

**JAYARAJ ANNAPACKIAM COLLEGE
FOR WOMEN (AUTONOMOUS)**

A Unit of the Sisters of St. Anne of Tiruchirappalli

Accredited with 'A+' Grade (Cycle 4) by NAAC

DST FIST Supported College

**Affiliated to Mother Teresa Women's University,
Kodaikanal**

**PERIYAKULAM – 625 601, THENI DT.
TAMIL NADU.**



M.PHIL. MATHEMATICS

2020-2023

PG AND RESEARCH CENTRE OF MATHEMATICS

M. PHIL. PROGRAM OUTCOMES

PO. NO.	UPON COMPLETION OF THIS PROGRAM THE STUDENTS WILL BE ABLE TO
1.	Reflect critically on their own, with their peers' and synthetic working situations in the light of new concepts and course input.
2.	Identify relevant sources, evaluate them and to use these appropriately in their studies.
3.	Engage in independent study and group/pair work including the presentation of materials.
4.	Relate skills with self management and task achievement, meeting deadlines, problem-solving and meta cognitive awareness.
5.	Associate study skill with data collection and researching, digesting, selecting, planning, writing and presenting articles for publication.
6.	Present reports on their findings in the respective category of work to improve their expertise and imbibe practical abilities.

M. PHIL. PROGRAMME SPECIFIC OUTCOMES

PSO. NO.	UPON COMPLETION OF THIS PROGRAM THE STUDENTS WILL BE ABLE TO	PO MAPPED
PSO - 1	Apply recent methodologies and techniques in research	PO - 5
PSO - 2	Provide novel solutions to complex problems.	PO - 2
PSO - 3	Develop professional skills in Mathematics	PO - 4
PSO - 4	Implement effective academic and personal strategies for carrying out research projects independently and ethically.	PO - 6
PSO - 5	Equip themselves to face the research challenges in Mathematics and Apply fuzzy logic in pure and applied mathematics	PO - 1 PO - 3

M. PHIL. COURSE PATTERN (2020 - 2023) (UGC/ TANSICHE/ MTU)

Sem.	Subject Code	Subject Title	Hours	Credits
I	20MMA1C01	Research Methodology	10	8
	20MMA1C02	Algebra, Analysis and Topology	14	12
	20MMA1E3A/	Advanced Topology	06	-
	20MMA1E3B/	Mathematical Modelling		
	20MMA1E3C	Fuzzy set theory and its Applications		
II	20MMA2E3A/	Advanced Topology	-	05
	20MMA2E3B/	Mathematical Modelling		
	20MMA2E3C	Fuzzy set theory and its Applications		
	20MMA2R01	Project	30	15
		Total	60	40

❖ No External Exam for Indepth Study Course.

CONTINUOUS INTERNAL ASSESSMENT COMPONENT (CIA)

THEORY:

Component	Marks	Marks
Internal Test I	40	Converted to 25
Internal Test II	40	
Seminar	10	
Term Paper	5	
Attendance	5	
Total	100	25

PASSING MINIMUM

Semester Examination	
Theory	50% out of 75 Marks (i.e. 37.5 Marks)

PROJECT WORK

The ratio of marks for Internal and External Examination is 50:50.

THE INTERNAL COMPONENTS OF PROJECT

Components	Marks
First Review	10
Second Review	10
Final Review (Internal Viva Voce)	30
Total	50

EXTERNAL VALUATION OF PROJECT WORK

Components	Marks
Dissertation	25
External Viva Voce	25
Total	50

EXTERNAL QUESTION PATTERN

(Maximum Marks-75)

5 Questions × 15 Marks = 75 Marks

(Internal Choice and One Set of Question from each Unit)

INTERNAL QUESTION PATTERN

(Maximum Marks-40)

5 Questions × 8 Marks = 40 Marks

(Internal Choice and One Set of Question from each Unit)

CONTINUOUS INTERNAL ASSESSMENT (CIA)

INDEPTH STUDY COURSE

Component	Marks
Internal Test I	30
Internal Test II	30
E-Content Preparation	10
Seminar Paper Presentation (1)	15
Journal Format Submission (1)	15
Total	100

INTERNAL QUESTION PATTERN FOR INDEPTH STUDY COURSE

(Maximum Marks-30)

3 Questions × 10 Marks = 30 Marks

(Open Choice Three Questions out of Five)

RESEARCH METHODOLOGY

Semester: I

Hours: 10

Code : 20MMA1C01

Credits: 8

COURSE OUTCOMES:

CO NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Understand some basic concepts of research and its methodologies.	PSO - 5	K
CO - 2	Identify and define appropriate research problem and parameters.	PSO - 2	S
CO - 3	Familiar with different methods of mathematical proof.	PSO - 5	E
CO - 4	Analyze and apply the methods of data collection.	PSO - 4, PSO - 5	An
CO - 5	Construct Mathematical models for real problems and develop real situations to Mathematical problems.	PSO - 3, PSO - 5	Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester : I		RESEARCH METHODOLOGY										Hours: 10	
Code : 20MMA1C01												Credits: 8	
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's	
	1	2	3	4	5	6	1	2	3	4	5		
CO1	4	3	4	3	3	3	3	3	3	3	3	4	3.27
CO2	3	4	3	3	3	3	3	4	3	3	3	3	3.18
CO3	4	3	4	3	3	3	3	3	3	3	3	4	3.27
CO4	4	3	4	3	3	4	3	3	3	4	4	4	3.45
CO5	4	3	4	4	3	3	3	3	4	3	4	4	3.45
Overall Mean Score												3.32	

Result: The Score for this Course is 3.32 (High Relationship)

Note:

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

Values Scaling:

$\text{Mean Score of Cos} = \frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	$\text{Mean Overall Score for Cos} = \frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$
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UNIT I

An introduction-Meaning of research-Objectives of research- Motivation in research-Types of research - Research methods versus methodology-Research and Scientific method-Criteria of good research- Defining the research problem - Selecting the problem - Necessity of defining the problem- Techniques involved in defining a problem - Research design-Meaning of research design- Need for research design- Features of a good design- Important concepts relating to research design - Report of thesis. **(30 Hours)**

UNIT II

Sampling design -Element selection - Census and sample survey -Implication of sample design - Steps in sample design -Criteria of selecting a sample procedure -Characteristics of a good sample design- Types of sample design -Selection of random sample -Conclusion. Methods of data collection - Collection of primary data - Collection of data through questionnaires - Collection of data through schedules - Difference between questionnaires and schedules - Other methods of data collection - Collection of secondary data - Selection of appropriate method for data collection - Case study method - Conclusion. **(30 Hours)**

UNIT III

Proof methods and induction - Formal proofs - Proofs and the real world - Propositional reasoning examples - Proofs by contradiction - Proofs: False proofs - Inductive proofs - More simple induction -Tiling problem - Geometry - Double induction - Strong induction - Tournaments - Induction, strong induction and well ordering - Structural induction - Induction and recursive algorithms.

(30 Hours)

UNIT IV

Mathematical modelling through difference equations - The need for Mathematical modelling through difference equations: some simple models -Basic theory of linear difference equations with constant coefficients -Mathematical modelling through difference equations in Population Dynamics and Genetics - Mathematical modelling through difference equations in Probability theory.

(30 Hours)

UNIT V:

Mathematical modelling through graphs -Situations that can be modelled through graphs - Mathematical models in terms of directed graphs - Mathematical models in terms of signed graphs - Mathematical modelling in terms of weighted digraphs - Mathematical modelling in terms of unoriented graphs. **(30 Hours)**

COURSE BOOKS:

1. C.R. Kothari, Research Methodology - Methods & Techniques, Edition 2004, New Age International (P) Ltd. Publishers.
2. Pankaj Madan, VageeshPaliwal and Rajul Bhardwaj, Research Methodology, Vision Publishing House, New Delhi, 2008.
3. RajendraAkerkar and RupaliAkerkar, Discrete Mathematics, Dorling Kindersley (India) Pvt. Ltd., 2008.
4. J. N. Kapur, Mathematical Modelling, New Age International Publishers, New Delhi, 2011.

Unit I : Book- 1 Chapters 1,2 &3

Unit II : Book- 2 Chapters 4 & 6

Unit III: Book - 3 Chapter 1

Unit IV: Book - 4 Chapter 5: Sections 5.1, 5.2, 5.4 & 5.5

Unit V : Book - 4 Chapter 7: Sections 7.1 to 7.5

ALGEBRA, ANALYSIS AND TOPOLOGY

Semester: I

Hours: 14

Code : 20MMA1C02

Credits: 12

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Get through knowledge on Modules and its applications.	PSO - 3	K
CO - 2	Apply localization in the study of projective modules as locally free modules.	PSO - 3	Ap
CO - 3	Identify the measurable sets and functions.	PSO - 4	C
CO - 4	Apply the concepts of Banach algebra in approximation theory.	PSO - 1	An
CO - 5	Acquire knowledge of L - Fuzzy topology.	PSO - 1	An

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester : I		ALGEBRA, ANALYSIS AND TOPOLOGY										Hours: 14
Code : 20MMA1C02												Credits: 12
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO1	3	3	3	4	3	3	3	3	4	3	3	3.18
CO2	3	3	3	4	3	3	3	3	4	3	3	3.18
CO3	3	3	3	4	3	3	3	3	3	4	3	3.18
CO4	3	3	3	3	3	4	4	3	3	3	3	3.18
CO5	3	3	3	3	4	3	4	3	3	3	3	3.18
Overall Mean Score											3.18	

Result: The Score for this Course is 3.18 (High Relationship)

Note:

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

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$
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UNIT I: MODULES

Free Modules - Projective Modules - Tensor Products - Flat Modules. (42 Hours)

UNIT II: LOCALISATION

Ideals - Local Rings - Localisation - Applications (42 Hours)

UNIT III: POSITIVE BOREL MEASURES & L^p SPACES

Regularity properties of Borel Measure - Lebesgue measure - Continuity properties of measurable functions - convex functions and inequalities - the L^p spaces - Approximation by continuous functions. (42 Hours)

UNIT IV: ELEMENTARY THEORY OF BANACH ALGEBRAS

Banach Algebras - introduction - invertible elements - ideals & homomorphism - Spectrum of an element in Banach Algebra - Spectral radius formula - Quotient Algebras - Applications (42 Hours)

UNIT V: FUZZY TOPOLOGICAL SPACES

Fuzzy Topological Spaces - Interior, Closure operator - Kuratowski's 14 Sets Theorem - Fuzzy topological spaces via interior and closure operators - Quasi coincident relation - Q neighbourhood of a point - Adherent points and accumulation points in L-Fuzzy topological space - Derived sets and C. T. Yang's Theorem - Continuous functions on fuzzy topological spaces. (42 Hours)

COURSE BOOKS:

1. N. S. Gopalakrishnan, Commutative Algebra - Oxonian Press pvt Ltd, New Delhi
2. Walter Rudin, Real And Complex Analysis, Third Edition, Mcgraw - Hill International Editions
3. Liu Ying Ming and Luo Mao- Kang, Fuzzy Topology, World Scientific Publishing Co., Pvt., Ltd., 1997.

Book 1: Unit I : Chapter 1 Sections 1.1 - 1.4

Unit II : Chapter 2 Sections 2.1 - 2.4

Book2: Unit III : Chapter 2 Sections 2.15 - 2.25

Unit IV : Chapter 3 Sections 3.1 - 3.17

Book 3: Unit V : Chapter 2 Sections 2.2, 2.3 (2.3.1 to 2.3.7 and 2.3.21 to 2.3.31) & 2.4

ADVANCED TOPOLOGY

Semester: I

Code : 20MMA1E3A

Hours: 6

Credits: 5

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Understand the basics of separation axioms in classical topology.	PSO - 3	K
CO - 2	Apply the topological concepts to nano topology.	PSO - 1	Ap
CO - 3	Compare classical topology with bitopology.	PSO - 4	An
CO - 4	Read and understand research articles published in journals.	PSO - 5	S
CO - 5	Write research article for publication.	PSO - 5	E

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester : I		ADVANCED TOPOLOGY										Hours: 6
Code : 20MMA1E3A												Credits: 5
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO1	3	3	3	4	3	3	3	3	4	3	3	3.18
CO2	3	3	3	3	4	3	4	3	3	3	3	3.18
CO3	3	3	3	3	3	4	3	3	3	4	3	3.18
CO4	4	3	4	3	3	3	3	3	3	3	4	3.27
CO5	4	3	4	3	3	3	3	3	3	3	4	3.27
Overall Mean Score											3.22	

Result: The Score for this Course is 3.22 (High Relationship)

Note:

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

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$
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UNIT I

Homotopy of Paths - The Fundamental Group - The Fundamental Group of the Circle. (18 Hours)

UNIT II

Application and additional examples of Fundamental Groups - Knots. (18 Hours)

UNIT III

Bitopological Separation: Pairwise T_1 and T_2 Spaces - Pairwise Regular - Quasi-Metrizable Bitopological Spaces - Pairwise Normal Bitopological Spaces. (18 Hours)

UNIT IV

Bitopological Connectedness - Zero Dimensional Spaces - Pairwise Compact Spaces. (18 Hours)

UNIT V

Nano Topology - Introduction and an application. (18 Hours)

COURSE BOOKS:

1. C.Wayne Patt, Foundations of Topology, II Edition - Jones & Bartlett Student Edition - 2012.
2. K. Chandrasekhara Rao, Topology, Narosa Publishing House Pvt. Ltd., 2009.
3. Prepared Course material.

BOOK 1 :

Unit I: Chapter - 8: Sections 8.1, 8.2 & 8.3

Unit II: Chapter - 8: Sections 8.5 & 8.6

BOOK 2 :

Unit III: Chapter 11 - Sections 11.1 to 11.4

Unit IV: Chapter 12 - Sections 12.1 to 12.3

Unit V: Prepared Course material

BOOKS FOR REFERENCE:

1. John L.Kelley, General Topology, D.Van Nostrand Company, INC, London, 2005.
2. Klaus Janich, Topology, Springer.

MATHEMATICAL MODELLING

Semester: I

Hours: 6

Code : 20MMA1E3B

Credits: 5

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire the knowledge of formulating mathematical models of real life situations.	PSO - 1	K, Ap.
CO - 2	Understand the model behavior and assess the model's ability to simulate important features of the natural systems.	PSO - 1	An
CO - 3	Know the conditions of optimality and various optimization techniques.	PSO - 5	K
CO - 4	Get acquainted with the computational methods.	PSO - 2	K, S
CO - 5	Inculcate interest in research.	PSO - 4	Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester : I		MATHEMATICAL MODELLING										Hours: 6	
Code : 20MMA1E3B												Credits: 5	
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's	
	1	2	3	4	5	6	1	2	3	4	5		
CO1	3	3	3	3	4	3	4	3	3	3	3	3	3.18
CO2	3	3	3	3	4	3	4	3	3	3	3	3	3.18
CO3	4	3	4	3	3	3	3	3	3	3	3	4	3.27
CO4	3	4	3	3	3	3	3	4	3	3	3	3	3.18
CO5	3	3	3	3	3	4	3	3	3	4	3	3	3.18
Overall Mean Score												3.2	

Result: The Score for this Course is 3.2 (High Relationship)

Note:

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

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$
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UNIT I

Introduction - single variable optimization - multivariable optimization with no constraints - multivariable optimization with equality constraints - multivariable optimization with inequality constraints. **(18 Hours)**

UNIT II

Introduction - The meaning of inventory control - Functional role of inventory - Reasons for carrying inventory - Factors involved in inventory problem analysis - Inventory model building - Single item inventory control models without shortages. **(18 Hours)**

UNIT III

Single item inventory control models with shortage - multi-item inventory control models with constraints - single item inventory control models with quantity discounts **(18 Hours)**

UNIT IV

Inventory control models with uncertain demand - Information systems for inventory control - Selective inventory control techniques. **(18 Hours)**

UNIT V

Probabilistic inventory control models: Introduction - instantaneous demand inventory control models without setup cost - continuous demand inventory control models without setup cost - Instantaneous demand inventory control model with setup cost. **(18 Hours)**

COURSE BOOKS:

1. Optimization Theory and Applications, S. S. Rao (Second edition), Wiley Eastern Limited.
2. Operations Research Theory and Applications, J. K. Sharma 4th edition, Macmillan Publishers India Ltd.
Unit I : Book1: Chapter 2: 2.1-2.5
Unit II : Book2: Chapter 14: 14.1-14.7
Unit III : Book2: Chapter 14:14.8-14.10
Unit IV : Book2: Chapter 14:14.11-14.13
Unit V : Book2: 15: 15.1-15.4

BOOK FOR REFERENCE:

1. R. Panneerselvam, Operations Research, Second Edition, Prentice - Hall of India Private Limited, New Delhi.

FUZZY SET THEORY AND ITS APPLICATIONS

Semester: I

Code : 20MMA1E3C

COURSE OUTCOMES:

Hours: 6

Credits: 5

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire the necessary knowledge of important parts of fuzzy set theory	PSO - 3	K
CO - 2	Distinguish between the crisp set and fuzzy set concepts	PSO - 5	A
CO - 3	develop knowledge on evolutionary algorithms	PSO - 2, PSO -5	An,S
CO - 4	Demonstrate multi objective and combinatorial optimization problems	PSO -1, PSO - 5	An,E
CO - 5	Construct mathematical models for real life problems	PSO - 1, PSO - 4	Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester : I		FUZZY SET THEORY AND ITD APPLICATIONS										Hours: 6
Code : 20MMA1E3C												Credits: 4
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO1	3	3	3	4	3	3	3	3	4	3	3	3.18
CO2	4	3	4	3	3	3	3	3	3	3	4	3.27
CO3	4	4	4	3	3	3	3	4	3	3	4	3.45
CO4	4	3	4	3	4	3	4	3	3	3	4	3.45
CO5	3	3	3	3	4	4	4	3	3	4	3	3.36
Overall Mean Score											3.34	

Result: The Score for this Course is 3.34 (High Relationship)

Note:

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

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$
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UNIT I

Introduction -Fuzzy Sets - t - norms, t - co norms -Algebra of Fuzzy Sets-Mixed Fuzzy Logic -Alpha Cuts-Distance Between Fuzzy Sets (18 Hours)

UNIT II

Introduction -Fuzzy Numbers-Fuzzy Arithmetic-Interval Arithmetic- Alpha Cuts and Interval Arithmetic-Properties of Fuzzy Arithmetic-Fuzzy Max and Min-Inequalities-Defuzzification (18 Hours)

UNIT III

Introduction -Definitions-Transitive Closure-Fuzzy Equivalence Relation- Fuzzy Relation Equations (18 Hours)

UNIT IV

Introduction-Extension Principle- Alpha Cuts and Interval Arithmetic- Types of Fuzzy Functions-Inverse Functions-Derivatives (18 Hours)

UNIT V

Genetic Algorithms -Fuzzy Optimization-Maximum/ Minimum of Fuzzy Functions (18 Hours)

COURSE BOOK:

1. An Introduction to Fuzzy Logic and Fuzzy sets , James J. Buckley Esfandiar Eslami, Springer International Edition.

Unit I : Chapter 3: 3.1-3.7

Unit II : Chapter 4: 4.1-4.6

Unit III : Chapter7: 7.1-7.5

Unit IV : Chapter 8: 8.1 -8.6

Unit V : Chapter 15 & Chapter 16: 16.1,16.2

BOOK FOR REFERENCE:

1. Fuzzy Set Theory and Its Applications, H. J. Zimmermann, Fourth Edition, Springer International Edition

PROJECT

Semester: II

Hours: 30

Code : 20MMA2R01

Credits: 15

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Obtain Mathematical maturity on understanding the subject and to see how the theory works.	PSO - 5	K
CO - 2	Improve abstract thinking and equip with creativity.	PSO - 2	K
CO - 3	Stimulate interest in research methodologies to pursue research.	PSO - 3	An
CO - 4	Construct numerical samples from real life problems.	PSO - 1	Ap
CO - 5	Have sustainable development in research.	PSO - 5	S, E

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester : II		PROJECT										Hours: 30	
Code : 20MMA2R01												Credits: 15	
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's	
	1	2	3	4	5	6	1	2	3	4	5		
CO1	4	3	4	3	3	3	3	3	3	3	3	4	3.27
CO2	3	4	3	3	3	3	3	4	3	3	3	3	3.18
CO3	3	3	3	4	3	3	3	3	4	3	3	3	3.18
CO4	3	3	3	3	4	3	4	3	3	3	3	3	3.18
CO5	4	3	4	3	3	3	3	3	3	3	3	4	3.27
Overall Mean Score												3.2	

Result: The Score for this Course is 3.27 (High Relationship)

Note:

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

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$
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