



List of Courses which focuses on Professional Ethics, Gender, Human Values, Environment & Sustainability and other value framework

Department : Chemistry

Programme Name : Ph. D.

Academic Year : 2022-23

Courses which focuses on Professional Ethics, Gender, Human Values, Environment & Sustainability and other value framework:

Sr. No.	Course Code	Name of the Course
01.	SPC-R1	Research Methodology, Publication Ethics and Computer Applications

साध्यक्ष/Head
रसायन शास्त्र विभाग
Deptt. of Chemistry
गुरु घासीदास विश्वविद्यालय,
Guru Ghasidas Vishwavidyalaya,
बिलासपुर 495009 (छ.ग.)
Bilaspur 495009 (C.G.)



Scheme and Syllabus

Pre Ph.D. Coursework

Paper I

Credit 4

Research Methodology, Publication Ethics and Computer Applications

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.

Unit 3: 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 manipulation in 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.

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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 Resemh: 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. <https://doi.org/10.1038/489179a>
11. 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.

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