**CENTRAL UNIVERSITY**

**FACULTY OF ENGINEERING**

**DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY**

**FIRST SEMESTER 2022/2023 ACADEMIC YEAR**

**COURSE OUTLINE**


| | | | | |
|---|---|---|---|---|
| **Course:** | **ITEC318:** | **Research Methods** | **Credits:** | **3** |
| **Lecturer:** | **Name: Bright S.K. Anibrika** | | **Mobile:** | **0544032589** |
| | **Office: Computer Sci & I.T Dept. Block C** | | | **0208560460** |
| | **Email: skbselorm7@gmail.com** | | | |

**Office Hours: By appointment**


## Course description:

This course provides a basic introduction to the principles, methods, and techniques of empirical social research. Topics include the fundamentals of the scientific method and scientific inquiry, ethical considerations in research, basic methods of quantitative and qualitative data collection, and strengths and weaknesses of various data collection methods. The course is designed to make you a more informed consumer of scientific research through discussion, analysis, and hands-on practice

## Course objectives:

By the end of the course, students will be able to:

You will be able to:

1. Apply ethical guidelines to research proposals to identify potential risks such as harm to participants, lack of informed consent, and voluntary participation concerns
2. Create a real-world measurement by conceptualizing and operationalizing an abstract concept into a specific survey measure
3. Explain why research designs often deviate from ideal standards, including use of non-probability sampling, non-random assignment, lack of control groups, etc.
4. Evaluate the reliability and validity of a research study based on its research design, sampling methods, data collection instrument, and analysis technique Construct a web-based survey to analyze the relationship between two variables
5. Analyze variables using univariate and bivariate methods and illustrate your findings with correctly formatted graphs and tables

## Teaching Approaches:

There would be formal lectures, practical lab work, assignments and discussions.

## Minor Modifications:

When minor modifications are made to this syllabus, those will be reflected in the Virtual Learning Environment (VLE). Please inform your suggestions and comments through the VLE. http://vle.bit.lk

## Online Learning Materials and Activities:

You can access all learning materials in the VLE, if you are a registered student. It is very important to participate in learning activities given in the VLE to learn this course

## Assessment:

There would be two quizzes, two an unannounced quizzes and a number of class exercises and assignments. These would constitute 40% of the total scores for the final grade. In addition, there is a final end of semester examination which would constitute 60% of the total scores for the final grade.

## Online Assignments:

Online assignments, quizzes and other related form of assessment could be conducted on the VLE as well.

## Content:

**Introduction**

o Course overview

o Logical foundations of empiricism

o Scientific method

**• Research Techniques**

o Controlled experiments

o User studies, surveys, and survey tools

o Empirical studies

o Formal proofs

o Mathematical Modeling

o Performance metrics

o Simulation

o Data gathering, validation, and analysis

o Proper use of statistics

o Closed Form vs. approximate solution

**• Application Domains**

o Examples

 Simulation modeling

 Software Engineering

 Algorithm Analysis

 Human Computer Interaction

 Cybersecurity

 Deterministic and or Stochastic Modeling

 Optimization

**• Proposing and Performing Research**

o Types of papers (survey, position, research, etc.)

o Problem identification

o Literature review and citation

o Research question and hypotheses

o Identifying subjects

o Selecting appropriate methodology

o Writing a proposal

o Assessment and validation

**Compilation**

o Project management

o Technical writing, formats

o Peer review and publication venues

o Presentation and tools

o Possible student presentations

**Conduct of Research**

o Ethics

o Plagiarism

o Intellectual property

o Legal issue

**Reading Textbooks**


1. Bassey, M. (1999) Case Study Research in Educational Settings, Buckingham, Open University Press.

2. Bennett, N., Glatter, R., and Levacic, R. (eds.) (1994) *Improving Educational Management through research and consultancy*, London, Paul Chapman Publishing Limited

3. BERA (2011) *Revised Ethical Guidelines for Educational Research,* Southwell, BERA.

4. Blaxter, L., Hughes, C. and Tight, M. (1996) *How to Research,* Buckingham, Oxford University Press.

5. Coffey, A, and Atkinson, P. (1996) *Making Sense of Qualitative Data: complementary research strategies*, California, Sage Publications Incorporated

6. Cohen, L. and Manion, L. (1994) *Research Methods in Education,* London, Sage.