ST. JOSEPH'S COLLEGE OF ARTS & SCIENCE (AUTONOMOUS)

CUDDALORE-1

PG & RESEARCH DEPARTMENT OF MATHEMATICS

M.Phil. MATHEMATICS

SYLLABUS (2018-2019)

PG AND RESEARCH DEPARTMENT OF MATHEMATICS

CURRICULUM TEMPLATE

M.Phil. MATHEMATICS

SEMESTER – I

S.No	Part		Hours/ Week	Credit	Course Code	Course Title	Maximum Marks		
							CIA	ESE	TOTAL
1	III	Core Theory - 1	6	5	MMT101A	Algebra and Analysis	25	75	100
2	III	Core Theory - 2	6	5	MMT102A	Topology and Differential Equations	25	75	100
3	III	Core Theory - 3	6	5	GMT201	Elective Paper (Guide Paper)	25	75	100
4	III	Library	12	-		Science-6 (Library)+6(Lab)	-	-	-
Semester Total			**30**	**15**			**75**	**225**	**300**

SEMESTER – II

S.No	Part		Hours/ Week	Credit	Course Code	Course Title	Maximum Marks		
							CIA	ESE	TOTAL
5	III	Core Theory - 1		21	JMT201	Dissertation and Viva Voice	100	100	200
Semester Total				**21**			**100**	**100**	**200**

YEAR – I	ALGEBRA AND ANALYSIS FOR THE STUDENT ADMITTED FROM 2016	MMT101A
SEMESTER –I		Hrs / Week: 6
CORE – I		Credit: 5

OBECTIVES:

The course aims to apply the concepts of Rings, Ideals, Modules of Fractions and Primary Decomposition, Abstract Integration, L^p – spaces, Fourier Transforms and Holomorphic Fourier Transforms in Research Paper.

COURSE OUTCOME:

CO1: Knowing the advance concepts of rings, ideals and modules.
CO2: Getting the knowledge of rings modules of Fractions and primary decomposition.
CO3: Knowing the advanced concepts of measure theory and HP spaces.
CO4: Knowing the Fourier transforms and some new types.
CO5: Getting the basic knowledge of research methodology

SEMESTER IV	COURSE CODE: MMT101A					COURSE TITLE: ALGEBRA AND ANALYSIS									HOURS: 6	CREDIT: 5
COURSE OUTCOME	PROGRAMME OUTCOME (PO)					PROGRAMME SPECIFIC OUTCOME(PSO)										
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO2	PSO4	PSO5	PSo6	PSO7	PSO8	PSO9	PSO 10	Mean Score of CO's
CO1	4	5	4	3	2	4	3	4	3	4	3	4	4	5	4	3.6
CO2	5	5	5	4	2	3	4	5	4	3	4	3	3	5	4	3.6
CO3	3	4	4	3	2	5	4	3	5	4	4	4	5	3	3	4.0
CO4	4	5	3	4	2	5	4	4	5	4	3	5	4	4	5	3.9
CO5	3	5	5	3	2	4	4	3	5	4	4	5	3	5	5	3.6
Mean Overall Score																3.7

Result: The Score of this Course is 3.7 (High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

UNIT I: RINGS, IDEALS AND MODULES

Rings and ring homomorphism-Ideals, Quotient rings-Zero-divisors, Nil potent elements ,units-Prime ideals and maximum ideals-Nil radical and Jacobson radical-operations on ideals-extension and contraction-exercises-Modules and module homomorphism-sub modules and quotient modules-operation on sub modules-Direct sum and product-Finitely generated modules. -Exercises.

UNIT-II: RINGS, MODULES OF FRACTIONS AND PRIMARY DECOMPOSITION

Extract sequences-Tensor product of modules-Restriction and extension of scalars-Exactness properties of the tensor product-Algebra-Tensor product of algebras-Local properties-Extended and contracted ideals in rings of fractions Exercises- Primary decomposition – Exercise.

UNIT-III: ABSTRACT INTEGRATION AND L^P – SPACES

L^P– Spaces

Convex Function and Inequalities – The **L^P**– Spaces – Approximation by Continuous Functions – The Inversion Theorem.

H^P Spaces

The concept of H^Pspaces-the role played by the **H^P**spaces-simple functions –inequalities-Exercises.

UNIT-IV:FOURIER TRANSFORMS AND HOLOMORPHIC FOURIER TRANSFORMS

Formal properties – The Invention Theorem – thePlancheral Theorem – The Banach algebra Li- Introduction – Two Theorems of Paley and Wiener – Quasi – analytic classes – The Denjoy- Carleman theorem.

UNIT-V: RESEARCH METHODOLOGY

Research – Research methods and methodology –Types of Research – Mode of approach– Art of writing a Research paper and thesis

TEXT BOOKS:

1. M.F. Atiyah, I.G. Macdonald, Introduction to Commutative Algebra, Addison – Wesley Publishing Company, 1969.
   Unit-I Chapter – 1 (pg 1-10), Chapter – 2 (pg 17 – 31)
   Unit-II Chapter - 3 (pg 36 – 43), Chapter – 4 (pg 50 – 55)
2. Walter Rudin, Real and Complex Analysis II Edition, McGraw Hill International, 1986.
   Unit – III Chapter - 3 (pg61 – 70), Chapter – 17 (pg335 – 355),
   Unit-IV Chapter – 9 (pg 178 – 193), Chapter – 19(pg 371 – 383) .

3. Unit-V Research Methodologyby S Rajasekar, P Philominathan and V Chinnathambi, e-material at http://arxiv.org/pdf/physics/0601009.pdf

YEAR – I	TOPOLOGY AND DIFFERENTIAL EQUATIONS FOR THE STUDENT ADMITTED FROM 2016	MMT102A
SEMESTER –I		Hrs / Week: 6
CORE-2		Credit: 5

OBECTIVES:

The course aims to apply the concepts Fundamental Group, Covering Spaces, Simplified Complexes, Linear Systems, and Non Linear Systems: Local Theory, Techniques and Dynamics of Teaching- Learning in Research Paper.

COURSE OUTCOME:

CO1: Get Knowing the fundamental group and covering spaces
CO2: Knowing the simplicial complexes.
CO3: Knowing the linear systems
CO4: getting the knowledge of nonlinear systems: local theory
CO5: Knowing the techniques and dynamic of teaching.

SEMESTER IV	COURSE CODE: MMT102A					COURSE TITLE : TOPOLOGY AND DIFFERENTIAL EQUATIONS									HOURS: 6	CREDIT: 5
COURSE OUTCOME	PROGRAMME OUTCOME (PO)					PROGRAMME SPECIFIC OUTCOME(PSO)										
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO2	PSO4	PSO5	PSo6	PSO7	PSO8	PSO9	PSO10	Mean Score of CO's
CO1	4	5	4	3	2	4	3	4	3	4	3	4	4	5	4	3.6
CO2	5	5	5	4	2	3	4	5	4	3	4	3	3	5	4	3.5
CO3	3	4	4	3	2	5	4	3	5	4	4	4	5	3	3	4.0
CO4	4	5	3	4	2	5	4	4	5	4	3	5	4	4	5	3.9
CO5	3	5	5	3	2	4	4	3	5	4	4	5	3	5	5	3.6
Mean Overall Score																3.67

Result: The Score of this Course is 3.67 (High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

UNIT –I: FUNDAMENTAL GROUP AND COVERING SPACES
Homotopy – Fundamental group – Covering spaces.

UNIT – II: SIMPLICIAL COMPLEXES
Geometry of Simplicial Complexes - Bary Centric subdivisions – Simplicial approximation Theorem – Fundamental Group of a simplicial Complex.

UNIT-III: LINEAR SYSTEMS
Uncoupled Linear System – Diagonalization – Exponentionals operators – The Fundamental Theorem for linear system – Linear System in R2 – Complex Eigen Values – Multiple Eigen Values – Non Homogeneous Linear System.

UNIT-IV: NON LINEAR SYSTEMS: LOCAL THEORY
Some preliminary concepts & definitions – The Fundamental Existence – Uniqueness Theorem – Dependence on Initial Conditions and Parameters – The Maximum Interval of Existence- The Flow Defined by a Differential Equation.

UINT-V: TECHNIQUES AND DYNAMICS OF TEACHING- LEARNING
a. Emerging trends in Educational Psychology– Meaning, Scope and Methods
b. Learning–Different Theories of learning, Approaches to learning(Classical Conditioning-Ivan Pavlov; Operant conditioning-B.F.Skinner); kinds of learning, factors affecting learning
c. Motivation: Intrinsic and extrinsic motivation, Development of memory and intelligence.

TEXT BOOKS:

1. I.M.Singer, J.A.Thorpe, Lecture notes on Elementary Topology and Geometry, Spring- Verlag, Newyork,1967.
   Unit-I -Chapter -3 ,pg(49-77)Unit-II-Chapter -4 ,pg (78-108)
2. L. Pergo, Differential Equation and Dynamical System, third edition, Springer – Verlag, Newyork,2006
   Unit-III Chapter -1,sections (1.1 to 1.7and 1.10) –pg(1-39 , 60-63)
   Unit-IV Chapter -2,sections (2.1 to 2.5)-pg(65-101)

3. Unit-V : Covey, Stephen. (2004),7 Habits of Highly effective people, Free Press. Driscoll, M. P. (2005),Psychology of Learning for Instruction, Pearson HigherEd. Gardner, Howard (1983; 1993) Frames of Mind: The theory of multiple intelligences, New York: Basic Books

QUESTION PATTERN

Internal Examination (25 marks)

Two Internal Examinations	15 marks
Assignment / Seminar	10 marks
Total	**25 marks**

External Examination (75 marks)

Question Pattern

M. Phil. COMPUTER SCIENCE

Time: 3 Hours **Max. Marks: 75**

PART A (5x6=30)

ANSWER ALL FIVE QUESTIONS

Internal Choice (Either or Pattern)

PART B (3x15=45)

ANSWER ANY THREE QUESTIONS

Out of Six Questions (Open Choice)

TOTAL (30+45=75)