



RPE001	RESEARCH AND PUBLICATION ETHICS (RPE)	L	T	P	C
Regulation: 2020		1	1	0	2
OBJECTIVES: To understand and able to write the Research manuscripts To carryout research with honestly and integrity					
Unit – I : PHILOSOPHY AND ETHICS AND SCIENTIFIC CONDUCT Introduction to philosophy: definition, nature and scope, concept, branches; Ethics: definition, moral philosophy, nature of moral judgments and reactions; Ethics with respect to science and research; Intellectual honesty and research integrity; Scientific misconducts: Falsification, and plagiarism (FFP); Redundant publications: duplicate and overlapping publications, Salami slicing; Selective reporting and misrepresentation of data					8
Unit – II : PUBLICATION ETHICS 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 lead to unethical behavior and vice versa, types; Violation of publication ethics, authorship and contributor ship; Identification of publication misconduct, complaints and appeals; predatory publishers and journals					7
Unit – III : OPEN ACCESS PUBLISHING Open access publications and initiatives; SHERPA / RoMEO online resource to check publisher copyright & self-archiving policies; Software tool to identify predatory publications developed by SPPU; Journal finder / journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggester, etc.					4
Unit – IV : PUBLICATION MISCONDUCT Group Discussions Subject Specific ethical issues, FFP, authorship; Conflicts of interest; Complaints and appeals: examples and fraud from India and abroad Software Tools Use of plagiarism software like Turnitin, Urkund and other open source software tools					4
Unit – V : DATABASE AND RESEARCH METRICS Databases Indexing databases; Citation databases: Web of Science, Scopus, etc. Research Metrics Impact Factor of journal as per Journal Citation Report, SNIP, SJR, IPP, Cit Score; Metrics: h-index, g index, i10 index altmetrics					7

Reference Books	
<ol style="list-style-type: none">1. Engineering Ethics, Fleddermann C P, Pearson Education, 20122. Ethics Engineering, Martin M W, TMG, 20103. Thesis writing – A manual Researchers, Rahim, New Age Publication4. Research Methodology, C R Kothari, MGH Publication, 20045. Research Methodology Methods & Techniques, C R Kothari, GPS Publications, 2004	
e-References	
<ol style="list-style-type: none">1. https://www.ugc.ac.in/e-book/CARE%20ENGLISH.pdf2. http://eneri.eu/what-is-research-ethics/3. https://www.niehs.nih.gov/research/resources/bioethics/whatis/index.cfm4. https://researcheracademy.elsevier.com/publication-process/ethics	

RRM001 - RESEARCH METHODOLOGY

L	T	P	C
3	0	0	3

Regulation 2023

Aim: This course aims to develop research skills among research students and scholars on the basic concepts of scientific research and scholarly communication.

Objectives:

- a) To learn the six levels of competencies within the cognitive domain and their successful applications in research
- b) To provide students and scholars with knowledge of the principles of research and statistical analysis
- c) To familiarize on various processes of research publications
- d) To learn the art and science of scientific writing and successful publishing
- e) To acquire the skills on information and communications technology (ICT) tools for conducting efficient research
- f) To gain knowledge on the most recent changes in intellectual property rights (IPR)

Unit I: Fundamentals of scientific research

Goals of research and critical steps for successful research initiatives, Implications of cognitive, affective and psychomotor domains in research, Types of research, Ideas detection, Divergent and convergent thinking, Inductive and deductive reasoning, Research gap, Identifying research problem, Defining research problem, Formulation of research questions, Hypothesis generation, Listing objectives of the study, Potential targets of a study, Time frame of the research, Impact of research on local and global issues and benefits to the society.

Unit II: Literature search and review

Fundamentals of literature search and review, Types and significance of literature search, Research process, Methods of literature search (protocol driven, snowballing, *etc.*), Sources of literature search, Empowering efficient literature search, Search engines and databases: ScienceDirect, JANE,

PubMed/Medline, MeSH, Embase, Web of Science, BibliMed, Scopus, Google Scholar, SciFinder, Cochrane library, PubChem, Merck Index, Knovel, ProQuest, Inflightnet, zbMATH, *etc.*

Unit III: Data Analysis and Statistical tools

Fundamental of descriptive and inferential statistics, Measures of central tendency, Skewness, Kurtosis, Normal distribution, types of data (categorical vs numerical data), scales of measurement, correlation coefficient, types of distribution (Gaussian vs non-Gaussian), types of variables, Parametric and non-parametric statistics, Confidence interval, Hypothesis testing, Statistical tests of significance, Standard deviation and standard error, Sample size calculation, Power of study, Null-hypothesis, Alternative hypothesis, Types of error (False positive and false negative), Level of significance, Outliers, One-tailed and two-tailed test, Conceptual framework for statistical analyses of data: Student t test, ANOVA (one-way, two-way, three-way, repeated measures of ANOVA). Post-hoc statistical tests (Tukey's, Dunnett's, Bonferroni, *etc.*), Chi-square test, Wilcoxon-matched-pairs signed-ranks test, Mann-Whitney test, Friedman test, Kruskal-Wallis test, *etc.*, Applications of statistical software and tools.

Unit IV: Structuring the scientific article and scholarly communication.

Types of publication, Significance of report writing, Steps in writing reports, Layout of a research report, Principles of scientific writing, Mechanics of writing a research report, Precautions of writing a research report, Structuring the key components of a research article: title, abstract, introduction, materials and methods, results, discussion, summary, conclusions, funding source, references, legends for figures and tables, *etc.*, Scientific misconduct and ethics in research, Identifying legitimate journals, Journal selection, Cover letter, Conflict of interest, Authors contribution statement, Journal submission, Gatekeepers and peer-review process, Responding to reviewers, Successful publications.

Unit V: Computing resources and tools for research reports

Basics of Internet services: various sources of abstracts, articles and papers, and downloading. TOC registration, Online journals, e-books, Courseware and technical reports, Imaging and file formats, File conversions, Tools for report writing: styles and formats, latex, MS Office suite–Word, Excel, PowerPoint, Access for scientific and other applications, Free and Open Source Software (FOSS), AMOS, Graphical and statistical tools, *etc.*

Unit VI: Intellectual Property Rights (IPR) and Funding

Types of IPR, Acts of IPR, Filing procedure of IPR in India and abroad, World Intellectual Property Organization (WIPO), Search and service portals of IPR, Commercialization of IPR, Case studies on IPR disputes, Scholarships and funding agencies for research: National and International perspectives.

References

1. Jagadeesh G, Balakumar P, Senatore F, editors. The Quintessence of Basic and Clinical Research and Scientific Publishing. Springer Verlag, Singapore; 1st ed. 2023 edition.
2. Jagadeesh G, Murthy S, Gupta YK, Prakash A, editors. Biomedical Research – From Ideation to Publication. New Delhi: Wolters Kluwer Health-Lippincott Williams and Wilkins; 2010.
3. Balakumar P, Inamdar MN, Jagadeesh G. The critical steps for successful research: The research proposal and scientific writing. J. Pharmacol. Pharmacother. 2013;4:130-8.
4. C.R. Kothari, Gaurav Garg, Research Methodology: Methods and Techniques, 4th edition, New Age International Publisher (2019).
5. N.Gurumani, Research Methodology for Biological Science, MJP Publishers, Chennai (2021).

Online resources (Accessed 07 July 2023)

1. NPTEL: https://onlinecourses.nptel.ac.in/noc23_ge36/preview.
2. Elsevier Researcher Academy: <https://researcheracademy.elsevier.com/>
3. WIPO: wipo.int
4. IPR India: <https://ipindia.gov.in/>
5. National Digital Library of India: <https://www.ndl.gov.in/>
6. TKDL: <https://www.csir.res.in/documents/tkdl>