

Pre-Ph.D. Course Work 2019-20

Stat 600a: Research Methodology & Publication Ethics 4+1 (5 credits)

- 1. Foundations of Research:** Meaning, Objectives, Motivation, Utility, Concept of theory, empiricism, deductive and inductive theory. Characteristics of scientific method- Understanding the language of research- Concept, Construct, Definition, Variable. Research Process.
08 Lectures
- 2. Problem Identification & Formulation:** Research Question- Investigation Question- Measurement Issues- Hypothesis- Qualities of a good Hypothesis –Null Hypothesis & Alternative Hypothesis, Sampling distribution.
08 Lectures
- 3. Sampling and Data Collection and Analysis:** Concepts of Statistical Population, Sample, Sampling Frame, Sampling Error, Sample Size, Non Response. Practical considerations. Methods of validation, observation and collection of data, methods of data collection, sampling methods, data processing and analysis strategies and tools, data analysis with statically package (Sigma STAT, SPSS for student t-test, ANOVA, ANCOVA, etc.).
08 Lectures
- 4. Qualitative and Quantitative Research Tools and Design:** Qualitative research; Quantitative research- Concept of measurement, causality, generalization, replication. Levels of measurement- Nominal, Ordinal, Interval, Ratio. Problems in measurement in research- Validity and Reliability. Concept and Importance in Research; Features of a good research design; Exploratory Research Design- concept, types and uses, Descriptive Research Designs- concept, types and uses. Experimental Design: Concept of Independent & Dependent variables, Factor analysis and Path analysis.
15 Lectures
- 5. Descriptive and Internal Statistics:** Measurement Scales, Sources of error in measurement. Measures of Central Tendency (Mean, medium, Mode), Measures of dispersion (range, mean deviation, standard deviation) Graphical representation of data. Normal Probability (standard Error type Ist and type IInd), Correlation, Regression.
08 Lectures
- 6. Ethics:** Ethical issues, ethical committees (human & animal); IPR- Intellectual Property Rights and Patent law, Commercialization, copy right, royalty, trade related aspects of intellectual property rights (TRIPS); scholarly publishing- IMRAD citation and acknowledgement, Plagiarism and Self-Plagiarism, reproducibility and accountability.
08 Lectures
- 7. Interpretation of Data and Paper Writing:** Concept and design of research paper, Layout of a research paper, Types of Research Reports, Oral Presentation, Conclusion and Suggestions, Precautions for writing Research Reports, Review of literature, Journals in respective disciplines, Impact factor of Journals, When and Where to publish?, Meaning of Interpretation, Techniques of Interpretation, Precaution in Interpretation.
05 Lectures
8. Department wise Assignment, Surveys, Field report, Department specific lectures.
9. Revision: **10 Lectures**

Unit-I Introduction to Computers and Peripherals**15 Lectures**

What is Computer, Generations of Computers; Components of Computer System, Central Processing Unit (CPU), VDU, Keyboard and Mouse, Other input/output Devices, Computer Memory, concept of Computer, Data and Information; Keyboard, Mouse, Monitor and Printer.

Unit-II Introduction to Operating System & Application Software**15 Lectures**

What is an Operating System; Basics of Popular Operating Systems; The User Interface, Using Mouse; Using right Button of the Mouse and Moving Icons on the screen, Use of Common Icons, Status Bar, Using Menu and Menu-selection, Running an Application, Viewing of File, Folders and Directories, Creating and Renaming of files and folders, Opening and closing of different Windows; Using help; Creating Short cuts, Basics of O.S. Setup; Common utilities.

Unit-III Introduction to Word Processor**05 Lectures**

Word Processing Basics; Opening and Closing of documents; Text creation and Manipulation; Formatting of text; Table handling; Spell check, language setting and thesaurus; Printing of word document.

Unit-IV Introduction of Spreadsheet**05 Lectures**

Basics of Spreadsheet; Manipulation of cells; Formulas and Functions; Editing of Spread Sheet, printing of Spread Sheet.

Unit-V Introduction to Power Point**05 Lectures**

Basics of presentation software; Creating Presentation; Preparation and Presentation of Slides; Slide Show; Taking printouts of presentation/ handouts.

Unit-VI Introduction to Internet and Other Tools**15 Lectures**

Basic of Computer networks; LAN; WAN; Concept of Internet; Applications of Internet; connecting to internet; What is ISP; Knowing the Internet; Basics of internet connectivity related troubleshooting, World Wide Web; Web Browsing software, Search Engines; Understanding URL; Domain name; IP Address; Basics of electronics mail; Getting an email account; Sending and receiving emails; Accessing sent emails; Using Emails; Document collaboration; Instant Messaging.