REVISED SYLLABUS OF Pre-Ph.D. COURSE WORK

Research Methodology

Sl. No.	Topic	No. of Hrs.
1.	Introduction to the course	1
2.	Introduction: What is Research? Why do research? Where & How to Start: How to get an idea for research Formulation of Hypothesis Defining an objective. Justification for study requirements for a Ph.D. thesis: Component guide, subjects and animals (in adequate numbers), Clinical trials. Instruments and expertise to operate them properly, Consumables (kits,) Drugs (if any) Practical difficulties (to maintain a log book) - Research questions - **Research integrity**, Conduct of sciences, state of arts in medical research - Importance of research collaborations - Understanding of interdisciplinary, multidisciplinary & transdisciplinary research - Research Funding	6 1 2 1 1 1
3.	What is research Instrument? Validity and reliability of Research Instrument. Role of Guides & Role of Ph.D. students. - Knowledge of External & internal quality control	2 1

4.	Review of Literature: Why review literature? Sources (Books, Journals, Reviews and Monographs, Computerized search), Methods, Useful addresses. Understanding types of writing bibliography[Vancouver, Harvard style etc] How to write references. Use of software in writing references. How to cite an article or any published material.	4+ 6 hrs hands on training
5.	Study Design: Introduction to Study designs – Quantitative and Qualitative Descriptive study design- Cross sectional Analytical study designs- Case control and Cohort Experimental study designs – RCT, Non RCT , Cross over Odds Ratio , Relative Risk Bias and Confounders Qualitative types –FDG. Group discussion , In depth interview Strategies to eliminate errors/bias –controls, randomization, cross over design, placebo, blinding techniques, selection of sample: Animal studies, human studies, selection criteria. How to write Progress Report What is quantitative research and qualitative research, their scope and utility in research Journal Club and Seminar presentation - Significance of Journal club & seminar during program - Critiquing an article scientifically - What is plagiarism, how to find it?	8 3 1 1 1 2
6.	Data Collection and Presentation : Pilot study, Types of data, scales of measurement of data (Classificatory data, rating scale, Interval Scale, ratio scale). Errors in measurement, Coefficient of variance. Sources of errors. Data collection: Methodology, Screening, Presentation of data: Tables ,Figures, Graphs and scatter plots, Bar diagram, Histogram, Pie chart, Master chart	8
7.	Sampling, Sampling techniques and Calculation of sample size.	4

8.	Descriptive Statistics : Measures of Central tendency, Dispersion , Standard error, Coefficient of Variance, CI,	6
9.	Inferential Statistics : Parametric & Non Parametric Tests	10
10.	Inferential Statistics: Interpretation of statistical significance tests, Writing conclusions. - Knowledge on big data - Application and analysis of derived data scientifically and correlating with the work in simple terms	4 1 2
11.	Ethical Aspects: Biomedical ethics, Human experiments, Informed consent, functioning of ethical committee, application for ethical clearance, Animal experiments and ethics. - Ethical publications- norms of ICMJE, COPE, CSE regulations and act. Knowledge on Conflict of Interest during research & publications. - ICMR guidelines on biomedical research ,understanding of preparation of consent form etc relevant to the work, - Understanding ethical requirements in blinded studies, drug trials and in herbal products - Ethical guidelines in genetic research and gene analysis studies - Understanding and application of ethical principles in research related to reproduction in humans - CPCSEA guidelines in handling animals in animal experiments. - Awareness regarding injury statement in research and compensation etc.	4 2 8
12.	Screening of volunteers/Animals: What is screening of volunteers? How to screen? Why to screen? Data Sheet Inclusion and Exclusion criteria. Screening of animals. - Basic understanding of Knockout models in animals	3 1
13.	Drawing Conclusions from the study, Inference, Interpretation, Limitations, Conclusions.	2
14.	Writing thesis : What and How to write: Introduction,	4 1

	Review of Literature, Materials and Methods, Results, Discussion, Conclusion, Summary, Tables, Figures and charts, Bibliography. What the examiners like to see in a thesis, Check list. Research Protocol writing: What is research protocol? What details are needed? How to write? - Art of research presentations oral and poster preparation - Knowledge of patents, intellectual properties , scientific impacts (citations, h-index & impact factors) - Knowledge on indexing (Scopus / PubMed / Thomson Reuters) - How to write a scientific article from the existing data, modifying the drafts as per standard guidelines - How to publish the article - Understanding art and science of scientific writing	1 2 1 2 2
15.	Use of Computers : Hardware and software, Uses in Research: Writing protocol, data storage and retrieval, Data analysis, statistical analysis of data using Excel and SPSS, Drawing figures and graphs, Bibliography storages.	2+ 4 hrs Hands on for use of SPSS
16.	File transfers (tif, jpg, ftp, ws ftp) Introduction to Educational and Research Resources on Net: Wikipedia, JAVA applets, Educational Applets , Virtual Labs, Electronic Journals, e-books, Digital Library. - Research networking : Global perspective - Understanding of social media pages for research update - Maintenance of data and research related work documents for further reference. Copy right issues and ownership issues	4 1 1 1

Research and Publication Ethics (RPE)

THEORY:

- **RPE 01: PHILOSOPHY AND ETHICS (3hrs.)**
  1. Introduction to philosophy: definition, nature and scope, concept, branches.
  2. Ethics: definition, moral philosophy, nature of moral judgements and reactions.

- **RPE 02: SCIENTIFIC CONDUCT (5hrs.)**
  1. Ethics and respect to science and research.
  2. Intellectual honesty and research integrity.
  3. Scientific misconducts: Falsification, Fabrication, and Plagiarism (FFP).
  4. Redundant Publications: duplicate and overlapping publications, salami slicing.
  5. Selective reporting and misrepresentation of data.

- **RPE 03: PUBLICATION ETHICS (7hrs.)**
  1. Publication Ethics: definition, introduction and importance.
  2. Best practices / standards setting initiatives and guidelines: COPE, WAME, etc.
  3. Conflicts of interest.
  4. Publication misconduct: definition, concept, problems that lead to unethical behavior and vice versa, types.
  5. Violation of publication ethics, authorship and contributorship.
  6. Identification of publication misconduct, complaints and appeals.
  7. Predatory publishers and journals.

PRACTICE

- **RPE 04: OPEN ACCESS PUBLISHING (4hrs.)**
  1. Open access publications and initiatives.
  2. SHERPA / RoMEO online resource to check publisher copyright & self-archiving policies.
  3. Software tool to identify predatory publications developed by SPPU.
  4. Journal finder / journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggestor, etc.

- **RPE 05: PUBLICATION MISCONDUCT (4hrs.)**

  A. Group Discussions (2 hrs.)
  1. Subject specific ethical issues, FFP, authorship.
  2. Conflicts of interest.
  3. Complaints and appeals: examples and fraud from India and abroad.

  B. Software tools (2hrs.)

  Use of plagiarism software like Turnitin, Urkund and other open source software tools.

- **RPE 06: DATABASES AND RESEARCH METRICS (7hrs.)**

  A. Databases (4hrs.)
  1. Indexing databases.
  2. Citation databases: Web of Science, Scopus, etc.

  B. Research Metrics (3hrs)
  1. Impact Factor of journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score.
  2. Metrics: h-index, g-index, i10 index, almetrics.

REGISTRAR