FEB 600: RESEARCH METHODS

1. Course description

FEB 600 is a 45 hrs course taught at the postgraduate level within the Department of Environmental and Biosystems Engineering. The course is taught in the first semester in the first year of postgraduate studies. It prepares students for scientific research and development of thesis. The course provides content on the logic of inquiry and the necessity for an empirical approach to practice. It also addresses the process of formulating appropriate research questions, objectives, and hypotheses, techniques for reviewing literature, approaches for testing relationships and patterns among variables, methods of data collection, methods for assessing and improving the validity and reliability of data and measures, and the ethics of scientific research. Its goal is to help postgraduate students to understand research practice, research cycle in general and with emphasis on the University of Nairobi, through critical examination of methods associated with decision-making, critical thinking, and ethical judgment.

2. Course objectives

The overall objectives of this course are:

1) To help students develop a thorough understanding of the fundamental theoretical ideas and logic of research. These fundamental ideas underpin the approach to research, the vast range of research methods available and the researcher's choice of methods.

2) To help students develop a thorough understanding of the issues involved in planning, designing, executing, evaluating and reporting research within the stipulated Calendar of the University of Nairobi.

Specifically, at the end of the course, the students should be able to:

• Understand some basic concepts of research and its methodologies

• Identify appropriate research topics

• Select and define appropriate research problem and its parameters

• Prepare and defend a research proposal

• Organize and conduct a scientific research in a more appropriate manner

• Write and defend a research thesis

3. Course outline

Week	Topic	Examination
1	**Introduction** Concept and significance of research Types of research Introduction to postgraduate research at University Research process at the University of Nairobi Challenges in research Importance of knowing how research is done Research ethics	
2	**Aspects of research: What to consider** Choosing a research topic Planning and designing research Data collection and analysis Presenting a research output	
3-4	**Writing research document** Types of research documents Introduction Literature review Materials and methods Work-plan and budget Results and discussions Conclusions and recommendations	
5	**Class presentation of research area** Research Topic Introduction: Background, problem statement, objectives, hypothesis/research questions, scope of work	Examination (6%)
6	**Research data** Types of data Data collection strategies (measurements, surveys, field observations, secondary data) Time and cost budget	
7-8	**Analytical methods in research** Fundamentals of sampling in scientific research	

	Statistical techniques: summary, modelling, computing	
9-10	**Developing a research proposal**	
12-13	Class presentation of research proposal	9%
14	Draft Thesis proposal	15%
15	Revision	
16	End of semester examination	70%

4. Course examination

The course shall be examined as follows:

1) Course-work (30%)

    a. Class presentation of research topics   6%

    b. Class presentation of research proposal   9%

    c. Production of draft thesis proposal   15%

2) End-of-semester examination (70%)

    a. Compulsory question one

    b. Choice of any other three from the remaining four questions

5. Course reference materials

Kothari CR (2006). Research Methodology: Methods and Techniques. New Age International Publishers. New Delhi.

Rubin A and Babbie E. (2005). Research Methods for Social Work (5th Edition). Wadsworth/Thomson.

Kathleen M and Jonathan W (2011). How to Write Dissertations and Project Reports. Harlow UK: Pearson Education Ltd.