Corse Title – Course Code

Department of Electrical & Electronics Engineering
Faculty of Engineering

1. Basic Details

Programme: B. ENG
Your: 2014/2015
Total Units: 3
Level: 400L

Taught Semester: First Semester

Instructor:
Engr. Dr. O. Akinsanmi
Office: Engineering Building
Phone: +2348068108694
Email: olaitan.akinsanmi@fuoye.edu.ng

Office: Thursday 10am – 11am or by appointment

Reading Materials:
http://eee.fuoye.edu.ng/400/f-semester/187-eee-441-electromagnetic&waves-II-3-units.html

Department: Electrical and Electronics Engineering

Prerequisites: EEE341 (Electromagnetic fields & waves I)

Prior Knowledge:

- An understanding of the basic vector analysis
- An understanding of Maxwell's equation in differential form
- An understanding of Maxwell Equation in integral form
- An understanding of stokes and divergence theorem in the conversion of integral expression to differential or cul or point forms.
- Establishment of the wave equation in the derivation of the velocity of light
- Establishment of why light an electromagnetic fields travels faster than sound.

2. Course Overview

Electromagnetic fields and waves II examines the establishment of Maxwell' equations from Gases law, Amperes law and Faraday's law: The topics covers include the time varying magnetic and electric fields, wave propagation, transmission lines, wave guides and Antennae.

3. Course Objectives

- To understand the fundamentals of Maxwell's equations
- To understand the application of Maxwell's equation in the establishment of wave equation (Electric and Magnetic field sources).
- To understand the wave propagation in good conduction and skin effect.
- Fundamentals of transmission lines waves guides and antennae.

4. Intended Learning Outcomes (ILO)

- Proper understanding of Maxwell's equation
- Proper understanding of wave equation derived from Electric and Magnetic fields sources
- Understanding of the time varying magnetic and electric field
- Establishment of skin effect
- Transmission lines, wave guide and Antennae Application

5. Course Content

Review of electromagnetic laws in integral form Gauss' Law, Ampere's and Faraday's Law Electric fields one to distribution of charge, magnetic fields in and around current carrying conductors.
Time – varying magnetic and electronic field conduction and displacement current density Maxwell's equation.
Wave propagation in good conductors, skin effect, plane waves in unbounded dielectric media.
Fundamentals of transmission lines, wave guides and Antennae.

6. Course Schedule

Week	Topics	Reading assignment
1.	Introduction and Review of electromagnetic laws in integral form	
2.	Derivation of the differential expression of Maxwell's equation from the integral form	
3.	Derivation of wave equation from electric and magnetic sources	
4.	Electric field due to distribution of charges and magnetic field and around current carrying conductors, conduction and displacement unit density	
5.	The varying magnetic & electric field	
6.	Quiz 1	
7.	Wave propagation in good conduction, skin depth	
8.	Plane waves in unbounded dielectric media	
9.	Foundational of transmission lines	
10.	Waves guides	
11.	Antennae	
12	Quiz 2	
13	Revision	

7. Learning & Teaching Method

- Lecture: 1: 3hrs (Thursday 11am – 1pm)
- Formative Phase tests and Group tutorial/ Discussions

8. Learning & Teaching Method

Activity type	Percentage	Hours
Lectures & Class Exercises	26%	30
Group Tutorials/Discussions	9%	10
Guided Independent Study	65%	75
Total	100%	115

9. Course Assessment Method

Requirement:	3 Hours Exam
Status:	Compulsory Course
Write Examination:	60%
Quiz/Test:	20% (Two Quizzes)
Homework:	10%
Attendance:	10%

Level of Performance	Grade	Rating (credit points per unit)
70 – 100%	A = Excellent	5.0
60 – 69%	B = Very Good	4.0
50 – 59%	C = Good	3.0
45 – 49%	D = Satisfactory	2.0
40 – 44%	E = Poor	1.0
0 – 39%	F = Failure	0.0

10. Industry Relevance

- Wave equations as the Fundamental Communication Engineering
- Electromagnetic fields & wave is the fundamental of the current trends in the world technology i.e. medical, military etc. ICT.

11. Required Text

- Elements of Electromagnetics by M. O. Sadiku

12. Recommended Text

- Elements of Electromagnetics by William H. Hayt, Jr
- Basic Electromagnetics with Application by NannapaneniuRao

13. Attendance Policy

Attendance is strictly mandatory. The University policy stipulates that in order to be eligible for a course examination, a student shall be expected to attend a minimum of 65% of the lecture, tutorials, practical and classes for the course in which he/she is registered **[Ref. Students' Handbook of Information, pg. 52]**. Any student, therefore, whose attendance rating falls below the required 65% shall not be eligible to write the course exam. In this regard, students will be notified of their eligibility status for a course examination prior to the exam.

14. Calculator Policy

Programmable calculators will not be allowed in the quizzes or final exam. The University policy prohibits the use of mobile phone, electronic programmable calculator, information storage devices, etc. in the quizzes or final exam **[Ref. Students' Handbook of Information, pg. 49]**. A "programmable calculator" is one that can store program steps or text at any level of sophistication and the rule applies irrespective of whether or not there appears to be anything stored. If you are in any doubt as to the eligibility of your calculator, please see me well before the quiz/exam.

15. Exemption from Quizzes/Exam

Dated medical documentation is required for exemption from a quiz; in this case the weighting will be moved to the final. Makeup quizzes will not be offered under any circumstances. The University policy prohibits a student from absenting from exam except on acceptable medical grounds, and in consultation with the HOD and the Dean of the faculty. Any student absent on the ground of illness must produce a certified medical report, and students who absent from quizzes/exam for reasons other than illness, accident or some exceptional circumstances shall be deemed to have failed the course **[Ref. Students' Handbook of Information, pg. 52]**.

16. Ethical and Unethical Conduct

The preliminary purpose of Homework is to help students learn and gain practical experience in the subject matter. Allowing and encouraging collaborations with fellow students best serves this purpose. Modern engineering is, after all, almost exclusively a team effort. However, fairness requires us to be able to assess *your own* contribution. Therefore, the written material that you hand in *must* be *your ownwork*, and any discussion or collaborations with fellow students must be identified in writing on your solution (e.g. noting "the solution to problem #5 was worked out together with Mark Davison", or "the solution to problem #2 was benefited from discussions with Ruth Peters"). Nearly identical solutions from different students who do not cross – reference each other will be viewed as statistically "unlikely", thus worthy of further examination.

This policy is intended to help you make the most out of the course by allowing you to freely work with your classmates. If you are in any doubt as to what constitutes ethnical or unethical conduct, please see any member of staff for assistance. Violations of this policy will be handled with maximum severity.