



List of Revised Courses

Department : **Pure and Applied Physics**

Program Name : **Pre Ph.D. (Physics)**

Academic Year : **2021-22**

List of Revised Courses

Sr. No.	Course Code	Name of the Course
01.		Research Methodology, Publication Ethics and Computer Applications



Minutes of Meetings (MoM) of Board of Studies (BoS)

Academic Year : 2021-22

School : School of Physical Sciences

Department : Pure and Applied Physics

Date and Time : March 10, 2022 - 02:00 PM

Venue : Smart Class Room

The scheduled meeting of member of Board of Studies (BoS) of Department of Pure and Applied Physics, School of Studies of Physical Sciences, Guru Ghasidas Vishwavidyalaya, Bilaspur, was held to design and discuss the Pre Ph.D. (Physics), scheme and syllabi.

The following members were present in the meeting:

1. Dr. M. N. Tripathi
2. Prof. P. K. Bajpai
3. Prof. D. C. Gupta, External Member (Professor & Head, School of Studies in Physics, Jiwaji University, Gwalior)
4. Dr. A. K. Singh
5. Mr. P. Rambabu
6. Dr. R. P. Patel
7. Dr. M. P. Sharma

The committee discussed and approved the scheme and syllabi. The following courses were revised in the Pre Ph.D. (Physics):

- ❖ Research Methodology, Publication Ethics and Computer Applications

विभागाध्यक्ष/H.O.D.
शुद्ध एवं अनुप्रयुक्त भौतिकी विभाग
Dept. of Pure & Applied Physics
गुरु घासीदास विश्वविद्यालय
Guru Ghasidas Vishwavidyalaya
बिलासपुर (छ.ग.)/Bilaspur (C.G.)

Signature & Seal of HoD



Scheme and Syllabus

Course Structure Pre Ph.D. Physics Syllabus 2021-22

level	Course name	Credit	Remarks
School level	Research Methodology & Computer Applications	04	Common to all
Department level	Experimental, Theoretical techniques & Instrumentation in Physics Research	04	Common to Physics Candidates
Paper -III (Optional) Any one of the followings	III A: Advanced Materials III D: Advance Nuclear Physics III E: Advanced Astronomy and Astrophysics	04	Any course



Paper I

Research Methodology, Publication Ethics and Computer Applications

Credit 4

Unit 1: Philosophy and Ethics

Introduction to philosophy: definition, nature and scope, concepts, branches, Ethics: definition, moral philosophy, nature of moral judgements and reaction.

Unit 2: Research methodology

Definition of Research, Components of Research Problem, Various Steps in Scientific Research: Hypotheses, Research Purposes, Research Design, Literature searching, Literature Survey, defining the question and formulating hypothesis/ hypothesizes, Collection of research data, tabulating and cataloging. Sampling and methods of data analysis.

Unit3: Laboratory practices and safety guidelines:

Safe working procedure and protective environment, Laboratory safety measures, Handling radiation, Chemical hazards and their types, Safe chemical use, Proper storage and disposal of hazardous materials, Bio-hazardous and other toxic experimental materials, Maintenance of equipments.

Unit 4: Computer applications in scientific writing skills

Curve fitting, Method of least square fit, least square fit (straight line) to linear equations and equation reducible to linear equations. Back ground correction and mathematical analysis of data using origin.

Structure and Components of Research Report, Types of Report: research papers, thesis, Research Project Reports, Pictures and Graphs, citation styles, writing manuscript in Latex, Steps to better writing.

Types of errors; mean deviation, standard deviation and probable errors; propagation of errors with summation, difference, product and quotient, Estimates of Means and Proportions; Chi-Square Test.

Unit 5: Ethics in Science and Research Publication

The source of ethical issues in science: examples from Physical Sciences.

Publication ethics: definition, introduction and importance, Best practices/standards setting initiatives and guidelines: COPE, WAME, etc., Conflicts of interest, Publication misconduct: definition, concept, problems that leads to unethical behavior and vice versa, types, Violation of publication ethics, the problem of plagiarism and related issues, authorship and contributorship, Identification of publication misconduct, complaints and appeals, Predatory publishers and journals.

IPR and Patent regime: Recording and storage/retention of recorded materials. Management and use responsibilities in proper utilization of the facilities. Socio-legal issues, originality



References:

1. "How to write and Publish" by Robert A. Day and Barbara Gastel, (Cambridge University Press).
2. "Survival skills for Scientists" by Federico Rosei and Tudor Johnson, (Imperial College Press).
3. "How to Research" by Loraine Blaxter, Christina Hughes and Malcolm Tight, (Viva Books).
4. "Probability and Statistics for Engineers and Scientists" by Sheldon Ross, (Elsevier Academic Press).
5. "The Craft of Scientific Writing" by Michael Alley, (Springer).
6. "A Students's Guide to Methodology" by Peter Clough and Cathy Nutbrown, (Sage Publications).
7. Bird, A. (2006). Philosophy of science. Routledge.
8. MacIntyre, Alasdair (1967) A Short History of Ethics. London.
9. P: Chaddah, (2018) Ethics in Competitive Research: Do not get scooped; do not get plagiarized, ISBN:97-9387480865.
10. Beall J. (2012), Predatory publishers are corrupting open access. Nature, 489(7415)179.
11. <https://doi.org/10.1038/489179a>
12. 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.