2023
TP-153

Course Specification
(Bachelor)

Course Title:	Electromagnetics II
Course Code:	EE1272
Program:	Electrical Engineering
Department:	Electrical Engineering
College:	College of Engineering
Institution:	Imam Mohammad Ibn Saud Islamic University
Version:	V5
Last Revision Date:	01-01-2025

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (3)					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (6th level, 3rd year)					
4. Course general Description:					
Time varying fields, Maxwell's equations. Plane wave propagation. Reflection and refraction. Poynting vector. Introduction to transmission line theory. Introduction to radiation and antennas.					
5. Pre-requirements for this course (if any)**:**					
EE1271					
6. Co-requisites for this course (if any)**:**					
--					
7. Course Main Objective(s):					
To develop an understanding of time varying field concepts leading to the derivation of Maxwell's equations, understand basic plane wave propagation problems. And understand the characteristics of transmission lines and the basics of antennas and radiation.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	45
2.	**Laboratory/Studio**	-
3.	**Field**	-
4.	**Tutorial**	15
5.	**Others (specify)**	-
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
K1	State basic plane wave propagation problems	1.2	Lectures and tutorials	Quizzes and Exams
K1	List the characteristics of transmission lines.	1.1	Lectures and tutorials	Quizzes and Exams
K1	Recognize of time varying field concepts leading to the derivation of Maxwell's equations	1.8	Lectures and tutorials	Quizzes and Exams
2.0	**Skills**			
S1	Solve problems involving basics of antennas and radiations.	2.5	Lectures and tutorials	Quizzes and Exams
3.0	**Values, autonomy, and responsibility**			
V1 / V2	Communicate effectively in oral, written, graphical and visual forms	3.5 / 4.1	Project Assignment	Project Report

C. Course Content

No	List of Topics	Contact Hours
1	Review of static fields	10
2	**Farady's law, time harmonic fields, Maxwell equations in final form**	4
3	**Electromagnetic wave propagation**: plane wave, reflection, refraction, poynting vector	10
4	Transmission lines; parameters, equations. Standing wave ratio, and Smith chart	10
5	Waveguides; TM and TE modes, modes excitation and attenuation. Waveguide resonators	12
6	Antennas; monopole, dipole, loop. Antenna arrays, and antenna characterstics	12
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	8 HWs	1 week from posting	10%
2.	5 quizzes	To be announced	10%
3.	2 term exams	To be announced	40%
4.	Final exam	To be announced	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Elements of Engineering Electromagnetics by Matthew Sadiku, 5th Edition/or latest: Oxford University Press
Supportive References	1- John D. Kraus, Electromagnetics, McGraw-Hill. 2-Clayton Paul, Electromagnetics for Engineers, Wiley. 3- S. Wentworth, Fundamentals of Electromagnetics with Engineering Applications, Wiley.
Electronic Materials	Computer animations and online resources supplied by the instructor.
Other Learning Materials	Different Online sites.

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	One classroom: fits up to 25 students with white board.

Items	Resources
Technology equipment (projector, smart board, software)	A laptop computer connected to a projector to display PowerPoint presentations
Other equipment (depending on the nature of the specialty)	N/A

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Indirect
Effectiveness of Students assessment	Students	Indirect
Quality of learning resources	Relevant Focus Group	Indirect
The extent to which CLOs have been achieved	Dept. Quality Committee	Direct
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	