

**COURSE CODE:** WMA 407  
**COURSE TITLE:** TROPICAL WEATHER SYSTEMS  
**NUMBER OF UNITS:** 3 Units  
**COURSE DURATION:**

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## COURSE DETAILS:

**Course Coordinator:** Dr G. C. Ufoegbune  
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**Office Location:** Room B205, COLERM  
**Other Lecturers:** Prof NJ Bello

## COURSE CONTENT:

Definition of the meteorological Tropics:  
General characteristics of the tropical atmosphere, spatial and seasonal distribution of weather elements in the tropics. Insolation and temperature air masses, sub-tropical anticyclones, cloudiness, rainfall and evapo-transpiration, radiation and water balances in the low altitudes. Implications for agriculture and water resources management of the tropics. Basic features of planetary scale motion in the tropic aspects for tropical circulation. The sub-tropical high-pressure cell (STHs) the trade winds, the equatorial trough, the Southeast Asian monsoons, the westerlies. Effects on tropical climate and agriculture.

## COURSE REQUIREMENTS:

WMA 201, 202

## READING LIST:

## LECTURE NOTES

Definition of the meteorological Tropics:

The region, tropics, has been given different definitions:

- Area between the tropics of cancer and tropic of Capricorn, which indicates the outer limits of the areas where the sun can ever be in zenith.
- Area between latitudes 30° North and South of the Equator.
- Areas of the world where there is no cold season, i.e., where the winter never comes.
- The area of the world where the annual range of temperature is equal or less than the mean daily range.
- Area of the world where the mean sea level temperature for the coldest month of the year is not below 18°C

General characteristics of the tropical atmosphere, spatial and seasonal distribution of weather elements in the tropics

Net radiation flux is defined as the difference in incoming radiation flux and outgoing radiation flux.

A positive net radiation flux indicates a surplus of energy, while a negative net radiation flux indicates a deficit.

When the earth-atmosphere system is considered as a whole, there is a positive net radiation flux between about 4°N and 4°S, while there is a negative net radiation flux poleward of 40° in both hemispheres.

In order for a steady-state temperature to be achieved, there must be transport of heat from the earth's surface to the atmosphere, and from the tropics to the Polar Regions.

It is this latitudinal heat imbalance that drives the general circulation of the atmosphere and oceans.

Spatial and Seasonal distribution of weather elements in the Tropics

- Radiation and Temperature.
- Air Masses
- Anticyclones
- Cloudiness
- Rainfall and Evapo-transpiration
- Water balance in the low latitude

Implication of the distribution of weather elements in the Tropics to Agriculture and Water Resources

Basic features of planetary scale motion in the Tropics

- Introduction
- Horizontal movements of Air
- Large Scale Vertical Motion
- Basic General Circulation in the Tropics (causes and implications)

Trade winds, Equatorial Through, South East Monsoon and the Westerlies.