

Subject Title	: Applied Statistics and Research Methodology	Code : SO316
Credits	: 3	Level : 3
Status	: Compulsory	Stage : 2
Offering Department:	SO	Semester : 3

Teaching Pattern

Lecture	22 hours
Tutorial	11 hours
Self-learning	8 hours
Computer assessment	1 hours
	—————
	42 hours

Learning Outcomes

On completion of this subject, the student should be able to:

1. show an understanding of the ethical issues which may be encountered in research.
2. locate, critique, cite and reference journal papers.
3. explain the principles involved in the conception, design, conduct and completion of research projects.
4. analyse data using appropriate statistical tests, and correctly interpret and present the results.

Outline Syllabus

Research ethics
 Reviewing and criticising the literature
 Structuring a literature review
 Generating hypotheses
 Experimental design
 Describing and displaying quantitative and qualitative data
 Choosing and using appropriate statistical tools
 Interpreting and reporting the results of statistical tests

Indicative Content

Introduction and subject structure and assessment. (2 hours)
 How science is done; the “Research Method” and alternative views.
 Skills needed for project work - skills you will develop through this subject
 Plagiarism and its avoidance; citing sources

Ethical issues in research. (2 hours)
PolyU Code of Research Ethics

Types of data (2 hours)
Displaying your data
Averages and dispersion
Identifying and handling outliers

Introduction to probability (2 hours)
Characteristics of Normal distribution.
Sampling distribution of mean and standard error.
Degree of freedom

Sample size consideration (2 hours)
The null hypothesis; experimental hypothesis
Error in hypothesis testing (type I and type II errors)

Definition of power (2 hours)
One and two-tailed tests
Concept of p values

Parametric and non-parametric tests: (Demonstration session) (2 hours)
Student's T test; Wilcoxon test, Mann-Whitney test, Krustal Wallis test.
Chi-square test

Principle of independence of data. Correlation. (2 hours)
Research questions.
Experimental and non-experimental designs
Random assignment; matched assignment

Control groups; placebo effect; masking (2 hours)
Prospective vs retrospective; longitudinal vs cross-sectional
Validity and reliability of data
Repeated measures
Sensitivity and specificity; false positive and negative (2 hours)

Populations and random samples (2 hours)
Sampling methods; random, systematic and stratified sampling
External validity

Descriptive research; Surveys and questionnaires; (2 hours)
Interview techniques

Assessment

Coursework

100%

Student must pass both elements (I & II) of the assessment to pass the subject as a whole.

Assessment Ia: MCQ assessment

Assessment Ib: Analysis of data and interpretation of results

Assignment II: Fully referenced literature review & continuous assessment coursework

Reading List

Polgar S and Thomas SA (2001). Introduction to Research in the Health Sciences. 4th ed. New York: Churchill Livingstone.

Motulsky H. Intuitive Biostatistics (1995). New York: Oxford University Press.

Altman DG (1991). Practical Statistics for Medical Research, 1st Ed. London, Boca Raton, Chapman & Hall.