



Course Specifications

Course Title:	Electricity and Magnetism 3
Course Code:	PHY2303
Program:	BSc
Department:	Physics
College:	Applied Sciences
Institution:	Umm Al-Qura University

Table of Contents

A. Course Identification	3	
6. Mode of Instruction (mark all that apply)		3
B. Course Objectives and Learning Outcomes	3	
1. Course Description		3
2. Course Main Objective		3
3. Course Learning Outcomes		3
C. Course Content	4	
D. Teaching and Assessment	4	
1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods		4
2. Assessment Tasks for Students		4
E. Student Academic Counseling and Support	5	
F. Learning Resources and Facilities	5	
1. Learning Resources		5
2. Facilities Required		5
G. Course Quality Evaluation	5	
H. Specification Approval Data	6	



A. Course Identification

1. Credit hours: 4hrs
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: Level 6/ 2 nd years
4. Pre-requisites for this course (if any): Electricity and Magnetism 2
5. Co-requisites for this course (if any):

6. Mode of Instruction (mark all that apply)

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

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	30 Hours
2	Laboratory/Studio	30 Hours
3	Tutorial	
4	Others (specify)	
	Total	60 Hours

B. Course Objectives and Learning Outcomes

1. Course Description The course will cover the principle of an alternating current (AC), such as basic concepts, components in AC circuit, RC, RL and RLC circuits, types of filters, resonance and electric power.
2. Course Main Objective <ol style="list-style-type: none">1. Define the main properties of an alternating current2. Use the complex number3. Understand the principle of basic components in AC circuit4. Understand the concept of the electric power5. Understand the theory of RC, RL, RLC circuits6. Understand different types of filters (Low pass filter, High pass filter...)7. Understand the theory of the resonant circuit.8. Calculate the Power Factor



3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Define the main properties of an alternating current	K1-I
1.2		K1-P
1.3	Analyze the equations of R-C, R-L and R-C-L circuits and calculating the impedance, power factor, root-mean- square values of current and voltage.	K1-P
1.4		K2-P
2	Skills :	
2.1	Solve ac circuit problems using complex number .	S1-P
2.2		S1-P
2.3		S2-I
2.4	Analyse the different types AC circuit.	S2-I
2.5		S2-P
3	Values:	
3.1		V1-I
3.2	Collaborate with the others to resolve problems.	V2-I

C. Course Content

No	List of Topics	Contact Hours
1	Principles of alternating current AC waveforms, frequency, Angular frequency, Period, Instantaneous value of the voltage, Maximum or peak value of the voltage, Peak to peak value of the voltage, Initial phase, Root-Mean- Square (RMS) Values of Current and Voltage.	2
2	Complex number Introduction, Vectors and AC waveforms, Simple vector addition, Complex vector addition, Polar, rectangular and Exponential Form notation, Complex number arithmetic.	2
3	Reactance and Impedance - Inductive AC resistor circuits, AC inductor circuits, Series resistor-inductor circuits, Parallel resistor-inductor circuits.	5
4	Reactance and Impedance - Capacitive AC resistor circuits, AC capacitor circuits, Series resistor-capacitor circuits, Parallel resistor-capacitor circuits.	5
5	Reactance and Impedance – RLC Review of R, X, and Z , Series R, L, and C, Parallel R, L, and C, Series-parallel R, L, and C, Susceptance and Admittance.	5
6	Resonance An electric pendulum, Simple parallel resonance, Simple series resonance, Applications of resonance, Resonance in series-parallel circuits, Q and bandwidth of a resonant circuit .	5
7	Filters What is a filter?, Low-pass filters, High-pass filters, Band-pass filters, Band-stop filters, Resonant filters.	3
8	Power Factor	3



	Power in resistive and reactive AC circuits, True, Reactive, and Apparent power, Calculating power factor, Practical power factor correction	
	Practical Part: Students will conduct various experiments in the practical part of the course. Each student will perform the experiment, collect data, extract result, and prepare a written report every week.	10
Total		40

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and Understanding		
1.1	Define the main properties of an alternating current	1. Demonstrating the basic information and principles through lectures and the achieved applications 2. Discussing phenomena with illustrating pictures and diagrams 3. Lecturing method: a. Power point b. e-learning 4. Tutorials 5. Revisit concepts 6. Discussions 7. Start each chapter by general idea and the benefit of it, 8. Build a strategy to solve problem	1-Mid term theoretical exams 2-Final practical exam 3-Final theoretical exam
1.2	Apply the complex number to describe voltage or current.		
1.3	Analyze the equations of R-C, R-L and R-C-L circuits and calculating the impedance, power factor, root-mean-square values of current and voltage.		
1.4	Apply mathematical formulation to describe the physical principle or phenomena		
2.0	Skills		
2.1	Solve ac circuit problems using complex number .	1. Preparing main outlines for teaching 2. Following some proofs 3. Define duties for each chapter 4. Homework assignments 5. Encourage the student to look for the information in different references	1. Midterm's exam. Exams, short quizzes 2. Asking about physical laws previously taught 3. Discussions of how to simplify or analyze some phenomena.
2.2	Calculate Reactance and Impedance.		
2.3	Analyse the concept of the electric power.		
2.4	Analyse the different types of filters and the resonant circuit.		
2.5	Calculate the Power Factor.		
3.0	Values		
3.1	Write a report, Search on the internet, Collect the material of the course.	· Lab work · Active learning · Small group discussion	· Evaluate the efforts of each student in
3.2	Collaborate with the others to resolve problems		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
			preparing the report. · Evaluate the scientific values of reports. · Evaluate the work in team · Evaluation of the role of each student in lab group .

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Exercises & Home works	All weeks	10 %
2	Midterm's exam.	8 th week	20 %
3	Lab. Reports and Exam	11 th week	20 %
4	Final Exam (theoretical)	End of the term	50 %

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

Each student will supervise by academic adviser in physics department and the time table for academic advice were given to the student each semester.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Lessons In Electric Circuits, Volume II – AC. By Tony R. Kuphal dt. 6 th Edition, 2007
Essential References Materials	Fundamentals of Physics, by David Halliday, Robert Resnick and Jearl Walker, Wiley, 10 th Edition, Extended Edition on: 978-1-119-46013-8
Electronic Materials	The website of the course



Other Learning Materials	Lab manual.
---------------------------------	-------------

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs etc.)	Classrooms, equipped laboratories and library.
Technology Resources (AV, data show, Smart Board, software, etc.)	
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
1. Following up the progress of students in the course.	Instructor	Homework & quiz
2. Evaluating the progress of student	Instructor	Questionnaires.
3. Evaluating the instructor	Student	Questionnaires.
4. Revision of Exam paper	Another staff member	Standers of the exam papers

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

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

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	

