Course Specifications

General Information

Course name	Applied Biostatistics and Scientific Research
Course number	AMSR4392
Faculty	
Department	
Course type	Major Needs
Course level	4
Credit hours (theoretical)	3
Credit hours (practical)	0
Course Prerequisites	

Course Objectives

1 - Identify appropriate areas and issues of concern for research that will improve public health practice

2 - Develop skills to participate in transdisciplinary research

3 - Develop skills to assess the usefulness of research across the health researchers view of public health education

4 - Construct appropriate hypotheses and research questions for developing evidence –based public health education

5 - Identify the importance of and develop a plan for conducting quantitative, qualitative, and mixed method strategies

6 - Describe relevant validity and reliability issues that impact data measurement and select appropriate instruments or measurement techniques for research projects

7 - Select appropriate observation and analysis techniques for public health education research projects, including those involving communities

8 - Demonstrate knowledge of ethical issues, including informed consent and data maintenance, of concern to research in general and qualitative and quantitative research in particular

9 - Identify the basic principles of statistical analysis for quantitative and qualitative research

10 - Know the various statistical techniques to solve statistical problems Appreciate statistical techniques in solving the problems

Intended Learning Outcomes

Knowledge and Understanding	* Examine the role and importance of scientific inquiry and how it guides health care research * Describe the flow and sequence of activities in quantitative and qualitative research * Demonstrate understanding of applied research designs, methods, and analysis strategies in the health sciences * Apply critical thinking and scientific approaches in evaluating literature and research findings
Professional Skills	* Be able to plan for and develop a research proposal
General Skill	* Develop a research proposal based in literature and inclusive of methodology and instruments appropriate for health care * Demonstrate understanding of ethical principles and standards in research with human subjects

Course Contents

1 - 1 Research Methodology a) Types of clinical study designs: Case studies, observational studies, interventional studies, b) Designing the methodology c) Sample size determination and power of a study Determination of sample size for simple comparative experiments, determination of sample size to obtain a confidence interval of specified width, power of a study d) Report writing and presentation of data 2 Biostatistics 2.1 a) Introduction b) Types of data distribution c) Measures describing the central tendency distributions- average, median, mode d) Measurement of the spread of data range, variation of mean, standard deviation, variance, coefficient of variation, and standard error of the mean. 2.2 Data graphics Construction and labeling of graphs, histograms, pie charts, scatter plots, semilogarithmic plots 2.3 Basics of testing hypothesis a) Null hypothesis, level of significance, power of a test, P value, statistical estimation of confidence intervals. b) Level of significance (Parametric data)- students t-test (paired and unpaired), chi-square test, Analysis of Variance (one-way and two-way) c) Level of significance (Non-parametric data)- Sign test, Wilcoxon's signed rank test, Wilcoxon rank sum test, Mann Whitney U test, Kruskal-Wall test (one way ANOVA) d) Linear regression and correlation- Introduction, Pearson's and Spearman's correlation and correlation co-efficient. e) Introduction to statistical software: SPSS

Teaching and Learning Methods

1 - Project based learning

2 - Standard lectures

3 - Discussion and class activities

Students Assessment

Assessment Method	TIME	MARKS
Assignments	The first trimester	30%
Midterm Exam	Week 8	30%
Final Exam	Week 15	40%

Books and References

Essential books	Creswell, J. W. (2014). Research design: Qualitative, quantitative, and mixed methods approaches (3rd ed.) Thousand Oaks, CA. Sage. (ISBN: 978-1-4522-2609-5 cloth) (ISBN: 978-1-4522-2610-1pbk) (JC)
Recommended books	Kumar, R. (2011). Research Methodology: A step-by-step guide for beginners (3rd ed.). Thousand Oaks, CA, Sage
Other References (Periodical, web sites, ... etc.)	Reference lists, websites, links to reports, and PDF copies posted on Folio