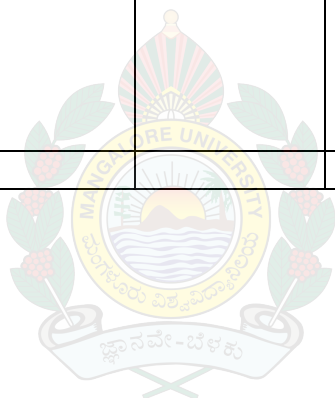


**MANGALORE UNIVERSITY**  
**DEPARTMENT OF MATERIALS SCIENCE**

**SCHEME OF EXAMINATION AND SYLLABUS FOR THE COURSE WORK OF  
Ph.D PROGRAMME IN MATERIALS SCIENCE**

**Scheme**

Papers	Particulars	Hours of instruction per week	Duration of examinations (hrs)	Marks			Credits
				IA	Theory	Total	
Paper I	Research Methodology	4	3	30	70	100	4
Paper II	Reviewing of literature and planning of the proposed research work with a tentative title	16	–	–	–	200	8
						<b>Total</b>	<b>20</b>



# MANGALORE UNIVERSITY

## DEPARTMENT OF MATERIALS SCIENCE

### SYLLABUS FOR THE COURSE WORK OF PHD PROGRAM IN MATERIALS SCIENCE

**Course Objectives:** This course aims to prepare the student with necessary background to carry out research in Materials Science. Other than the standard research methodology subjects like selecting the problem, designing the research, data analysis and data representation in terms of report/ paper writing, the basic general facilities required for material synthesis and characterization are also covered.

**Expected Course outcomes:** The student is expected to have a good knowledge on the systematic approach to the research work, and analyze the results and represent them. The student is expected to have an understanding of the important experimental techniques.

#### PAPER I: RESEARCH METHODOLOGY-

**Introduction to Research Methods:** Objectives, significance, type of research, design of research, Literature Survey, Exploratory Studies, Basic outlines of experiments. ( 10 hours)

**Conditions for Material Preparation and Characterization :** Production and measurement of high temperature, low temperature and high vacuum. ( 10 hours)

**Instrumentation and Techniques of Analysis:** Principles of XRD, Spectrophotometers, DSC, TGA, UTM, Electron Microscopy, AFM, Microtron. ( 10 hours)

**Analysis of Data:** Fundamentals of Computers, Curve fitting, Treatment of errors and numerical methods, graphical representation. ( 10 hours)

**Preparation of Technical Papers/ Reports:** Interpreting & reporting results, General Guidelines for writing, Types of reports, format and style, Main body of the report/paper, Illustrations. ( 10 hours)

#### References:

1. Research Methodology- S.C. Sinha, A.K. Dhiman (Ess Ess Publications, 2002)
2. Research Methodology in Social Science- Arvind Kumar (Sarup & Sons, 2002)
3. Hand book of Research Methodology, Modern Methods & New Techniques-M.N. Borse (Shree Niwas Publications, 2004)
4. Fundamentals of Vacuum Techniques-A. Pipco *et al* (MIR, 1984)
5. Instrumental Methods in Chemical Analysis – G.W. Ewing (McGraw Hill, 1975)
6. Heat & thermodynamics- Zeemansky & Markw (Mc Graw Hill, 1968)
7. Modern Metallographic techniques and their applications-V.A. Philips (Wiley Interscience, 1971)
8. Elements of X-ray diffraction-B.D. Cullity (Addison-Wesley, 1956)