

Dhaka International University
Department of Computer Science and Engineering

Course Code: 0533-101	Course Title: Physics
Course Type (Core Course/Electives/ GED): Basic Science Course	
Year /Semester: 1 st Semester	Academic Session:
Course Teacher: Md. Rakib Hossain	Credit Value: 3
Contact Hours: 3 hours	Total Marks: 100

Rationale: To teach students electricity, magnetism and electrical network theorems so that they can establish a grounding in electromagnetism in preparation for more advanced courses and analyze electrical circuits applying network theorems.

Course Objectives:

The objectives of this course are:

1. To make the students understand the various concepts of electrostatics, electric potential, energy density and their applications.
2. To facilitate necessary knowledge about magnetostatics, magnetic flux density, scalar and vector potential and its applications.
3. To provide the knowledge of Faraday's law, induced emf and Biot-Savart law.
4. To enhancing the skill on electrical circuits, capacitors and resistors and analyze circuits using Ohm's Law and Kirchhoff 's rules
5. To apply the knowledge of network theorems in the electrical circuits.

Course Content:

Electricity: Different electrical units, Coulomb's law, Electric field, Electric potential, Gauss's law and its applications, Electric dipole, Electric field in dielectric media, Ohm's law and Kirchhoff's law with applications, AC voltage applied to circuits containing passive elements, Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem, Reciprocity theorem, Millman's theorem, Substitution theorem, Analysis of series and parallel AC and DC networks.

Magnetism: Faradays and Lenz's law of electromagnetic induction, Self and Mutual induction, Biot-Savart law, Magnetic force on change in current, Ampere's law, Alternating voltage and current with their graphical representation, RMS value of a current and voltages, Introduction to transformers.

Course Outcomes (COs): After learning this course student will be able to-

1. Explain electricity and magnetism, and the close connection between electricity and magnetism
2. Apply Faraday's law and Lorentz law in induction problems & Biot-Savart law and Ampere's law to calculate magnetic fields
3. Execute different electrical circuit laws and apply it in circuit.
4. Analyze electrical circuits and develop simple equivalent circuits of complex circuits applying network theorems.

Mapping of CLOs with Program Outcomes (PLOs):

CLOs	PLOs	Bloom's Taxonomy (Domain/Level)	Delivery Method & Activities	Assessment Strategy
CLO-1	PLO-A	Cognitive/ Understand	Lecture, Hand note	Quiz Test, Class Test, Exam
CLO-2	PLO-A	Cognitive/ Apply	Lecture, Hand note	Quiz Test, Exam, Assignment
CLO-3	PLO-C	Cognitive/ Apply	Lecture, Hand note	Class Test, Contest, Exam,
CLO-4	PLO-B	Cognitive/ Analyze	Lecture, Hand note, Sample Problems	Exam, Assignment, Analyze and solution of given problems.

Mapping of Course – PO – K – EP/EA																																		
Course	Program Outcomes (POs)												Knowledge Profiles								Complex Eng. Problems (EP)					Complex Eng. Activity (EA)								
	Eng. Knowledge		Problem Analysis		Design		Investigation		Modern tool		Engineer & Society		Envir. & Sustainability		Ethics		Teamwork		Communication		Proj. Manage. & Fin.		Life-long learning											
	A	B	C	D	E	F	G	H	I	J	K	L																						
	C				C P	CA		A	A	P A	C A	A																						
	K1 – K4	K 5	K 8	K 6	K 7								K 1	K 2	K 3	K 4	K 5	K 6	K 7	K 8														
	EP (P1 + two or more P2-P7)												E A							P 1	P 2	P 3	P 4	P 5	P 6	P 7	A 1	A 2	A 3	A 4	A 5			
0533-103 (Physics)	x	x	x										x	x	x	x								x		x		x						

Mapping Course Learning Outcomes (CLOs) with the Teaching-Learning and Assessment Strategy:

Week	Topic	Teaching Learning Strategy	Assessment Strategy	Corresponding CLOs
1.	Basic electrical quantities, basic electrical components, electrical networks, Basic laws: Ohm's law,	<ul style="list-style-type: none"> • Lecture • WB • MMP 	<ul style="list-style-type: none"> • Test (SQ) • Contest • Class Test 	CLO-3
2.	voltage divider rule, current divider rule, Open circuit, Short Circuits	<ul style="list-style-type: none"> • Lecture • WB • MMP 	<ul style="list-style-type: none"> • Test (BQ) • Class Test 	CLO-3
3.	Kirchhoff's Law, voltage and current sources	<ul style="list-style-type: none"> • Lecture • WB • MMP 	<ul style="list-style-type: none"> • Test (SQ) • Contest • Class Test 	CLO-3
4.	Equivalent Resistance, Wye-delta transformation, DC Circuit Analysis	<ul style="list-style-type: none"> • Lecture • WB • MMP 	<ul style="list-style-type: none"> • Test (SQ/BQ) • Contest 	CLO-3
5.	Methods of Network Analysis: Nodal Analysis, Mesh Analysis	<ul style="list-style-type: none"> • Lecture • WB • MMP 	<ul style="list-style-type: none"> • Test (BQ) • Assignment 	CLO-3 CLO-4
6.	Network Theorems: Superposition theorem	<ul style="list-style-type: none"> • Lecture • WB • MMP 	<ul style="list-style-type: none"> • Test (SQ/BQ) • Assignment 	CLO-3 CLO-4
7.	Thevenin's theorem	<ul style="list-style-type: none"> • Lecture • WB • MMP 	<ul style="list-style-type: none"> • Test(SQ/BQ) • Assignment 	CLO-3 CLO-4
8.	Norton's theorem	<ul style="list-style-type: none"> • Lecture • WB • MMP 	<ul style="list-style-type: none"> • Test (SQ/BQ) • Assignment 	CLO-3 CLO-4
9.	Maximum Power Transfer theorem	<ul style="list-style-type: none"> • Lecture • WB • MMP 	<ul style="list-style-type: none"> • Test (SQ/BQ) • Assignment 	CLO-3 CLO-4
10.	Reciprocity theorems, Millman theorem	<ul style="list-style-type: none"> • Lecture • WB • MMP 	<ul style="list-style-type: none"> • Test (SQ/BQ) • Assignment 	CLO-3 CLO-4
11.	Different electrical units, charge, Coulomb's law, Gauss's law and its applications	<ul style="list-style-type: none"> • Lecture • WB • MMP 	<ul style="list-style-type: none"> • Test (SQ/BQ) • Assignment 	CLO-1
12.	Electric field, Lines of force, electric potential and potential function, Electric dipole and Electric field in dielectric media	<ul style="list-style-type: none"> • Lecture • WB • MMP 	<ul style="list-style-type: none"> • Test (SQ/BQ) • Assignment 	CLO-1

13.	Faraday's law, Lenz's law, self and mutual inductions	<ul style="list-style-type: none"> ● Lecture ● WB ● MMP 	<ul style="list-style-type: none"> ● Test (SQ/BQ) ● Quiz Test ● Presentation 	CLO-2
14.	Biot-Savart's law and Ampere's law	<ul style="list-style-type: none"> ● Lecture ● WB ● MMP 	<ul style="list-style-type: none"> ● Test (SQ/BQ) ● Quiz Test ● Presentation 	CLO-2
15.	Magnetic force on change in current, Alternating voltage and current with their graphical representation	<ul style="list-style-type: none"> ● Lecture ● WB ● MMP 	<ul style="list-style-type: none"> ● Test (SQ/BQ) ● Quiz Test ● Presentation 	CLO-2
16.	RMS value of a current and voltages	<ul style="list-style-type: none"> ● Lecture ● WB ● MMP 	<ul style="list-style-type: none"> ● Test (SQ/BQ) ● Quiz Test ● Presentation 	CLO-2
17.	Revisions, Q and A	<ul style="list-style-type: none"> ● Lecture 	<ul style="list-style-type: none"> ● Q/A 	

References:

1. Introductory Circuit Analysis - Robert L. Boylestad; Publisher: Prentice Hall; 12 Edition (January 15, 2010).
2. Griffiths, David J. "Introduction to electrodynamics." (2005): 574-574.
3. Electrical Technology - B.L. Theraja; Publisher: Chand (S.) & Co Ltd, India (July 21, 2008)
4. Electronic Devices and Circuit Theory - Robert L. Boylestad, Louis Nashelsky; Publisher: Prentice Hall; 10 Edition (July 31, 2008).
5. Engineering Circuit Analysis - William Hayt, Jack Kemmerly, Steven Durbin; Publisher: McGraw-Hill Science/Engineering/Math; 7 Edition (February 20, 2007).
6. Network Analysis - Mac E. Van Valkenburg; Publisher: Prentice Hall College Div; 3 Edition (June 1974).