



T.C.

ESKİŞEHİR OSMANGAZİ ÜNİVERSİTESİ

FACULTY OF ENGINEERING and ARCHITECTURE

ELECTRICAL and ELECTRONICS ENGINEERING DEPARTMENT



## COURSE INFORMATION FORM

Course Name	Course Code
Physics II	151222198

Semester	Number of Course Hours per Week		Credit	ECTS
	Theory	Practice		
2	3	0	3	3

Course Category (Credit)				
Basic Sciences	Engineering Sciences	Design	General Education	Social
3				

Course Language	Course Level	Course Type
English	Undergraduate	Compulsory

<b>Prerequisite(s) if any</b>	
<b>Objectives of the Course</b>	To teach students the fundamental laws and related problem solving approaches of electricity and magnetism; hence, to provide them the conceptual materials in order to comprehend the basic scientific foundations in associated novel academic research and emerging technological advancements.
<b>Short Course Content</b>	Electric charges, Coulomb's Law, electric field, Gauss's Law, electric potential, capacitance and dielectric materials, resistance and electric current, magnetic field, magnetic field sources, electromagnetic induction, Maxwell's equations.

Learning Outcomes of the Course	Contributed PO(s)	Teaching Methods *	Measuring Methods **
1 Acquire the theoretical knowledge and to develop an understanding on their comprehensive applications on topics in electricity and magnetism.	1, 2	1, 2, 5	A, K
2 To model and solve problems including engineering and advanced physics by using theoretical information and practical knowledge in electricity and magnetism.	3, 5	1, 2, 5, 10	A, K
3 To realize the significance of the dielectric materials on capacitors through the proper understanding of electric field, electric potential, and capacitances.	1, 2, 4	1, 2, 5, 6	A
4 Getting to know simple electric circuits. Learn about current, resistivity, and electromotor force and their impact on electric circuits.	1, 2, 4	1, 2, 5, 6	A
5 To be able to analyze electric circuits by using Kirchoff's laws upon the foundations of conservation of charges and energy.	1, 2, 4	1, 2, 4	A
6 To learn magnetic field, magnetic force, and sources of magnetic field; hence, grasp the correlation between the moving charges and magnetism.	2	1,5	C, K
7 To be able to grasp the interconnection between electricity and magnetism; as changing magnetic field gives rise to an induced electric field, and vice versa.	2	1, 5	C, K

\*Teaching Methods 1:Expression, 2:Discussion, 3:Experiment, 4:Simulation, 5:Question-Answer, 6:Tutorial, 7:Observation, 8:Case Study, 9:Technical Visit, 10:Trouble/Problem Solving, 11:Individual Work, 12:Team/Group Work, 13:Brain Storm, 14:Project Design / Management, 15:Report Preparation and/or Presentation

\*\*Measuring Methods A:Exam, B:Quiz, C:Oral Exam, D:Homework, E:Report, F:Article Examination, G:Presentation, I:Experimental Skill, J:Project Observation, K:Class Attendance; L:Jury Exam

<b>8</b>	To be able to comprehend that how the electricity is generated in power plants using renewable energy sources by referring to the Maxwell's equations.	8, 10, 11	2, 4, 7	A, K
<b>9</b>	To grasp the impact of electricity and magnetism in modern technology and especially in electronics by starting from the visualization of the atomic structure and proceeding through step by step evolution of the developments of the utilization of free electrons.	2, 8	1, 4, 7	K
<b>10</b>	To develop a capacity for analytical thinking and to get prepared for advance coursework related to the electricity and magnetism.	1, 2	1, 2, 11, 13	A, K

<b>Main Textbook</b>	Young H.D., Freedman R.A. University Physics with Modern Physics, 14 <sup>th</sup> Edition (2015), Pearson.
<b>Supporting References</b>	Halliday, D., Resnick, R., and Walker, J. (2008). Fundamentals of Physics (8th Edition). John Wiley & Sons, Inc.  Serway, R.A., Beichner, R.J., Physics For Scientists and Engineers with Modern Physics (2007), Harcourt College Publishers.
<b>Necessary Course Material</b>	

<b>Course Schedule</b>	
<b>1</b>	Atomic structure and electrical charges.
<b>2</b>	Coulomb's Law.
<b>3</b>	Electric field.
<b>4</b>	Gauss's Law .
<b>5</b>	Electric potential.
<b>6</b>	Capacitances.
<b>7</b>	Dielectric materials.
<b>8</b>	Mid-Term Exam
<b>9</b>	Electric current, resistance, and electromotor force.
<b>10</b>	Direct-current circuits.
<b>11</b>	Kirchhoff's laws.
<b>12</b>	Magnetic field and magnetic force.
<b>13</b>	Sources of the magnetic field.
<b>14</b>	Electromagnetic induction.
<b>15</b>	Maxwell's equations and electromagnetic waves.
<b>16,17</b>	Final Exam

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Calculation of Course Workload			
Activities	Number	Time (Hour)	Total Workload (Hour)
Course Time (number of course hours per week)	14	3	42
Classroom Studying Time (review, reinforcing, prestudy,...)	14	1	14
Homework			
Quiz Exam			
Studying for Quiz Exam			
Oral exam			
Studying for Oral Exam			
Report (Preparation and presentation time included)			
Project (Preparation and presentation time included)			
Presentation (Preparation time included)			
Mid-Term Exam	1	2	2
Studying for Mid-Term Exam	1	15	15
Final Exam	1	2	2
Studying for Final Exam	1	15	15
	<b>Total workload</b>		<b>90</b>
	<b>Total workload / 30</b>		<b>3</b>
	<b>Course ECTS Credit</b>		<b>3</b>

Evaluation	
Activity Type	%
Mid-term	40
Quiz	
Homework	
<b>Final Exam</b>	60
<b>Total</b>	100

<b>RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (PO) (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)</b>		
<b>NO</b>	<b>PROGRAM OUTCOME</b>	<b>Contribution</b>
<b>1</b>	Adequate knowledge of mathematics, science and Electrical and Electronic Engineering; ability to practice theoretical and practical knowledge of these areas into modeling and solving problems of Electrical and Electronics Engineering.	5
<b>2</b>	Ability to identify complex engineering problems in Electrical and Electronics Engineering and related fields, for this purpose having skills to formulate, select, and apply appropriate methods.	5
<b>3</b>	Having skills to apply modern design methods to design a complex system, equipment or product that should work under realistic conditions and constraints and satisfy specific requirements concerning the Electrical and Electronics Engineering.	4
<b>4</b>	Having skills to develop, select and apply modern techniques and tools needed for Electrical and Electronics Engineering applications, skills to use information technology effectively.	2
<b>5</b>	Skills to design and conduct tests, collect data, analyze results, and interpret data for the experimental investigation of Electrical and Electronics Engineering problems.	4
<b>6</b>	Ability to function effectively as an individual and as a member of teams within the discipline and in multidiscipline areas.	2
<b>7</b>	To communicate and represent effectively in both Turkish and English.	2
<b>8</b>	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.	3
<b>9</b>	Understanding of professional and ethical responsibility.	1
<b>10</b>	Information on project management, change management and risk management practices, awareness on entrepreneurship, innovation and sustainable development.	1
<b>11</b>	Information about universal and societal effects of engineering applications on health, safety and environment; awareness of the legal consequences of engineering solutions.	1

<b>LECTURER(S)</b>				
<b>Prepared by</b>	Arş. Gör. Dr. Selçuk Temiz			
<b>Signature(s)</b>				

**Date:**06.06.2024