**MET 3201 Climate Change, Adaptation and Mitigation (3CU)**

**Description**

This course deals with developing a conceptual, but also quantitative, understanding of climate variability and change. It will address the application of this understanding to key issues such as the detection of climate changes in the historical record, and the attribution of changes to specific causes such as human activities.

**Objectives**

The course will help the students to achieve the following objectives

* Understand the concepts of climate variability and climate change
* Describe the causes of climate variability/ change
* Describe how climate change is attributed and its impacts in different sectors
* Describe the adaptation and mitigation measures that are proposed in the different sectors

**Learning outcomes**

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

* Explain the distinction between internally generated climate variability and externally forced climate change
* Describe the major causes and characteristics of internal climate variability, including the role of the oceans
* Describe mathematically the concepts of radiative forcing and climate feedback, and the application of these describing equilibrium and transient climate change
* Explain the processes of detecting climate changes and attributing their causes
* Evaluate recent observed changes in climate in the context of changes that have occurred in the past
* Describe the formulation of climate models, and evaluate their strengths and weaknesses
* Describe the basis, methods, and limitations, of climate prediction

**Intellectual, Practical and transferable skills**

* Creative and innovative
* Problem solving
* Analytical
* Communication

**Teaching and learning patterns**

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

**Indicative content**

* Observations of climate variability and change
* Internal variability of the climate system, including ENSO
* Radiative forcing of climate change: greenhouse gases, solar variability, aerosols and volcanoes
* Climate feedback mechanisms
* Causes of climate change on millennial and longer timescales: orbital forcing and ice age cycles
* Detection of climate change and its attribution to specific causes,
* Climate predictability and prediction
* Natural Disaster Impacts of extreme weather events on ecosystems in Africa, floods, drought Mitigation and Adaptation
* Early warning systems (FEWS, TEWS, etc)
* Vulnerability assessments to Natural disasters (especially Meteorological and Hydrological ones)
* Projected changes in climate and policy responses

**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**

* **IPCC** assessment Reports
* **Simeon .H. Ominde and Calestous Juma** (1991): A Change in the Weather: African perspectives on climate change, *ACTS Press*