Course Unit Title	Electromagnetic Theories
Course Unit Code	BME260
Type of Course Unit	Compulsory
Level of Course Unit	Sophomore
National Credits	3
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	3
Practice (hour/week)	-
Laboratory (hour/biweekly)	2
Year of Study	2
Semester when the course unit is delivered	1
Course Coordinator	Assist. Prof. Dr. Dilber Uzun Özşahin
Name of Lecturer (s)	Assist. Prof. Dr. Dilber Uzun Özşahin
Name of Assistant (s)	Niyazi Şentürk
Mode of Delivery	Face to Face.
Language of Instruction	English
Prerequisites	PHY102
Recommended Optional Programme Components	-

Course description:

This course is an undergraduate level electromagnetic theories course, which emphasizes as a basic for understanding on electromagnetic theories and their applications. The course focuses on an important role of electromagnetic theories in diverse areas of electromagnetic spectrum, electric filed and several point charges, electric flux, capacitors and capacitance, moving particles in the electric field, polarization, energy of capacitor, diverjans theorem, general situation of the induction.

Objectives of the Course:

- Understand Maxwell's equations
- Understand electromagnetic fields, charges, currents
- Apply 3-dimensional vector calculus to electromagnetic fields
- Calculate electromagnetic field distributions

- Understand field concept underlying common electrical components (inductors, transistors)

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Formulate potential problems within electrostatics, magnetostatics and stationary current distributions in linear, isotropic media, and also solve such problems in simple geometries using separation of variables and the method of images.	1,5
2	Define and derive expressions for the energy both for the electrostatic and magnetostatic fields, and derive Poyntings theorem from Maxwells equations and interpret the terms in the theorem physically.	1,3,5
3	Describe and make calculations of plane electromagnetic waves in homogenous media, including reflexion of such waves in plane boundaries between homogenous media.	1,3,5

Assessment Methods: 1. Written Exam, 2. Assignment, 3. Project/Report, 4. Presentation, 5. Lab. Work

Course's Contribution to Program

		CL
1	Apply knowledge of mathematics, natural science with relevant to life science and multidisciplinary context of engineering science.	5
2	Analyze, design and conduct experiments, as well as to analyze and interpret data.	4
3	Design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.	4
4	Function on multidisciplinary teams.	3
5	Control in design work, by using simulation, modelling and tests and integration in a problem solving oriented way.	3
6	Display an understanding of professional and ethical responsibility.	3
7	Communicate effectively aware of the non-technical effects of engineering.	1
8	Search technical literature and other information sources.	2
9	Recognize of the need for, and an ability to engage in life-long learning.	2

10	Exhibit a knowledge of contemporary issues.	2
11	Use the techniques, skills and modern engineering tools necessary for engineering practice to develop marketable products for the global market.	3

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	1	Electromagnetic Spectrum	
2	1,2	Electric field Strength	
3	2	Force between the point sources	
4	3	Electric charge potential	
5	5	Electric field as the gradient of electric potential	
6	5	Electric Flux	
7	6	Capasitors and Capasitance	
8			Midterm
9	7	Moving Particles in the electric field	
10	8	Dielectrics permitivite	
11	8	Polarization	
12	9	Energy of Capacitors	
13	9	Static and stable magnetic fields	
14	13		
15			Final

Recommended Sources

Textbook:

Markus Zahn, Electromagnetic Field Theory: A Problem Solving Approach. (Massachusetts Institute of Technology: MIT OpenCourseWare). http://ocw.mit.edu (accessed MM DD, YYYY). License: Creative Commons Attribution-NonCommercial-Share Alike.

Assessment		
Attendance	12.5%	
Project	17.5%	
Homeworks	10%	
Midterm Exam	20%	Written Exam
Final Exam	40%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Near East University Academic Regulations for Undergraduate Studies

Course Policies

1. Attendance to the course is mandatory.
2. Students may use calculators during the exam.
3. Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Near East University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class (including Exam weeks)	16	3	48
Labs and Tutorials	3	2	6
Assignment	-	-	-
Project/Presentation/Report	2	2	4
E-learning activities	-	-	-
Quizzes	-	-	-
Midterm Examination	1	15	15
Final Examination	1	20	20
Self Study	14	5	70
Total Workload			163

Total Workload/30(h)	5.43
ECTS Credit of the Course	5