THE FEDERAL UNIVERSITY OF TECHNOLOGY, AKURE

Department of Meteorology

MET202 – Instrumentation and Environmental Measurement

COURSE PARTICULARS

Course Code: MET202
Course Title: Instrumentation and Environmental Measurement
No. of Units: 2
Course Duration: Two hours of theory per week for 15 weeks.
Status: Compulsory
Course Email Address: met202@gmail.com
Course Webpage: http://www.met.futa.edu.ng/courseschedule.php?coursecode=MET%20202
Prerequisite: NIL

COURSE INSTRUCTORS

Dr K.O Ogunjobi
SEMS Building,
Dept. of Meteorology,
Federal University of Technology, Akure, Nigeria.
Phone: +2347031145866
Email: kenog2010@gmail.com

 and

Dr. E. C Okogbue
SEMS Building,
Dept. of Meteorology,
Federal University of Technology, Akure, Nigeria.
Phone: +2348161530011
Email: emokogbue@yahoo.co.uk

COURSE DESCRIPTION

In this course students will learn the measurement techniques and instrumentation used in atmospheric sciences. The course will consist of lecture, laboratory and field work. The course will introduce students to the techniques of instrument calibration, deployment, and data acquisition. Students will become familiar with upper-air sounding techniques, remote sensing instruments such as SODAR and Radar, air-quality gas analyzers, and turbulence measurements from sonic anemometry.

COURSE OBJECTIVES

The objectives of this course are to:
- introduce students to fundamental principle of meteorological instrumentation and measurements;
- give students the basic skills for meteorological observations and measurements;
- develop students understanding of different meteorological instrument types, platforms, and their uses; and

- develop students' understanding on how to calibrate and install instrumentation for laboratory and field studies, data collection and analysis using a variety of data from different instrumentation types.

COURSE LEARNING OUTCOMES / COMPETENCIES

Upon successful completion of this course, the student will be able to:

- explain the fundamentals of instrument characteristics and the general requirements of a meteorological observatory;
- explain the general instrumentations to monitor various meteorological variables;
- select the appropriate instrumentation for a variety of atmospheric measurements;
- calibrate and install instrumentation for field studies; and
- analyze instrument performance and data quality and write scientific field reports.

GRADING SYSTEM FOR THE COURSE

This course will be graded as follows:

Assignments	20%
Test(s)	20%
Final Examination	60%
TOTAL	**100%**

GENERAL INSTRUCTIONS

The format of the lectures generally will include a combination of multimedia slides, overheads, and white board notes. The lectures will be available for download, in pdf format, on the course website after each class. Students are expected to take notes during the lectures and supplement your notes with the lecture multimedia viewslides.

The laboratory portion of the course will require the student to keep an organized binder for laboratory notes, including reports and any documentation needed that is not included in the text book, i.e., instrument manuals, etc.

Classroom protocol

*Cell phones and Laptop computers***:**
Students and Instructor will please turn their cell phones **off** or put them on **vibrate mode** while in class. Please **do not** answer your phones in class. Laptop computers may only be used for taking notes in class; any abuse of laptop use in class will result in banning its use in the classroom for all students.

Punctuality, etc.:
Please make every effort to arrive *on time*. Please do not start making preparations to leave (e.g., closing notebooks) prior to the scheduled end of the class. Please inform the lecturer if there is need to leave class early; try to take a seat near the front of the classroom to avoid disruption of the class as you leave.

Assignments and Group Work:

Students are expected to submit assignments as scheduled. Failure to submit an assignment as at when due will earn the student zero for that assignment. Only under extenuating circumstances, for which a student has notified any of the instructors in advance, will late submission of assignments be permitted.

Code of Conduct in Lecture Rooms and Laboratories:

Students should turn off their cell phones during lectures. Students are prohibited from engaging in other activities (such as texting, watching videos, *etc*.) during lectures. Food and drinks are not permitted in the laboratories.

READING LIST

Camarda, B. (2004). *Using Microsoft Office Word 2003*. Special Edition. Que Publishing, Indianapolis, USA. 1231p.

Odedele, T. O. (2010). *Using Computer Software Packages*. Published by Olasunkanmi, Nigeria. 304p.

Price, M. (2012). *Computer Basics in Easy Steps*. 8th Edition. In Easy Steps Limited, Warwickshire, UK. 240p.

Shelly, G.B., J.J. Quasney, S.M. Freund, R.E. Enger and M.B. Jones (2012). *Microsoft Excel 2010: Comprehensive*. Course Technology, Cengage Learning, Boston, USA. 760p.

WIIN-NIELSEN A. C. (1983). Guide to Meteorological instruments and methods of observation. OMM-N0. 8.

Sparks, W. R. (1970). Current concepts of temperature measurement applicable to synoptic networks. Aner. Met. Monog., vol.11, N0.33, 247-251.

Hardy, R. H. (1974) A note on the optimum averaging time of wind reports for aviation. Met.Mag., 103, 99-105.

WMO (1969) Time and space variations of visibility and low cloud within the approach control area. WMO Tech. Note N0. 95 (WMO-N0. 227), 97-101.

Basic Electronics by Gene McWhorter and Alvis J. Evans, Amer Radio Relay League; Second edition (April 1, 2010).

COURSE OUTLINE

Week	Topic	Remarks
1&2	Fundamental principles of Meteorological instrumentation.	During this first class, the expectation of the students from the course will also be documented.
2 & 3	Basic requirements; sensitivity, errors, durability, ease of use and maintenance.	Practical exercise will involve opening up a desktop PC to examine

		the components and specify their functions.
4	Exposure problems, Spot and continuous measurements.	When learning about computer configurations, students will be taught on what to look for when deciding on what PC or laptop to buy. The lecture on Operating Systems will involve brief introduction to various operating systems but emphasis will be laid on Windows.
5 & 6	General instrumentation to monitor precipitation, winds, evaporation, solar radiation, temperature, pressure, clouds, visibility and sea salinity.	Exercises will involve creating folders and sub-folders, and using Antivirus program to clean up a disk.
7 & 8	Upper air: radiosonde and radio-theodolite techniques. Use of radar and satellites Infrared measurement and Imagery.	Students will be requested to prepare a well formatted document as assignment.
		MID-SEMESTER TEST
9	Instrumentation in Micrometeorology, Soil temperature, moisture and heat flux.	Microsoft Excel is the spreadsheet program to be used. Students will be taught on efficient use of the program for routine activities.
10 & 11	Leaf area index, leaf/canopy resistance, solar radiation, eddies.	Students will be divided into groups and given topics to prepare slides on, for group presentation during the lab session.
12 & 13	Pollen disposal, Hydrological measurement water current, water table.	The Internet is a very powerful tool for research. Students will be taught on how to make the best use of it for their academic pursuits.
14&15	Observation system: Automatic stations, marine, aircraft and satellite observations.	This is the week preceding the final examination. At this time, evaluation will be done to assess how far the students' expectations for the course have been met.