**MET 3104 Hydrometeorology (3CU)**

**Description**

This course deals with an analysis of the water cycle and its interactions with the earth and atmosphere, including the processes of precipitation, evaporation, and stream flow.

**Objectives**

The course will help the students to achieve the following objectives

* Understand the hydrological cycle and all its components
* Describe how the different components of the hydrological cycle are measured
* Describe how stream flow forecasts are made

**Learning outcomes**

By the end of the course, a student should be able to:

* Describe the physical processes which give rise to the transport of water through the hydrological cycle
* Describe the instrumentation and methods of measurement or estimation of the various components of the hydrological cycle.
* Describe the significance of the hydrologic cycle to local and global energy budgets as well as climates of different regions
* Discuss the implications of human interventions on the hydrological cycle

**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 the Hydrological Cycle: Outline of the components of the cycle. Fluxes and stores of water on a global scale. Importance of the cycle on global and local scale.
* Precipitation: Types, measurement (by gauges, radar and satellite). Variations in space and time. Area estimates. Extreme values
* Evaporation: Physics of evaporation. Actual and Potential evaporation. Interception. Methods of measurement, methods of calculation (e.g penman, Bowen ratio)
* Soil Moisture; Characteristics of soils. Physics of water movement in soils. Infiltration and percolation
* Run off and river flow. Stream flow generation and flow measurements
* Hydrometry: Hydrographs, analysis, synthesis and theory application of the unit hydrograph, floods and low flows.
* Forecasting: purpose of forecasting, classification of forecasts; short term forecasting (river routing, linear reservoir storages). Long term forecasts.
* Effect of water pollution and human intervention on hydrological cycle

**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**

* **James. P. Bruce and Robert H. Clark** (1966): Introduction to Hydrometeorology, *Pergamon Press*
* **R.C. Ward** (1975): Principles of Hydrology, *McGraw-Hill*