Introduction to Full Text Search.

SELF STUDY : Indexing – Searching

UNIT – V DJANGO **(12 Hours)**

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

SELF STUDY : Internationalization and localization

REFERENCES:

1. Justin Couch, Daniel H.Steinberg, "J2EE Bible", Wiley India(P) Ltd, NewDelhi , 2002

2. William S. Vincent, "Django for Beginners: Build websites with Python and Django", 2018

3. Christian Bauer, Gavin King, and Gary Gregory, "Java Persistence with Hibernate", Second Edition, Manning Publications Co, 2019

4. Craig Walls, "Spring in Action", Fifth Edition, Manning Publications,2018

5.Sharanam Shah, Vaishali Shah, "Struts 2 for Beginners Struts 2 for Beginners", 3rd Edition, Arizona Business Alliance,2014

WEB REFERENCES:

1. https://www.javatpoint.com/spring-tutorial
2. https://www.tutorialspoint.com/asp.net_mvc/index.htm
3. https://www.journaldev.com/2134/struts-tutorial-for-beginners#struts-tutorial-8211-result-pages
4. https://howtodoinjava.com/hibernate-tutorials/
5. https://www.guru99.com/django-tutorial.html

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**Client server architecture**			
1.1	2-tier model - 3-tier model	2	Chalk & Talk	Black Board
1.2	n-tier model -J2EE architecture	2	Chalk & Talk	Black Board
1.3	DOTNET architecture - MVC architecture	2	Discussion	Google classroom
1.4	MVC Architecture	2	Chalk & Talk	Black Board
1.5	How to start an ASP.NET MVC application	2	Discussion	Black Board
1.6	The folders and files for a new MVC – application	2	Lecture	White board
UNIT - 2	**SPRING**			
2.1	Web services – Consuming a restful web service	1	Lecture	PPT
2.2	Java desktop application / JSP, building REST service with spring	2	Chalk & Talk	Black Board
2.3	Spring security architecture – accessing relational data using JDBC with spring	1	Lecture	PPT
2.4	Handling form submission	1	Lecture	White board
2.5	Creation of batch service	2	Discussion	Black Board

2.6	Securing web applications	2	Chalk & Talk	Black Board
2.7	Accessing data with mongo DB –	1	Chalk & Talk	Black Board
2.8	Creating asynchronous method	1	Lecture	PPT
2.9	Using web socket to build an interactive web application	1	Lecture	PPT
UNIT – 3 STRUTS				
3.1	Struts – Introduction	1	Lecture	White board
3.2	MVC framework – STRUTS architecture	2	Chalk & Talk	Black Board
3.3	Business service – parameter passing	2	Lecture	PPT
3.4	Action class and configuration files	2	Lecture	White board
3.5	struts.xml tags –Name space and wild cards	1	Lecture	PPT
3.6	Validation	1	Discussion	Google classroom
3.7	Interceptors	1	Chalk & Talk	Black Board
3.8	In built interceptors	1	Lecture	PPT
3.9	Custom interceptors	1	Chalk & Talk	Black Board
UNIT - 4 HIBERNATE				
4.1	HIBERNATE ORM – Persistence	1	Lecture	PPT
4.2	Relational Database	1	Lecture	PPT
4.3	The object relational impedance	1	Chalk & Talk	Black

	mismatch			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	1	Lecture	PPT
5.3	Template layer	1	Lecture	PPT
5.4	Forms	1	Lecture	White board
5.5	Automated admin interface	2	Lecture	White board
5.6	Django security	2	Lecture	White board
5.7	Django web application tools	1	Lecture	White board
5.8	Core functionalities – Geographic Framework.	2	Discussion	Google classroom

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

CIA	
Scholastic	45
Non Scholastic	5
	50

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

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

EVALUATION PATTERN

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

C1 – Sum of Two Weekly Tests

C2 – Average of Two Monthly Tests

C3 - Mid Sem Test

C4 – Once in a semester (Seminar / Assignment)

C5 – Non – Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Develop dynamic web applications using MVC	K2	PSO1
CO 2	Use dependency injection & inversion of control in developing Spring project	K2, K3, K4	PSO2
CO 3	Create the Struts classes and use MVC design pattern for creating large web applications	K2 & K3	PSO3
CO 4	Map Java classes and object associations to relational database tables with Hibernate mapping files	K2, K3 & K5	PSO2 & PSO4
CO 5	Use Django for rapid development, pragmatic, maintainable, clean design, and secures websites..	K2,K3 & K5	PSO2 & PSO5

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	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

COURSE DESIGNER:

Staff Name – S.MARY HELAN FELISTA

Forwarded By

HOD'S Signature & Name

S. Mary Helan Felista

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

NEW

REVISION 20%

II MCA

SEMESTER – III

(For those who joined in 2021 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCA304	ENTERPRISE APPLICATION DEVELOPMENT	MAJOR CORE	4	4

COURSE DESCRIPTION

This course provides exposure to different frameworks namely, Struts, Hibernate, Spring and Django. This collective information supports the learner for developing advanced enterprise applications.

COURSE OBJECTIVES

- To know the architectures of Distributed systems, to understand and compare the technologies associated with J2EE and DOTNET.
- To build lightweight enterprise-ready applications
- To acquire capability in Python programming and grow true web applications utilizing Django.

UNIT – I CLIENT SERVER ARCHITECTURE (12 Hours)

2-tier model - 3-tier model - n-tier model -J2EE architecture - DOTNET architecture - MVC architecture.

MVC Architecture - How to start an ASP.NET MVC application - The folders and files for a new MVC application

SELF STUDY : Working with Views - Working with controls

UNIT – II SPRING **20%** **(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 – Automated admin interface -- 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 –	2	Lecture	PPT

	configuration of tools			
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 C0s with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER: **Forwarded By**

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

S. Mary Helan Felista

REVISION

II MCA

SEMESTER – III

(For those who join in 2020 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCAAM03	MACHINE LEARNING	SPECIALIZATION ELECTIVE – AI & MACHINE LEARNING	4	4

COURSE DESCRIPTION

This course provides an introduction to learn Machine Intelligence and Machine Learning Applications algorithms to solve real world problems.

COURSE OBJECTIVE

- To introduce the fundamentals of Machine Learning and algorithms.
- To define the classifiers and its associated algorithms
- To impart the knowledge on supervised and unsupervised learning algorithms used for classification, prediction and clustering.

UNIT - I INTRODUCTION **(12 Hours)**

Introduction to machine learning - Learning Problems – Learning System – Issues in machine learning - Concept Learning - Learning Task – General-to-specific Ordering – Specific Hypothesis – Candidate Elimination – Inductive Bias.

SELF STUDY : Choosing the Target Function

UNIT – II DECISION TREE & BAYESIAN LEARNING (12 Hours)

Decision Tree Learning - Decision tree representation – Issues in decision tree learning- Bayesian Learning - Bayes Theorem – Bayes Theorem and Concept Learning – Naive Bayes classifier - Bayesian Networks -EM Algorithm

SELF STUDY : Avoiding Overfitting the Data

UNIT - III GENETIC ALGORITHMS (12 Hours)

Introduction to Instance Based Learning – K-Nearest Neighbor Learning - Radial Basis Function, Case based reasoning - Genetic Algorithms - Hypotheses – Genetic Operators – Hypothesis Space Search – Genetic Programming – Models of Evolution and Learning.

SELF STUDY : Parallelizing Genetic Algorithms

UNIT - IV LEARNING SETS OF RULES (12 Hours)

Introduction to Learning Sets of Rules - Sequential Covering Algorithms – Learning First order Rules – FOIL – Inverting Resolution - Analytical Learning **-** PROLOG EBG – Explanation Based learning – Features.

SELF STUDY : Deductive Learning

UNIT - V KNIME (12 Hours)

Introduction – Installation – First Run – Workbench – Running Workflow – Exploring Workflow – Building own Model – Testing Model .

REFERENCES :

1. Tom M. Mitchell, "Machine Learning", Tata McGraw-Hill, New Delhi, 1997.
2. Hastie.T, Tibshirani.R, and Friedman.J, "The Elements of Statistical Learning: Data Mining Inference and Prediction", Second edition, Springer, 2009.
3. Christopher M. Bishop, "Pattern Recognition and Machine Learning" – Information Science and Statistics, Springer, 2007.

WEB REFERENCES :

1. https://machinelearningmastery.com/machine-learning-with-python/
2. http://ibpsa.fr/jdownloads/Simurex/2015/Presentations/30_03_atelierdatamining.pdf
3. https://www.tutorialspoint.com/knime/index.htm

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 INTRODUCTION				
1.1	Introduction to Machine Learning	1	Chalk & Talk	Black Board
1.2	Learning problems	2	Chalk & Talk	Black Board
1.3	Choosing Representation and Function	2	Lecture	PPT
1.4	Concept Learning Task	2	Chalk & Talk	Black Board
1.5	General-to-specific Ordering	1	Discussion	Black Board
1.6	Specific Hypothesis	1	Lecture	White board
1.7	Candidate Elimination	2	Lecture	PPT
1.8	Inductive Bias	1	Lecture	White board
UNIT -2 DECISION TREE & BAYESIAN LEARNING				
2.1	Decision Tree Learning	1	Lecture	PPT

2.2	Decision tree representation	1	Chalk & Talk	Black Board
2.3	Basic Decision Tree Learning Algorithm	1	Lecture	PPT
2.4	Hypothesis Space Search	1	Lecture	White board
2.5	Inductive bias in Decision Tree Learning	1	Discussion	Black Board
2.6	Bayesian Learning	1	Discussion	Black Board
2.7	Bayes Theorem	1	Chalk & Talk	Black Board
2.8	Hypotheses and Probabilities	1	Chalk & Talk	Black Board
2.9	Bayes classifier	1	Lecture	White board
2.10	Bayesian Networks	1	Discussion	Black Board
2.11	EM Algorithm	1	Lecture	PPT
2.12	Gibbs algorithm	1	Lecture	PPT
UNIT -3 GENETIC ALGORITHMS				
3.1	Introduction to Instance Based Learning	1	Lecture	White

				board
3.2	K-Nearest Neighbor Learning	2	Chalk & Talk	Black Board
3.3	Radial Basis Function	1	Lecture	PPT
3.4	Case based reasoning	1	Lecture	White board
3.5	Introduction to Genetic Algorithms	1	Lecture	PPT
3.6	Hypotheses & Genetic Operators	2	Discussion	Google classroom
3.7	Hypothesis Space Search	1	Chalk & Talk	Black Board
3.8	Genetic Programming	2	Lecture	PPT
3.9	Evolution and Learning models	1	Discussion	Black Board
UNIT -4 LEARNING SETS OF RULES				
4.1	Introduction to Learning Sets of Rules	2	Lecture	PPT
4.2	Sequential Covering Algorithms	2	Lecture	PPT
4.3	Learning First-Order Rules : FOIL	1	Chalk & Talk	Black Board
4.4	Induction as Inverted Deduction	1	Chalk &	Black

			Talk	Board
4.5	Inverting Resolution	1	Discussion	Black Board
4.6	Inductive & Analytical Learning Problems	2	Lecture	PPT
4.7	PROLOG EBG	2	Chalk & Talk	Black Board
4.8	Explanation – Based Learning	1	Discussion	Google classroom
UNIT -5 KNIME				
5.1	Introduction	1	Lecture	PPT
5.2	Installation	2	Lecture	PPT
5.3	First Run	1	Lecture	White board
5.4	Workbench	2	Lecture	White board
5.5	Running Workflow	1	Lecture	White board
5.6	Exploring Workflow	2	Lecture	White board
5.7	Building own Model	2	Lecture	White board

5.8	Testing Model	1	Discussion	Google classroom

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

CIA	
Scholastic	**45**
Non Scholastic	**5**
	50

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

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

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

EVALUATION PATTERN

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

C1 – Sum of Two Weekly Tests

C2 – Average of Two Monthly Tests

C3 - Mid Sem Test

C4 – Once in a semester (Seminar / Assignment)

C5 – Non - Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Identify the concepts of machine learning	K2	PSO1
CO 2	Demonstrate Decision Tree learning and Bayesian Learning for classification.	K2, K3, K4	PSO2
CO 3	Analyze the logic behind Genetic Algorithms.	K2 & K3	PSO3
CO 4	Compare various set of rules available for Learning.	K2, K3 & K5	PSO2 & PSO4
CO 5	Propose solution for real world problems based on Inductive and Analytical Learning.	K2,K3 & K5	PSO2 & PSO5

Mapping of C0s with Pos

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

COURSE DESIGNER:

Staff Name – S. JEBAPRIYA

Forwarded By

HOD'S Signature & Name

(S. MARY HELAN FELISTA)

REVISION 20%

II MCA

SEMESTER – III

(For those who join in 2021 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
MCA	20MCAAM03	MACHINE LEARNING	SPECIALIZATION ELECTIVE – AI & MACHINE LEARNING	4	4

COURSE DESCRIPTION

This course provides an introduction to learn Machine Intelligence and Machine Learning Applications algorithms to solve real world problems.

COURSE OBJECTIVE

- To introduce the fundamentals of Machine Learning and algorithms.
- To define the classifiers and its associated algorithms
- To impart the knowledge on supervised and unsupervised learning algorithms used for classification, prediction and clustering.

UNIT I **(12 HRS.)**

INTRODUCTION

Introduction to machine learning -Learning Problems – Learning System – Issues in machine learning - Concept Learning - Learning Task – General-to-specific Ordering – Inductive Bias.

SELF STUDY : Choosing the Target Function

UNIT II **(12 HRS.)**

DECISION TREE & BAYESIAN LEARNING

Decision Tree Learning -Bayesian Learning - Bayes Theorem – Bayes Theorem and Concept Learning – Naive Bayes classifier - Bayesian Networks

SELF STUDY : Avoiding Overfitting the Data

UNIT III **(12 HRS.)**

GENETIC ALGORITHMS

Introduction to Instance Based Learning – K-Nearest Neighbor Learning - Genetic Algorithms - Hypotheses – Genetic Operators – Genetic Programming.

SELF STUDY : Parallelizing Genetic Algorithms

UNIT IV **(12 HRS.)**

LEARNING SETS OF RULES

Introduction to Learning Sets of Rules -Sequential Covering Algorithms – Learning First order Rules – FOIL – Analytical Learning **-** PROLOG EBG – Explanation Based learning

SELF STUDY : Deductive Learning

UNIT V **20%** **(12 HRS.)**

KNIME

Introduction – Installation – First Run – Workbench – Running Workflow – Exploring Workflow – Building own Model – Testing Model .

SELF STUDY : Testing model

REFERENCES :

1. Tom M. Mitchell, "Machine Learning", Tata McGraw-Hill, New Delhi, 1997.
2. Hastie.T, Tibshirani.R, and Friedman.J, "The Elements of Statistical Learning: Data Mining Inference and Prediction", Second edition, Springer, 2009.
3. Christopher M. Bishop, "Pattern Recognition and Machine Learning" – Information Science and Statistics, Springer, 2007.

WEB REFERENCES :

1. https://machinelearningmastery.com/machine-learning-with-python/
2. http://ibpsa.fr/jdownloads/Simurex/2015/Presentations/30_03_atelierdatamining.pdf
3. https://www.tutorialspoint.com/knime/index.htm

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 INTRODUCTION				
1.1	Introduction to Machine Learning	1	Chalk & Talk	Black Board
1.2	Learning problems	2	Chalk & Talk	Black Board
1.3	Learning System	2	Lecture	PPT
1.4	Issues in machine learning	2	Chalk & Talk	Black Board
1.5	Concept Learning	1	Discussion	Black Board
1.6	Learning Task	1	Lecture	White board
1.7	General-to-specific Ordering	2	Lecture	PPT
1.8	Inductive Bias	1	Lecture	White board

UNIT -2 DECISION TREE & BAYESIAN LEARNING				
2.1	Decision Tree Learning	2	Lecture	PPT
2.2	Bayesian Learning	2	Discussion	Black Board
2.3	Bayes Theorem	2	Chalk & Talk	PPT
2.4	Bayes Theorem and Concept Learning	2	Lecture	White board
2.5	Naive Bayes classifier	2	Discussion	Black Board
2.6	Bayesian Networks	2	Lecture	PPT
UNIT -3 GENETIC ALGORITHMS				
3.1	Introduction to Instance Based Learning	2	Lecture	White board
3.2	K-Nearest Neighbor Learning	2	Chalk & Talk	Black Board
3.3	Genetic Algorithms	2	Lecture	PPT
3.4	Hypotheses	2	Lecture	White board
3.5	Genetic Operators	2	Lecture	PPT
3.6	Genetic Programming	2	Discussion	Google classroom
UNIT -4 LEARNING SETS OF RULES				
4.1	Introduction to Learning Sets of Rules	2	Lecture	PPT

4.2	Sequential Covering Algorithms	2	Lecture	PPT
4.3	Learning First-Order Rules, FOIL	2	Chalk & Talk	Black Board
4.4	Analytical Learning	2	Chalk & Talk	Black Board
4.5	PROLOG EBG	2	Discussion	Black Board
4.6	Explanation, Based Learning	2	Discussion	Google classroom
UNIT -5 KNIME				
5.1	Introduction	1	Lecture	PPT
5.2	Installation	2	Lecture	PPT
5.3	First Run	1	Lecture	White board
5.4	Workbench	2	Lecture	White board
5.5	Running Workflow	1	Lecture	White board
5.6	Exploring Workflow	2	Lecture	White board
5.7	Building own Model	2	Lecture	White board
5.8	Testing Model	1	Discussion	Google classroom

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	Identify the concepts of machine learning	K2, K4	PSO1,PS02
CO 2	Demonstrate Decision Tree learning and Bayesian Learning for classification.	K2, K3, K4	PSO2, PSO3
CO 3	Analyze the logic behind Genetic Algorithms.	K2 , K4	PSO1, PSO3
CO 4	Compare various set of rules available for Learning.	K2, K3,K4 & K5	PSO4, PSO5
CO 5	Propose solution for real world problems based on Inductive and Analytical Learning.	K2,K3,K4 & K5	PS03, PSO4

Mapping COs Consistency with PSOs

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

Mapping of C0s with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER: **Forwarded By**

Staff Name – R. SMEETA MARY **HOD'S Signature & Name**

S. Mary Helan Felista