# MASTER OF PHILOSOPHY IN MATHEMATICS
# SYLLABUS SESSION 2013-14

## CURRICULUM

| S. No | Code | Papers | Max. Marks | Ex. Hrs. |
|---|---|---|---|---|
| 1 | MPMM 101 | Research Methodology | 100 | 3 |
| 2 | MPMM 102 | Analysis & Differential Equations | 100 | 3 |
| 3 | MPMM 103 | Specialization on dissertation topic on dissertation topic | 100 | 3 |
| 4 | MPMM 104 | Dissertation | 100 | - |

## RESEARCH METHODOLOGY THEORY AND TECHNIQUES
## MPMM 101

**UNIT – I**

**Research** – Definition – Importance and Meaning of research – Characteristics of research – Types of Research – Steps in research – Identification, Selection and formulation of research problem – Research questions – Research design – Formulation of HypoDissertation – Review of Literature.

**UNIT – II**

**Sampling techniques:** Sampling theory – types of sampling – Steps in sampling – Sampling and Non-sampling error – Sample size – Advantages and limitations of sampling.
Collection of Data : Primary Data – Meaning – Data Collection methods – Secondary data – Meaning – Relevances, limitations and cautions.

**UNIT – III**

**Statistics in Research** – Measure of Central tendency – Dispersion – Skewness and Kurtosis in research. Hypo Dissertation – Fundamentals of Hypo Dissertation testing – Standard Error – Point and Interval estimates – Important Non-Parametric tests : Sign, Run, Kruskal – Wallis tests and Mann-Whitney test.

**UNIT – IV**

**Para metric tests:** Testing of significance – mean, Proportion, Variance and Correlation – testing for Significance of difference between means, proportions, variances and correlation co-efficient. Chi-square tests – ANOVA – One-way and Two-way

**UNIT – V**

**Research Report:** Types of reports – contents – styles of reporting – Steps in drafting reports – Editing the final draft – Evaluating the final draft.

**Reference Books:**


1. Statistical Methods — S.P. Gupta
2. Research Methodology Methods and Techniques — C.R. Kothari
3. Statistics (Theory and Practice) — B.N. Gupta
4. Research Methodology Methods and Statistical Techniques — Santosh Gupta


## ANALYSIS & DIFFERENTIAL EQUATION
## MPMM 102

**UNIT – I**

**Lebesgue measure:** Introduction – Outer measure – Measurable sets & Lebsegue measure – A non-measurable set – Measurable functions – Littlewood's three principles.

**UNIT – II**

**The lebsgue integral:** Riemann integral – The lebsegue integral of bounded function over a set of finite measure – The integral of a non-negative function – The general lebsgue integral – Convergence in measure.

**UNIT – III**

D**ifferentiation & integration**
Differentiation of monotone functions – Functions of bounded variation – Differentiation of an integrate Absolute continuity – Convert functions.

**UNIT – IV**

**Differential equations:** Introduction equations with constant co-efficient : Introduction – The 2nd order homogenous equation – Initial value problem for second order equations – Linear dependence – A formula for the wornskian – The non-homogeneous equation of order two – The homogenous equation of order 'n' – Initial value problem for nth order equations – Equations with real constant.

**UNIT – V**

**Linear equations with variable co-efficients:** Introduction – Initial value problem for the homogenous equation – Solutions of the homogeneous equation – The wronskian and linear independence – Reduction of order of a homogeneous equation – The non-homogeneous equation – The Homogeneous equations with analytic co-efficient – The legendry equation.

**Reference Books:**

1. Real Analysis by H.L. Royden. 3rd edition – Prentice Hall India Publications.
2. An Introduction to 2.Ordinary Differential equations by Earl A. Coddington – Prentice Hall India Pubishers.