**MET 2102 Research Methods in Meteorology (3CU)**

**Description**

This course deals with method of data collection, analysis and interpretation in meteorological research.

**Objectives**

The course will help the students to achieve the following objectives

* Understand the importance of doing research in meteorology
* Describe the different sections of a research proposal
* Describe some statistical methods that are used in data analysis
* Use their knowledge to write research proposals for their projects

**Learning outcomes**

By the end of this course, students should be able to;

* Describe the methods used in meteorological research and outline the need for this research
* Identify and formulate research problems in meteorology
* Collect, analyze and interpret meteorological data
* Write research proposals and scientific research report

**Intellectual, Practical and transferable skills**

* Creative and innovative
* Problem solving
* Analytical
* Communication

**Teaching and learning patterns**

* Use of practical examples
* Class discussions
* Lectures
* Group presentations

**Indicative content**

* Introduction to research methods in meteorology: purpose, guidelines and types of research.
* Research proposal and research report formats.
* Ethics in conducting research work.
* Formulation of problem statement, objectives, and hypotheses.
* Literature review: its purpose and content.
* Methods of sampling and determination of sample size, data collection, organization.
* Data distribution: measures of central tendency, dispersion, skewness and kurtosis.
* Methods of data analysis and presentation: estimation of missing values and tests of data homogeneity and adequacy. Common errors in the measurements of: continuous and discrete variables values.
* Elementary probability theory: Significance tests of research hypotheses.
* Normal and binomial distribution: the Student’s t-test, Chi-square (2) and F-ratio test.
* Relationships between variables: correlation coefficients, simple linear regression analysis. Nearest neighbor analyses; exponential (decay and growth) models.
* Introduction to factor analysis applications in meteorology.
* Research results interpretation and writing of reports.

**Assessment Method**

The assessment method is structured to include course work, and final examination. Course work consists of assignments, reports, practicals and tests and accounts for 40% of the final grade. The final examination will account for 60% of the final grading

**Core Reference materials**

* **Gregory S** (1968): Statistical Methods and the Geographer, second edition, *Longmans*
* **Murray R. Spiegel and Larry J. S** (2008): Theory and Problems of Statistics, 4th edition, *McGraw-Hill*