



# LALIT NARAYAN MITHILA UNIVERSITY

Kameshwaranagar, Darbhanga  
(Examination Department)

350)

Date:- 08.10.2021

Meeting of the Committee notified Vide Memo No. 21178-84/21 dated-04-10-2021 is being held today, The following members are present.

- |  |            |
|--|------------|
| 1. Dean, Faculty of Science, LNMU, Darbhanga                     | - Member   |
| 2. Dean, Faculty of Humanities, LNMU, Darbhanga                  | - Member   |
| 3. Dean, Faculty of Social science, LNMU, Darbhanga              | - Member   |
| 4. Dean, Faculty of Commerce, LNMU, Darbhanga                    | - Member   |
| 5. Dr. Avni Ranjan Singh, Dept. of Economics, C. M. College, DBG | - Member   |
| 6. Controller of Examination                                     | - Convenor |

**Agenda :** To devise uniform standard/model for Ph.D Course work Examinations including syllabus in the light of Ph.D. Regulation notified by Governor's Secretariat BSU-512010-2684/GS(I) dated- 21.09.17 by BSU (Regulation) 05/2010-3230 GS (I) dated 18.12.2018.

**Resolution:** The Regulation was discussed and deliberated. The Committee unanimously resolved the following.

(1) The Ph.D. Course work examinations shall comprise two papers, each of 100 marks.

(2) Each paper shall be of 2 hours duration and shall consist of 3 parts:

PART-A

(a) Objective/ Multiple choice questions- (5 in numbers each carrying 2 marks).

PART-B.

(b) Short questions 5 in number of which 3 to be answered and each will carry 10 marks.

PART-C

(c) 3 Long answer questions to be set, out of which two are to be answered and each will carry 30 marks.

(3) Regarding Conduct of the syllabus for Ph.D. Course work, it was resolved-

(a) The First-Paper shall be common to all faculties and will consist of courses on Research Methodology, Quantitative Methods, Computer Applications and other Techniques/Methods.

*A. Singh*  
8.10.2021

*B. Jha*  
8.10.2021

*A. S.*  
8.10.21  
**Controller of Examination**  
**L.N.M.U., Darbhanga**



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- (b) The second paper will include subject specific Research Methods/Techniques/Reviewing the Literature, Developing Bibliography and References.
- (4) The Committee further resolved that Dr. Avni Ranjan Singh, Head Dept. of Economics, C. M. College, Darbhanga be authorised to frame detailed contents of Paper I.
- (5) The University departments be authorised to develop the course contents of Paper-II of the subjects concerned.
- (6) It was also resolved that the uniform pattern of Ph.D. course work examination shall be effective from PAT-2021 onwards.
- (7) Each answer book of a particular subject would be evaluated by three examiners (one for Part-A, one for Part-B and one for Part-C). Another (4<sup>th</sup> examiner) would be for transcription and totalling of the marks awarded. All the four examiners will be paid equal remuneration per answer book at the rate fixed by the Examination Board.

*Avni Singh*  
8.10.2021

*Avni Singh*  
8.10.21

*Avni Singh*  
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Controller of Examination  
L.N.M.U., Darbhanga

## Paper-I

### Research Methodology

**Full Marks: 100**

**Duration of Examination: 2 Hours**

**Questions shall consist of 3 parts:**

**Part-A : Short Questions (06 in number of which 04 to be answered, each carrying 10 marks) = 40**

**Part-B : Long Answer Question (04 to be asked of which 02 to be answered, each carrying 30 marks) = 60**

1. Introduction to Research: What is Research; Why is Research Conducted; Stages in Research; Changing Nature and Expanding Scope of Research; Why Research Methodology.
2. Introduction to Major Research Methods: Natural Observation; Historical Research; Ethnographic Research; Cross-Sectional Study; Longitudinal Study; Cohort Study; Case Study; Correlational Research; Action Research; Quantitative and Qualitative Research; theoretical research, applied research and empirical research; Experimental Research: Cause and Effect Relationships, Hypothesis in Experiments, Principles of Experimentation, Classification of Experiments, Experimental Design, Requirements of a Good Experiment; Reasoning in Research : Introduction to Logical Terms; Evidences; Inductive and Deductive Reasoning; Fallacious Reasoning; Formal and Informal Fallacies; Common Fallacies.
3. Research Design: Study designs in quantitative research; Study designs in qualitative research; Other commonly used philosophy-guided designs; Choice of Variables; Constructing hypotheses, Mechanisms and Design for Data Collection; Collection of Primary Data: Observation, Interview, questionnaire and schedule Sample Surveys and Designed Experiments, Estimation without Sampling, Methods of data collection in qualitative research; Collection of Secondary Data; Data Integration; Using Publications and the Library; Using Academic Databases: Search Engines, Citation Indexes and Citation Analysis, Government of India Initiatives for

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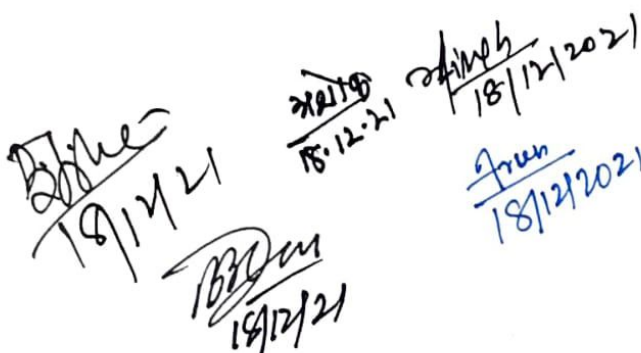
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Knowledge Management- INFLIBNET: e-ShodhSindhu, Shodhganga, ShodhGangotri, and N-List Projects.

4. Data analysis: Statistical analysis; Thematic analysis; Analysing narrative; Discourse analysis; Content analysis; Grounded Theory; Using computers in data analysis.
5. Ethics and Related Issues in Research: Concepts in Ethics in Research; Intellectual Property Rights; Scientific Values: Needed a Code of Conduct; Fraud and Misconduct in Science; Plagiarism: What is Plagiarism, Acknowledge Sources Appropriately, Paraphrasing, Direct and Indirect Quotations, Plagiarism Checking: ShodhShuddhi, UGC (Promotion of Academic Integrity and Prevention of Plagiarism in Higher Educational Institutions) Regulations, 2018, LNMU Plagiarism Policy and Regulations-2018.
6. Writing a Research Proposal: Introduction; The research problem; Objectives of the study; Hypotheses to be tested; Study design; Measurement procedures; Analysis of data; Structure of the report; Problems and limitations.
7. The Structure of a Thesis: Thesis Vs Dissertation; Parts of a Thesis; Preliminary Pages of a Thesis: Title Pages, Certificate Pages, Acknowledgements, Table of Contents, List of Tables, List of Figures, Dedication; The Subject Proper: Introduction, Review of Literature, Materials and Methods, Results, Analysis/ Discussion, Summary/Conclusion, References, Appendixes; The Abstract; Formatting Requirements of a Thesis: Margins, Page Numbering, Design and Formatting of Chapters, Numbering the Sections, Lay-Out of Tables, Language and Style, Typeface and Fonts, Paper and Text Spacing; Thesis Editing.


  
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**Controller of Examination**  
**L.N.M.U., Darbhanga**

# SYLLABUS OF COURSE WORK

of

## DOCTOR OF PHILOSOPHY

Prepared by

University Department of Chemistry



Lalit Narayan Mithila University Darbhanga

See  
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Abhishek  
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Simant  
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Dr. Kumod Kumar Jha  
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Dr. Kumod Kumar Jha  
Head  
Univ. Deptt. of Chemistry  
L.N.Mithila University, Darbhanga

# PAPER-II

## Elective

### Unit -I

#### A- Safety, Hazards and precautions in laboratory

Brief idea about toxicity, explosive nature and ill effects of various chemicals generally used in research and precautions to handle them.

#### B- Purification of Chemicals

An idea about LR, GR and AR grade chemicals. A brief knowledge about various techniques such as distillation, fractional distillation, crystallization, fractional crystallization, chromatography etc.

### Unit -II

#### A- Experimental Methods in Chemical Research

SEM, TEM, LEED, DTA, TGA, Magnetic Susceptibility

#### B-Structure elucidation of spectral data (IR, UV, NMR, ESR, Mass)

#### C-Data Analysis

Errors in chemical analysis, classification of errors, determination of accuracy of methods, significant figures, mean and standard deviation, least square method of analysis of fitting the data.

### Unit -III

A- General Aspects of Medicinal Chemistry, Pro-drugs and drug delivery systems, Drug metabolism

B- Modern Synthetic Procedures in Chemistry, Formation of C-C bonds *via* organometallic reagents,

C- Supramolecular Chemistry, The chemistry of molecular recognition, Applications of supramolecules

### Unit-IV

A- Nanomaterials: Synthesis and Characterization, Chemical Routes Preparation Techniques, Applications of Nanomaterials

B- Electrocatalysis, Mechanisms of some technologically important electrochemical reactions

C- Solar Cells, Introduction to Solar Cells, Various types of Solar Cells, Application of solar cells, Photoelectrochemical (PEC) cells, Dye-sensitized PEC Cells (DSSC)

### Unit-V

Density Functional Theory and Its Applications in Chemistry

See  
29.10.21  
Simank  
29.10.21

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Head  
Univ. Deptt. of Chemistry  
L.N.Mithila University, Darbhanga

## REFERENCES

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