HAJEE KARUTHA ROWTHER HOWDIA COLLEGE

(An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai.)

UTHAMAPALAYAM – 625533.

DEPARTMENT OF MATHEMATICS

Master of Philosophy- MATHEMATICS

SYLLABUS

(Effect from the Academic Year 2020 Onwards)

PROGRAMME EDUCATIONAL OUTCOMES (PEO):

PEO-1: Motivate the scholars to use latest technology for research work.

PEO-2: Motivate the scholars to develop an aptitude for historical research.

PEO-3: Help the students to get employment opportunities in higher educational Institutions and research centre.

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PROGRAMME OUTCOMES WILL BE ABLE TO (PO):

PO1: Knowledge and critical thinking

Acquire , analyze, evaluate and interpret data using appropriate techniques use research based knowledge and research methods including design of experiments analyze and interpretation of data and synthesis of the information to provide valid conclusion **.**

PO2: Complementary Skills

Recognize the need for information effectively, search for retrieve, evaluate and apply that information gathered in support of scientific investigation or scholarly debate.

PO3: Lifelong Learning

Recognize the need and have ability to engage in continuous reflective learning in the context of technological advancement.

PO4: Professional growth

Keep on discovering new avenues in the chosen field and exploring areas that remain conductive for research and development.

PO-5: Prepare the scholars to submits M. Phil., dissertations and Ph.D., Thesis**.**

RESEARCH GRADUATE ATTRIBUTES

As an Arts and Science College with due importance to Sciences and Humanities, the following graduate attributes will be nurtured in our students in a rich academic environment with excellent learning and research, co-curricular and extracurricular experiences.

1. Strong Analytical Thinking and Problem Solving Abilities

Our graduates shall have an ability to investigate and analyse information/ problems by thinking clearly and critically, find and execute the solution creatively and effectively in a timely manner.

2. Highly specialised knowledge of Area of Study

Our graduates shall have a comprehensive specialized knowledge of their chosen area of study/research which is acquired thorough focused laboratory experiences, collaborations with other institutions/industries.

3. Motivation of Intellectual Development

Regular interactions in forums like knowledge forum and attending various workshops/seminars and the interactions thereof will give a strong motivation to our students for the intellectual development.

4. International Exposure

The programmes such as Chancellor's Chair, Erudite, and different international conferences, lead to collaborations with international research centre/universities. This will give a wide international exposure to our graduates. Also the assistance given to students for paper presentation in conferences abroad will also enhance the international expertise.

5. Expertise in Extension and need based Research Activities

Our graduates acquire expertise in societal extension activities through the programmes organised by our NSS unit and Youth Welfare Department.

Our Marine Science graduates are getting special exposure and expertise in need based research in developing products/ technologies which are to be useful for the fishermen community.

HAJEE KARUTHA ROWTHER HOWDIA COLLEGE

(AUTONOMOUS)

UTHAMAPALAYAM

Choice Base Credit System

DEPARTMENT OF Mathematics

M.Phil., Mathematics (Semester)

Course Scheme, Scheme of Examinations & Syllabus

(Academic Year 2020 – 2021 onwards)

ELIGIBILITY:

Passed in M.A., Mathematics or any other Examination accepted by the Syndicate as Equivalent.

DURATION OF THE COURSE:

The students who are joining the degree shall undergo a study period of one academic year- two Semesters.

SUBJECTS OF STUDY:

Medium of instruction: English

I Semester

Theory Papers	Code
Paper I- Research Methodology: Associative Algebra	**-20MMAC11**
Paper II- Advance Mathematics: Advanced Analysis	**-20MMAC12**
Paper III- Elective (1) – Graph Theory	**-20MMAE11**
(2)- Stochastic Process	**-20MMAE12**

Scheme of Examinations under Choice Based Credit System

Term End Examinations (TEE) - 60 Marks

Continuous Internal Assessment Examinations (CIAE) - 40 Marks

Total - 100 Marks

Pattern of Continuous Internal Assessment Examinations (CIAE)

Average of Two Internal Tests (each 25 marks) - 25 Marks

Seminar - 15 Marks

Total - 40 Marks

Pattern of Term End Examinations

(Max. Marks: 60 / Time: 3 Hours)

Part A (5 x 6 = 30 marks)

Answer **ALL** questions choosing either (a) or (b)
(One question from each unit with internal choice)

Part B (3 x 10 = 30 marks)

Answer **ANY THREE** questions out of five questions
(One question from each unit)

M. Phil Mathematics Course Content and Syllabus 2020 – 21 onwards

Semter	Course code	Title of the Course	Credit	Hours	CIAE	TEE	Total Marks
I	20MMAC11	Research Methodology: Associative Algebra	4	6	40	60	100
	20MMAC12	Advanced Analysis	4	6	40	60	100

	20MMAE11	Elective A. Graph Theory	4	6	40	60	100
	20MMAE12	Elective B. Stochastic Process					
	Total		12	18	120	180	300

SEMESTER-II

Dissertation-200 marks

Evaluation of dissertation -150 marks

(Average of internal and external examiners)

Viva-voce -50 marks

Semester	Course code	Title of the Course	Credit	Hours	CIAE	TEE	Total Marks
II	20MMACEV	Dissertation	8	6	50	150	200

TOTAL NUMBER OF COURSES, HOURS, MARKS AND CREDITS FOR M.Phil.,

MATHEMATICS PROGRAMME (2020 – 2021 Onwards)

PART / SEM	I	II	COURSES		CREDIT
CORE	**2**		**2**	**(4+4)**	**4**
	6+6				
ELECTIVE	**1**		**1**		**4**
	6				
DISSERTATION		**1**	**1**		**8**
		6			
TOTAL HOURS	**18**	**6**	**24**		
TOTAL COURSES	**3**	**1**	**4**		

Assessment

Distribution of questions and marks

Bloom's Taxonomy	Sessional Examinations				Summative Examinations			
	Part – A	Part – B	Part – C	Total	Part - A	Part – B	Part – C	Total
Knowledge	8 (8)			8 Questions (20 marks + Assignment 5 marks) Total 25 marks	10 (10)			20 Questions (Total 75 marks)
Understand		4 (a or b) (16)				5 (a or b) (35)		
Apply			2 out of 3 (16)				3 out of 5 (30)	

Note: Figures in the parenthesis are marks

	CIA					TEE		
LEVEL	%	WEIGHT	MARKS	ATTAINMENT	%	WEIGHT	MARKS	ATTAINMENT
K1								
K2								
K3	0.2	3	2	1	0.2	3	3	1
K4	0.4	4	4	2	0.4	4	6	2
K5	0.4	5	4	2	0.4	5	6	2
TOTAL	1		10		1		15	
SEMINAR			15					
TOTAL			25					

RESEARCH METHODOLOGY

Programme : M.Phil., Mathematics **Course Category : Core - 1**
Semester : I **Hours : 6**
Course Code: 20MMAC11 **Credits: 4**

PREAMBLE

The course demonstrates the Quaternion algebra, Simple modules and Radical of an algebra .The chain conditions in rings are elaborately discussed.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Analyze and explain fundamental of mathematics. .	K4
CO2	Analyze modules, sub-modules, quotient modules and local properties of fractions.	K2
CO3	Explain semi simple algebra	K2
CO4	Determine Noetherian and Artinian rings research level	K5
CO5	Construct simple algebra.	K3

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	M
CO2	S	S	M	S	S
CO3	M	S	S	S	S
CO4	S	M	S	S	S
CO5	S	S	S	M	S

S- Strong; **M-Medium;** **L-Low**

Syllabus

Unit I

Associative algebra – Group algebras – Endomorphism algebra – Matrix algebras – Quaternion algebra – Finite dimensional algebras – Quaternion algebras – Isomorphism of Quaternion algebras.

Unit II

Modules – Change of scalars – Lattice of Sub modules – Simple modules – Semi Simple modules – structure of semi simple modules – Chain conditions – The Radical of ring – tensor product of modules.

Unit III

Structure of semi simple algebras – semi simple – Minimal right ideals – Simples algebras – Matrices of homeomorphisms – The Density theorem – Wedderburn structure theorem – Mascheke's theorem.

Unit IV

The Radical – radical of an algebra – Nakayam's Lemma – The Jacobson radical – The radical of an Artinian algebra – Nilpotent algebras – The radical of a Group algebra – Ideals in Artinian Direct decompositions – Local algebras – Fitting's lemma.

Unit V

Simple algebras – centers of simple algebras – The density theorem The Jacobson – Bourbaki theorem – Central simple algebras – The Braner Group – The Noehter – Skolem Theorem – The Double Centalizer Theorem.

Text Books

R.S.Pierce **"The Associative Algebras"** GIM 88, Springer Verleg 1982

Reference Books

- Vijay K Khanna and S.K. Bhambri , 2015, A course in Abstract Algebra, Vikas Publishing House Pvt. Ltd., New Delhi.
- Richard M. Foote and David S. Dummit , 2011, Abstract Algebra, John Wiley Publications, New York.
- Joseph A Gallian, 1999, Contemporary Abstract Algebra, Narosa Publication, New Delhi, 1999

Pedagogy

Chalk & Talk, Group Discussion, PPT

Teaching Aids

LCD Projector / Interactive / Black Board

Course Contents and Lecture Schedule

Module No.	Topic	No. Of Lectures	Content Delivery Method	Teaching Aids
Unit – I				
1.1	Group algebras	**3**	**Chalk and Talk**	**Black Board**
1.2	Simple modules	**4**	**Chalk and Talk**	**Black Board**
1.3	Quaternion algebra,	**4**	**Chalk and Talk**	**Black Board**
1.4	Finite dimensional algebras.	**3**	**Lecture**	**Black Board**
1.5	Isomorphism of Quaternion algebras.	**4**	**Discussion**	**Black Board**
Unit - II				
2.1	Lattice of Sub modules.	**4**	**Chalk and Talk**	**Black Board**
2.2	Simple modules	**4**	**Chalk and Talk**	**Black Board**
2.3	structure of semi simple modules.	**5**	**Discussion**	**Black Board**
2.4	Chain conditions.	**4**	**Lecture**	**Black Board**
2.5	The Radical of ring and tensor product of modules	**4**	**Discussion**	**Black Board**
Unit - III				
3.1	Structure of semi simple algebras	**4**	**Chalk and Talk**	**Black Board**
3.2	Matrices of homeomorphisms	**4**	**Chalk and Talk**	**Black Board**
3.3	The Density theorem – Wedderburn structure theorem	**5**	**Discussion**	**Black Board**
3.4	Mascheke's theorem	**4**	**Lecture**	**Black Board**
Unit – IV				
4.1	Radical of an algebra	**4**	**Chalk and Talk**	**Black Board**
4.2	The Jacobson radical	**4**	**Chalk and Talk**	**Black Board**
4.3	The radical of an Artinian algebra and Nilpotent algebras	**4**	**Chalk and Talk**	**Black Board**
4.4	Ideals in Artinian Direct decompositions	**4**	**Chalk and Talk**	**Black Board**
Unit – V				
5.1	Central simple algebras	**4**	**Chalk and Talk**	**Black Board**
5.2	The Braner Group	**5**	**Chalk and Talk**	**Black Board**
5.3	The Double Centalizer Theorem	**5**	**Chalk and Talk**	**Black Board**
Total		**90**		

ADVANCED ANALYSIS

Programme : M.Phil., Mathematics **Course Category : Core**
Semester : I **Hours : 6**
Course Code: 20MMAC12 **Credits: 4**

PREAMBLE

The course covers the analysis of integration , L_P – Spaces, various properties of topological spaces, Undestand Fourier series and study its applications plays a key role in finding approximate solutions to theoretical and practical problems.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Assimilate complex mathematical ideas and arguments	K4
CO2	Explain vector and Borelspaces	K2
CO3	Classify and analyze various properties of topological spaces.	K3,K4
CO4	Define and apply L_P – Spaces.	K3,K5
CO5	Undestand Fourier series and study its applications	K1,K3

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	M
CO2	S	S	M	S	S
CO3	S	S	S	S	S
CO4	S	M	S	S	S
CO5	S	S	S	M	S

S- Strong; **M-Medium;** **L-Low**

Syllabus

Unit I

Abstract Integration:

Set – Theoretic notations and terminology – The concept of measurability – Simple functions – Elementary properties of measures – integration of positive functions – integration of complex functions – The role played by sets of measure zero.

Unit II

Positive Boral measures:

Vector spaces – Topological preliminaries – The Riesz – Representation theorem – Regularity properties of Borel measure.

Unit III

Lebesgue Measure:

Lebesgue Measure – continuity properties of measurable functions.

Unit IV

L_P – Spaces:

Convex functions and inequalities – The L_P – Spaces – Approximation by continuous functions.

Unit V

Fourier transforms:

Formal properties – The inversion Theorem – The Plancherel theorem – The Banach algebra L_P

Text Books

Real and Complex Analysis (III – Edition) Walter Rudin Mc Graw - Hill

Reference Books

- Karunakaran. V, 2012, Real Analysis, Pearson, Chennai.
- Stephen Abbott, 2010, Understanding Analysis, Springer Verlag, New York.
- Tom M. Apostol,1969, Mathematical Analysis , A Modern Approach to Advanced Calculus, Addison-Wesley Publishing Company, United States

Pedagogy

Chalk & Talk, Group Discussion, PPT

Teaching Aids

LCD Projector / Interactive / Black Board

Course Contents and Lecture Schedule

Module No.	Topic	No. Of Lectures	Content Delivery Method	Teaching Aids
Unit – I				
1.1	Theoretic notations and terminology	**3**	**Chalk and Talk**	**Black Board**
1.2	The concept of measurability and Simple functions	**4**	**Chalk and Talk**	**Black Board**
1.3	Elementary properties of measures	**4**	**Chalk and Talk**	**Black Board**
1.4	integration of positive functions and integration of complex functions	**3**	**Lecture**	**Black Board**
1.5	The role played by sets of measure zero	**4**	**Discussion**	**Black Board**
Unit - II				
2.1	Vector spaces – Topological preliminaries – The Riesz – Representation theorem – Regularity properties of Borel measure.	**4**	**Chalk and Talk**	**Black Board**
2.2	Topological preliminaries	**4**	**Chalk and Talk**	**Black Board**
2.3	The Riesz – Representation theorem	**5**	**Discussion**	**Black Board**
2.4	Regularity	**4**	**Lecture**	**Black Board**
2.5	Regularity properties of Borel measure.	**4**	**Discussion**	**Black Board**
Unit - III				
3.1	Lebesgue Measure – continuity properties of measurable functions.	**4**	**Chalk and Talk**	**Black Board**
3.2	continuity properties of measurable functions.	**4**	**Chalk and Talk**	**Black Board**
3.3	Students presentation	**5**	**Discussion**	**Black Board**
3.4	Students presentation	**4**	**Lecture**	**Black Board**
Unit – IV				
4.1	Convex functions	**4**	**Chalk and Talk**	**Black Board**
4.2	Convex functions and inequalitie	**4**	**Chalk and Talk**	**Black Board**
4.3	The L_P – Spaces	**4**	**Chalk and Talk**	**Black Board**
4.4	Approximation by continuous functions	**4**	**Chalk and Talk**	**Black Board**
5.1	Fourier transforms:	**4**	**Chalk and Talk**	**Black Board**
5.2	Formal properties – The inversion Theorem –	**5**	**Chalk and Talk**	**Black Board**
5.3	The Plancherel theorem – The Banach algebra L_P	**5**	**Chalk and Talk**	**Black Board**
Total		**90**		

ELECTIVE – 1
GRAPH THEORY

Programme : M.Phil., Mathematics **Course Category : Elective**
Semester : I **Hours : 6**
Course Code: 20MMAE11 **Credits: 4**

PREAMBLE

The course deals with the graph theoretical concepts connectivity, planarity and distance that help to model real life situations.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Apply domination theory in installing common facility in appropriate points in town planning	K4
CO2	Anlyze changing and unchanging properties	K2
CO3	Analyze graceful labeling	K3,K4
CO4	Explain Ramsey numbers	K3,K5
CO5	Undestand product graphs	K1,K3

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	M
CO2	S	S	M	S	S
CO3	S	S	S	S	S
CO4	S	M	S	S	S
CO5	S	S	S	M	S

S- Strong; **M-Medium;** **L-Low**

Syllabus

Unit I:

Domination in Graphs – Dominating sets in graphs – Bounds on the domination number in terms of order, size, degree, diameter and girth.

Unit II:

Changing and unchanging properties of domination parameters.

Unit III:

Factorization and decomposition of Graphs – Graceful labeling of graphs – Harmonious labeling of graphs.

Unit IV:

The Ramsey number of graphs – Turan's theorem – Rainbow Ramsey Theorem.

Unit V:

Product Graphs.

Text Books

1. T.W. Haynes, S.T. Hedetniemi and P.J. Slater, Fundamentals of Domination in Graphs, Marcal Dekker Inc.1998.
2. G.Chartand and L. Lesniak, Graphs and Digraphs, Fourth Edition, Chapman and Hall CRC, 2005.
3. Gary chartnad and Ping zhang, Introduction to Graphs Theory, Tata Mcgraw- Hill, 2005
4. A text Book of Graph Theory Volume I and II by R. Balakrishan and Renganathan.

Reference Books

1. V.R. kulli, Theory of domination in graphs, Vishwa international Publishing, Gulbarga, 2010
2. K.R.Parthasarathy, Basic Graph Theory, Tata Mcgraw – Hill Publishing Company, 1994
3. Douglas West, Introduction in Graph Theory, prentice, Hall of India, 2010.

Pedagogy

Chalk & Talk, Group Discussion, PPT

Teaching Aids

LCD Projector / Interactive / Black Board

Course Contents and Lecture Schedule

Module No.	Topic	No. Of Lectures	Content Delivery Method	Teaching Aids
Unit – I				
1.1	Domination in Graphs	**6**	**Chalk and Talk**	**Black Board**
1.2	Dominating sets in graphs	**6**	**Chalk and Talk**	**Black Board**
1.3	Bounds on the domination number in terms of order, size, degree, diameter and girth	**6**	**Chalk and Talk**	**Black Board**
Unit - II				
2.1	Changing and unchanging properties of	**4**	**Chalk and Talk**	**Black Board**

	domination parameters			
2.2	Students presentation	**4**	**Chalk and Talk**	**Black Board**
2.3	Students presentation	**5**	**Discussion**	**Black Board**
2.4	Students presentation	**4**	**Lecture**	**Black Board**
2.5	Students presentation	**4**	**Discussion**	**Black Board**
Unit - III				
3.1	Factorization and decomposition of Graphs	**4**	**Chalk and Talk**	**Black Board**
3.2	Graceful labeling of graphs	**4**	**Chalk and Talk**	**Black Board**
3.3	Harmonious labeling of graphs	**5**	**Discussion**	**Black Board**
3.4	Students presentation	**4**	**Lecture**	**Black Board**
Unit – IV				
4.1	The Ramsey number of graphs	**4**	**Chalk and Talk**	**Black Board**
4.2	Turan's theorem	**4**	**Chalk and Talk**	**Black Board**
4.3	Rainbow Ramsey Theorem	**4**	**Chalk and Talk**	**Black Board**
4.4	Students presentation	**4**	**Chalk and Talk**	**Black Board**
5.1	Product Graphs.	**4**	**Chalk and Talk**	**Black Board**
5.2	Product Graphs	**5**	**Chalk and Talk**	**Black Board**
5.3	Students presentation	**5**	**Chalk and Talk**	**Black Board**
Total		**90**		

ELECTIVE – 2

STOCHASTIC PROCESS

Programme : M.Phil., Mathematics **Course Category : Elective**

Semester : I **Hours : 6**

Course Code: 20MMAE12 **Credits: 4**

PREAMBLE

The course deals with various distributions of discrete and continuous types. Estimation of parameters and testing of hypotheses are studied in detail

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Understand random variable and its properties	K4
CO2	Define Markov chains and its properties	K2
CO3	Explain Markov process in discrete space	K3,K4
CO4	AnalyzeMarkov process with Continuous states space.	K3,K5
CO5	Undestand martingales	K1,K3

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	M
CO2	S	S	M	S	S
CO3	S	S	S	S	S
CO4	S	M	S	S	S
CO5	S	S	S	M	S

S- Strong; **M-Medium;** **L-Low**

Syllabus

Unit I:

Random Variables and stochastic Process

Generating Function Laplace transform Laplace (stileltjes) Transform of a probability Distribution of a random classification of Distribution stochastic Process An Introduction.

Unit II:

Markov Chains

Definition and examples – Higher transition Probabilities – Sequence of Chain Dependent Trails – Classification of states and chains – Determination of Higher transition probabilities – stability of a Markov system – Graph theoretic approach – Markov chain with of Denumerable number of States.

Unit III:

Markov process with distcrete scale space poisson process and its Extensions

Poisson process – poisson process and related deistributions – generalization of poisson process – Birth and Death process – Markov process with Distcrete state space (Continuous Time Markov Chain)

Unit IV:

Markov process with Continuous states space

Introduction – Brownian motion – wiener process – Differential Equations for a Wiener process – kolmogorov Equation – First passage Time distribution for wiener process Ornstein – Uhlenbeck process

Unit V:

Martingales

Introduction – Definitions and examples – properties of martingales - Continuous Parameters Matingales

Text Books

J. Medhi "Stochastic processes" (2nd Edition) New Age international Pvt publisher – 2009

Reference Books

Stohastic process -Kulkarni

Pedagogy

Chalk & Talk, Group Discussion, PPT

Teaching Aids

LCD Projector / Interactive / Black Board

Course Contents and Lecture Schedule

Module No.	Topic	No. Of Lectures	Content Delivery Method	Teaching Aids
Unit – I				
1.1	Generating Function Laplace transform	**6**	**Chalk and Talk**	**Black Board**
1.2	Distribution of a random classification	**6**	**Chalk and Talk**	**Black Board**
1.3	Students presentation	**6**	**Chalk and Talk**	**Black Board**
Unit - II				

2.1	Definition and examples – Higher transition Probabilities – Sequence of Chain Dependent.	**4**	**Chalk and Talk**	**Black Board**
2.2	Trails – Classification of states and chains	**4**	**Chalk and Talk**	**Black Board**
2.3	stability of a Markov system – Graph theoretic approach	**5**	**Discussion**	**Black Board**
2.4	Students presentation	**4**	**Lecture**	**Black Board**
2.5	Students presentation	**4**	**Discussion**	**Black Board**
Unit - III				
3.1	Poisson process – poisson process and related deistributions –	**4**	**Chalk and Talk**	**Black Board**
3.2	generalization of poisson process – Birth and Death process	**4**	**Chalk and Talk**	**Black Board**
3.3	Birth and Death process – Markov process with Distcrete state space	**5**	**Discussion**	**Black Board**
3.4	Students presentation	**4**	**Lecture**	**Black Board**
Unit – IV				
4.1	Introduction – Brownian motion – wiener process	**4**	**Chalk and Talk**	**Black Board**
4.2	Differential Equations for a Wiener process	**4**	**Chalk and Talk**	**Black Board**
4.3	First passage Time distribution for wiener process Ornstein – Uhlenbeck process	**4**	**Chalk and Talk**	**Black Board**
4.4	Students presentation	**4**	**Chalk and Talk**	**Black Board**
5.1	Properties of martingales	**4**	**Chalk and Talk**	**Black Board**
5.2	Continuous Parameters Matingales	**5**	**Chalk and Talk**	**Black Board**
5.3	Students presentation	**5**	**Chalk and Talk**	**Black Board**
Total		**90**		

DISSERTATION

Programme : M.Phil., Mathematics **Course Category : Elective**
Semester : II **Hours : 6**
Course Code: 20MMACEV **Credits: 8**

Course Outcomes:

CO1: Formulate a research a topic

CO2: Familiar with the various stages of research process

CO3: Ability to analyze and evaluate the chosen topics

In the II semester the students have to write a dissertation.

Regular attendance is compulsory.

(200 marks : Dissertation-150 and Viva voce-50)