

Performa for course plan

- **Course Name:** Research Methodology (Dr. Rita Sharma and Prof. Indira Ghosh)
- **Course Code:** IT422
- **Credit:** 3
- **Course offered to:** M.Sc.- Third Semester

- **Course description:**

1. Introduction to Research Methodology: meaning, objective and motivation in interdisciplinary research area (6)
2. Research Methods and Design: problem identification and hypothesis testing, experimental design, sampling and variables (9)
3. Data Analysis and Interpretation: Univariate and bivariate analysis, Data normalization and scaling, application of basic statistical tools to association and prioritization of research topics(12)
4. Report/Manuscript writing and presentation: format for research articles and reviews, language editing, reference management, plagiarism, scientific presentation tips and citing relevant scientific literature (18)

- Pre-requisite (Mandatory): Knowledge in basic statistics and computational programming

- Pre-requisite (Desirable): Research-based literature surfing

- Course Outcome (CO): Mention three or more.

1. Understand the foundation and concept of interdisciplinary research
2. Understand the research design and methodology
3. Learn how to plan experiment, draw conclusions from results, judge reliability and validity of experiments
4. Get acquainted with appropriate format for research articles, manuscript editing and presentation skills
5. Learn to use tools for reference management and check for plagiarism.

- **Tentative plan:**

| Week number | Lecture topic | Cos met |
|-------------|--|-----------|
| Wk 1-2 | Introduction to Research Methodology | COs 1 & 2 |
| Wk 3-5 | Research Methods and Design | COs 2 & 3 |
| Wk 6-9 | Data Analysis and Interpretation | CO3 |
| Wk 10-15 | Report/Manuscript writing and presentation | COs 4 & 5 |

- **Resource Material:** details of required books/journal articles/websites etc.
1. ROIG (M). Avoiding plagiarism, self-plagiarism, and other questionable writing practices: A guide to ethical writing (2006)
 2. VAUGHAN (L). Statistical methods for the information professional: A practical, painless approach to understanding, using and interpreting statistics (Ed. 2), (2004) Information Today, Medford.
 3. Kothari C.K. (2004) 2/e, Research Methodology – Methods and Techniques (New Age International, New Delhi)
 4. Mathews. “Successful scientific writing: A step-by-step guide for Biomedical Scientists”, Second edition, Cambridge University Press, 2001.
 5. Research Methodology and Scientific Writing by C. George Thomas (2016) Ane Books Publisher
 - 6.

Articles:

1. RETHINKING PHDS, BY ALISON MCCOOK, 280 | NATURE | VOL 472 | 21 APRIL 2011
2. Publish like a pro, Kendall Powell, 14 October 2010 | Vol 467 | NATURE | 873
3. Genome Biology, Hardison (2016) 17:161 DOI 10.1186/s13059-016-1026-9
4. Estimating the reproducibility of psychological science, Open Science Collaboration, Science, 28 AUGUST 2015 • VOL 349 ISSUE 6251
5. Scientific Writing Made Easy: A Step-by-Step Guide to Undergraduate Writing in the Biological Sciences, Turbek et al 2016 published in Bulletin Ecological society of America
6. 1,500 scientists lift the lid on reproducibility by Monya Baker (2016) NATURE VOL 533, 452-454
7. Ten Simple Rules for Reproducible Computational Research (2013) Sandve et al PLOS Computational Biology Vol 9, Issue 10, e1003285
- 8.

Links:

<http://turnitin.com/>
<https://www.mendeley.com/>
<http://retractionwatch.com/>