

**NOTIFICATION**

Sub: Revised syllabus for Ph.D. Coursework in Materials Science

Ref: Academic Council approval vide agenda

No.: ಎಸಿಸಿ:ಶ್ಯ.ಸಾ.ಸ.2: 18(2021-22) dated 27.10.2021

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The revised syllabus for Ph.D. Coursework in Materials Science which has been approved by the Academic Council at its meeting held on 27.10.2021 is hereby notified for implementation with effect from the academic year 2021-22.

  
REGISTRAR

To,

1. The Chairman, Dept. of Materials Science, Mangalore University, Mangalagangothri
2. The Chairman, BOS in Materials Science, Mangalore University.
3. The Registrar (Evaluation), Mangalore University.
4. The Superintendent (ACC), O/o the Registrar, Mangalore University.
5. The Asst. Registrar (ACC), O/o the Registrar, Mangalore University.
6. Guard File.



**MANGALORE UNIVERSITY  
DEPARTMENT OF MATERIALS SCIENCE**

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

**Scheme**

Papers	Particulars	Hours of instruction per week	Duration of examination (hrs)	Marks			Credits
				IA	Theory	Total	
Course I	Research methodology	4	3	30	70	100	4
Course II	Research and Publication Ethics	2	3	30	70	100	2
Course III	Reviewing of literature Review Report Viva	3	-	-	-	150 50	6
<b>Total</b>							<b>12</b>



## Course II: Research and Publication Ethics(RPE)

### THEORY

#### I. PHILOSOPHY AND ETHICS(3 hrs)

1. Introduction to philosophy: definition, nature and scope, concept, branches
2. Ethics: definition, moral philosophy, nature of moral judgements and reactions

#### II. SCIENTIFIC CONDUCT(5 hrs)

1. Ethics with respect to science and research
2. Intellectual honesty and research integrity
3. Scientific misconducts: Falsification, Fabrication, and Plagiarism(FFP)
4. Redundant publications: duplicate and overlapping publications, salami slicing
5. Selective reporting and misrepresentation of data

#### III. PUBLICATION ETHICS(7 hrs)

1. Publication ethics: definition, introduction and importance
2. Best practices/standards setting initiatives and guidelines: COPE, WAME etc.
3. Conflicts of interest
4. Publication misconduct: definition, concept, problems that lead to unethical behavior and vice versa, types
5. Violation of publication ethics, authorship and contributorship
6. Identification of publication misconduct, complaints and appeals
7. Predatory publishers and journals

### PRACTICE

#### IV. OPEN ACCESS PUBLISHING (4 hrs)

1. Open access publications and initiatives
2. SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies
3. Software tool to identify predatory publications developed by SPPU
4. Journal finder/journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggester, etc.

#### V. PUBLICATION MICONDUCT(4 hrs)

**A. Group Discussions(2 hrs)**

1. Subject specific ethical issues, FFP, authorship
2. Conflicts of interest
3. Complaints and appeals: examples and fraud from India and abroad

**B. Software tools (2 hrs)**

Use of plagiarism software like Turnitin, Urkund and other open source software tools

**VI. DATABASES AND RESEARCH METRICS(7 hrs)**

**A. Databases (4 hrs)**

1. Indexing databases
2. Citation databases: Web of Science, Scopus, etc

**B. Research Metrics (3 hrs)**

1. Impact Factor of journal as per Journal Citation Report, SNIP, SJR,IPP, Cite Score
2. Metrics: h-index, g index, i10 index, altmetrics

**References**

Bird, A.(2006). Philosophy of Science. Routledge.

MacIntyre, Alasdair(1967) A Short History of Ethics. London

P.Chaddah,(2018) Ethics in Competitive Research: Do not get scooped; do not get plagiarized, ISBN:978-9387480865

National Academy of Sciences, National Academy of Engineering and Institute of Medicine.(2009). On Being a Scientist: A Guide to Responsible Conduct in Research: Third Edition. National Academies Press.

Rensik, D.B(2011).What is ethics in research & why is it important. National Institute of Environmental Health Sciences, 1-10. Retrieved from

<https://www.niehs.nih.gov/research/resources/bioethics/whatis/index.cfm>

Beall, J.(2012). Predatory publishers are corrupting open access. Nature, 489(7415), 179-179.

<https://doi.org/10.1038/489179a>

Indian National Science Academy(INSA), Ethics in Science Education, Research and Governance(2019), ISBN:978-81-939482-1-7.[http://www.insaindia.res.in/pdf/Ethics\\_Book.pdf](http://www.insaindia.res.in/pdf/Ethics_Book.pdf)

# 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)