Unit Description Form

Course Description Form

Faculty of Engineering / Department of

Unit Information

Course Information

Unit Title	**Electric fields**	**Unit delivery**	
Unit Type	**fundamental**	☒ نظريه ☒ حاضر ☒ المختبر ☐ تعليمي ☐ عملي ☐ Seminar	
Unit Code	BME-111		
ECTS Credits	**8**		
SWL (ساعة / SEM)	**125**		
Unit level	2	**Delivery Semester**	1
Department of Administration	Biomedical Engineering	**College**	Faculty of Engineering
Unit Commander	Ali Muhammad Abdul sadah Abdul wahid	**E-mail Address**	ali.mohammed@uowa.edu.iq
Title of Unit Commander	Assistant Lecturer	**Unit Commander Qualifications**	Master
Unit Teacher		**E-mail Address**	
Peer Reviewer Name	name	**E-mail Address**	
Date of accreditation of the Scientific Committee	26/9/2024	**Version number**	1.0

Relationship with other units

Relationship with other subjects

Prerequisites Unit	No	**Semester**	
Common Requirements Unit	No	**Semester**	

Unit objectives, learning outcomes and how-to contents Course objectives, learning outcomes and instructional contents	
Objectives of the Unit Course Objectives	Understand the basics of electromagnetic fields: Recognize basic concepts such as electric field, magnetic field, and lines of force. Basic Laws Explained: A Study of Maxwell's Laws, Static Electricity, and Magnetism. Analysis of electromagnetic interactions: interpreting the effect of electric and magnetic fields on moving charges and particles. Applications of electromagnetic fields: such as electromagnetic waves, wireless communications, and measuring devices. . Develop analytical skills: solve problems using differential equations and vectors in the analysis of electromagnetic fields. Linking theory to practice: Understand how electromagnetic principles are used in the design of engineering devices and technological systems.
Unit Learning Outcomes Learning outcomes of the course	Ability to explain the basic concepts of electric and magnetic fields and their relationship to charges and moving particles. Apply Maxwell's laws to understand electromagnetic behavior in different systems. . Analyze electromagnetic interactions using mathematical equations to solve related problems. . Interpret the properties of electromagnetic waves such as propagation, reflection, and refraction in different media. . Link theory to practical applications, such as the design of electromagnetic systems and communication devices. Develop the ability to solve problems using simulation software or customized technical tools.
Indicative Contents Indicative Contents	Electric fields: Identify electric charges, electric field lines, and calculate field strength using Coulomb's and diving laws. . Magnetic fields: the study of magnetic field lines, bio-savar and ampere laws, and magnetism in materials. . Maxwell's laws: a comprehensive explanation of the four laws and their connection to the behavior of electromagnetic fields. Electromagnetic waves: Wave properties such as speed, wavelength, and frequency, with applications in communications and energy transmission. . Electromagnetic interactions: The effect of fields on moving charges and electric currents. Practical applications: The use of electromagnetic fields in technological devices such as engines, generators, and antennas.

Learning and Teaching Strategies Learning and Teaching Strategies	
Strategies	Learning and Teaching Strategies for the Electromagnetic Fields Unit: The module relies on interactive lectures to explain theoretical concepts and basic laws. Learning is enhanced through hands-on sessions and laboratory experiments to understand the behavior of electromagnetic fields. Simulation software is used to analyze and solve applied problems. It also encourages group discussions and problem solving to develop critical thinking and link theory to practical applications.

Student Workload (SWL) The student's academic load is calculated for 15 weeks			
SWL منظم (h / sem) Regular academic load of the student during the semester	45	**SWL regulator(h/s)** Regular student load per week	3
SWL غير منظم (h / sem) Irregular academic load of the student during the semester	61	**Unregulated SWL (h/s)** Irregular student academic load per week	4
SWL إجمالى (h / sem) The student's total academic load during the semester	106		

Unit Evaluation Course Evaluation					
	As	**Time/Number**	**Weight (tags)**	**Week due**	**Related learning outcomes**
Formative Assessment	**Contests**	2	10% (10)	5, 10	LO #1 , 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO #3 , 4, 6 and 7
	Projects /Laboratory.	1	10% (10)	continuous	every
	report	1	10% (10)	13	LO #5 , 8 and 10
Final Assessment	**Midterm Exam**	2 hr	10% (10)	7	LO #1-7
	Final Exam	2 hours	50% (50)	16	every
	Overall Rating		100% (100 degree)		

Delivery Plan (Weekly Curriculum) Theoretical Weekly Curriculum	
week	**Covered Material**
Week 2+1	Electrostatic fields, Coulomb's law and electrical intensity The field resulting from the distribution of a continuous charge in a given volume
Week 4+3	Electric Flow Density Flow lines, displacement density Gauss's Law

Week5+6	Power and voltage Conductors and insulators
Week 8+7	Amplitudes and inductors
Week 9+10	Study of the magnetic field
Week 12+11	Magnetic Forces, Materials, and Inductance
Week 13	Electromagnetic fields

Learning and Teaching Resources

Learning and Teaching Resources

	text	**Available in the library?**
Required texts	William H. Hayt and Joun A. Buck, "Engineering Elecrtomagnetic". Sadiku, "Elements of Electromagnetic". Joseph A. Edminister, "Electromagnetics	Yes
Recommended texts		Yes
Websites		

Grading chart

Grading chart

group	**degree**	Appreciation	**Tags (%)**	**definition**
An-Najah Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance
	B - Very Good	Very good	80 - 89	Above average with some errors
	C - Good	Good	70 - 79	Proper work with noticeable errors
	D - Satisfactory	medium	60 - 69	Fair but with significant shortcomings
	E - sufficient	Acceptable	50 - 59	The work meets the minimum standards
Group failure (0 – 49)	**FX -** Failed	Deposit (in (processing	(45-49)	More work required but credit granted
	F - Failed	Failure	(0-44)	Large amount of work required

Note: Signs that are more than 0.5 decimal places greater than or below the full mark will be rounded higher or lower (for example, a score of 54.5 will be rounded to 55, while a mark of 54.4 will be rounded to 54. The university has a policy of not tolerating "imminent traffic failure", so the only modification to the marks granted by the original mark(s) will be the automatic rounding described above.