

**Ph.D. Course Work- Second Paper (Code CW-002)**  
**(Common for all)**

**STATISTICAL TOOLS, RESEARCH PUBLICATION ETHICS AND IPR**

<b>Paper Code: Ph.D.- CW-002</b>	<b>STATISTICAL TOOLS, RESEARCH PUBLICATION ETHICS AND IPR</b>	<b>Credits:-04 (60 Hours)</b>
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**Overview of the Course:** - The use of statistical tools is necessary for analysis of research data to find out their logical scientific conclusions. Research and Publication Ethics are the foundations of publication honesty, integrity and acceptability by the scientific community. Sessions are designed to identify quality research, quality publications, research misconduct, plagiarism, predatory publications and other relevant topics for high quality research. This course is mainly focusing on basics of philosophy of science and ethics, research integrity, publication ethics and to identify research misconduct and predatory publications, Indexing and citation databases, open access publications, research metrics and the approved research journals. This course is designed to provide researchers with an overview of current and emerging ethical issues with special emphasis on inter and intra disciplinary including cross-disciplinary issues involving research integrity, ethics and social accountability.

**Course Objectives:**

Its objectives to provide knowledge about ethics and code of research publication with concept of plagiarism

1. Acquire in-depth knowledge of various fundamentals, theories and principles related to the research and apply the acquired knowledge in carrying out research studies in the area of interest and to learn philosophy and ethics and scientific conduct.
2. To understand publication ethics and read, comprehend, and explain research articles in their academic discipline.
3. Understanding and writing good quality of research papers and gain knowledge about various indexing platforms of research journals and to find out predatory research journals.
4. To learn various statistical tools and technique for analysis of data and Apply parametric and non-parametric statistical tests to verify the developed hypothesis.

5. To suggest innovative solutions of the problem being investigated and to understand the intellectual property rights and procedure involved in filing and prosecuting trademark, copyright and patent applications.

**Course Outcome:** Upon Completing the Course, students will be able:

CO1: Recognize the basics of philosophy of science & ethics, research integrity, publication ethics and theories of research ethics.

CO2. Familiarize with important issues in research ethics, research integrity, scientific misconduct and misinterpretation of data.

CO3. The students will be trained for writing good quality of research publications in high reputed research. And demonstrate, use plagiarism software tools, open-source software tools, citation databases and research metrics.

CO4. The Scholar will be in a position to demonstrate scientific ‘add on’ values through quality research publications in high impact Journals.

CO 5. The Scholar will be in position to decide statistical tools to interpret his/her data for logical conclusions. The Scholar will be able to assess the contents of his/her research articles as per copyright, patent laws.

**Teaching-learning Methodology:-** Co-learning, lectures, Interactive video sessions, group discussions under/blended mode with practical sessions. Students have to attend online/offline lectures, watch online videos, read online resources and complete assignments, direct face to face sessions.

**Assessment:** Assessment will be based on subjective/ Descriptive questions/ short questions/Objective MCQ and 100% external

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**Unit I. Philosophy and Ethics & Scientific Conduct**

1. Introduction to Philosophy of Research: definition, nature and scope, concept of research
2. Ethics: Definition, moral philosophy, nature of moral judgments and reactions.
3. Ethics with respect to science, technology and research
4. Intellectual honesty and research integrity
5. Scientific misconducts: Falsification, Fabrication and Plagiarism, how to escape plagiarism, AI tools in research integrity
6. Redundant publications: duplicate and overlapping publications, salami slicing
7. Selective reporting and misrepresentation and manipulation of data

**Unit II. Publication Ethics**

1. Publication ethics: definition, introduction and importance
2. Best practices/standards setting initiatives and guidelines: COPE, WAME etc., ethical clearance, Subject specific ethical issues, FFP, authorship, Conflicts of interest.
3. Violation of publication ethics, authorship and contributor ship
4. Identification of publication misconduct, complaints and appeals
5. Predatory publishers and Journals, Approved and peer reviewed Research journals, Software tool to identify predatory publications developed by SPPU: UGC-CARE list of journals
6. Indexing online resources to check publisher's copyright & self-archiving policies, Open access publications and initiatives SHERPA-RoMEO online resource to check publisher copyright and self-archiving policies.
7. Journal finder/Journal suggestions viz. JANE, Elsevier Journal Finder, Springer Journal Suggested, etc.
  8. Use of reference management software and anti-plagiarism software like Urkund (Original), Turnitrin and similar software.
  9. Publication misconduct: definition, concept, problems that lead to unethical behavior and vice versa, types, Misconduct Publication of Research, open access publications and initiatives.

10. What is good quality research paper in Science, Art and Humanities, Management, medical Science, engineering and other subjects, how to identify good research journal for publication of good quality of research.

### **Unit III. Writing Of Good Quality Research Papers:**

1. how to write a good paper, interpretation of good research, presentation of data, original research, validation of original data, protection of original research, effect of publication of original research on patent filing.
2. Drafting Scientific Manuscript, Key aspects of drafting of scientific manuscript (Novelty, Social Relevance / National Importance, Credibility / Credential of Research Scholar, Drafting skills of Research Scholar), common content errors, useful resources, background ( author's perspective)
3. Author Publishing priorities, Identification of journal, Author Priorities for Journal Selection, Reader's priorities, ethical issues, style and language, article submission process, Manuscript Template, Title of the Manuscript, Title page, Abstract, Introduction, Experimental Details, Material and Methods, Statistical Methods, Results, Tables and Figures, Discussion, Acknowledgements/Funding, Reference section, General rules, After Submission, Overview of Peer Review Process, Publishing guidelines, Final advice

### **Unit IV. Databases and Research Metrics**

1. Indexing databases, Citation databases: Web of Science, Scopus etc.
2. Impact factor of Journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score
3. Research Metrics: h-index, g-index, i-10 index, altmetrics Altmetrics, Google Scholar, Research Gate, Pub-med etc. and other similar indexes
4. Strategies to increase citation by registering on various platforms

### **Unit V. A. Statistical Tools and Statistically Analysis of Data**

1. Analysis and interpretation of Data, Measurement of central tendency – mean, mode, median, arithmetic mean, geometric mean, Standard Deviation, p value Correlation and Regression. Test of significance: Chi square, t test, test z and f test
2. Hypothesis testing – null hypothesis, alternate hypothesis, acceptance/ rejection of null hypothesis, Probability Theories – Conditional Probability, validity, reliability testing, Normal distribution curve, dispersion, skewness, Parametric statistical testing – Pearson correlation, paired t-test, unpaired t-test, Coefficient of variation, Non- parametric statistical testing – Mann Whitney U test, Wilcoxon sign test, Kruskal Wallis test, Friedman test, ANOVA, ANCOVA.

### **B. Intellectual Property Rights:**

1. History of intellectual property and various conventions governing IPR, Key concepts of copyright and trademarks law, Key concepts of patent law
2. Advisory on filing and prosecuting copyright, trademark application and Patent application applications, IPR registration/ indexing (Copy right & Patent)

### **Reference Books:-**

1. Bird, A. (2006). Philosophy of Sciences. Routledge
2. MacIntyre, Alasdair (1967). A Short History of Ethics. London
3. P. Chandah. (2018). Ethics in Competitive Research: Do not get Scooped; do not get plagiarized.
4. National Academy of Sciences, National Academy of Engineering and Institute of Medicine (2009).
5. Deborah E. Bouchoux, Intellectual Property: The Law of Trademarks, Copyrights, Patents, and Trade Secrets, Delmar Cengage Learning

***Note:-*** The course with similar contents may be completed through SWAYAM/MOOCs and the candidates may submit their valid credit score to the research section to be added in the course work Marks Sheet as per UGC guidelines