**MET 3103 Boundary Layer meteorology (3CU)**

**Description**

This course explains how the earth and the atmosphere interact and how this interaction affects the atmospheric boundary layer.

**Objectives**

The course will help the students to achieve the following objectives

* Understand the evolution of the boundary layer on a daily basis
* Understand the concept of turbulence and its concepts
* Describe the urban heat island effects

**Learning outcomes**

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

* Describe the structure of the atmospheric boundary layer
* Distinguish between laminar and turbulent flows
* Define Reynold’s number and Richardson’s number
* Explain how the boundary layer is modified by an urban area

**Intellectual, Practical and transferable skills**

* Problem solving
* Analytical
* communication

**Teaching and learning patterns**

The mode of learning involves direct contact with students in form of lectures, Tutorials and assignments

**Indicative content**

* The structure of the atmospheric boundary layer.
* Fundamentals of turbulence: Laminar and turbulent flows, Reynolds’s number and averaging, Turbulent Kinetic Energy (TKE) and Richardson’s Number.
* Micrometeorology of the surface layer: Mixing length theory, Monin-Obukhov theory and wind profiles.
* Diurnal variation of the atmospheric boundary layer: Convective, neutral, nocturnal and cloudy boundary layers.
* Urban meteorology: Urban boundary layer and urban heat island.

**Assessment Method**

The assessment method is structured to include course work, and final examination. Course work consists of assignments, reports and tests and accounts for 30% of the final grade. The final examination will account for 70% of the final grading

**Core Reference materials**

* **Stull, R. B** (1988): An introduction to boundary layer Meteorology, *springer*
* **Oke,T.R** (1988): Boundary layer climates, 2nd edition, *Routledge*
* **Garratt,J. R** (1994): The atmospheric boundary layer, *Cambridge Univ. Press*