LESOTHO COLLEGE OF EDUCATION



2021 SEM 2 COURSE OUTLINE

PROGRAMME	Diploma in Education Secondary			
FACULTY	Sciences			
DEPARTMENT	Pure Science			
COURSE TITLE	Electricity and Magnetism			
COURSE CODE	РНҮ 1603 S-В		NO OF CREDITS HOURS	6
COURSE TYPE	COMPULSORY		ELECTIVE	
COURSE LECTURER	Puleng Ramoshebi			
LECTURER'S CONTACTS	Office 16 Admin Block; extn 2228; <u>p.ramoshebi@lce.ac.ls</u> Mobile:58866583			
GROUP REPRESENTATIVES	DUP NTATIVES			
ABRIDGED COURSE SYNOPSIS				
The course is intended to help student teachers with secondary physics content and its application beyond secondary education. It covers concepts of static electricity, current electricity, magnetism and electromagnetism. It also introduces concepts of electronics in the form of diodes and half-wave rectification.				

COURSE AIMS

The course is intended to:

- 1. help student-teachers to acquire adequate knowledge and understanding of Science concepts that are needed to teach Science effectively at Lesotho secondary schools.
- 2. assist student-teachers design and conduct activities/demonstrations to illustrate science concepts
- 3. develop in student teachers the skills, attitudes and interests which are necessary for the teaching and further study of Science.
- 4. raise awareness in student teachers of the need to care and preserve the environment which is

directly or indirectly affected by the applications of Science and impact thereof.

5. raise awareness in student teachers that the study and applications of Science are within the confines of social, economical, technological, ethical, cultural influences and limitations.

COURSE OBJECTIVES

By the end of this course, student teachers will be able to:

- 1. Measure quantities correctly
- 2. Apply the scientific method to design, perform experiments and write laboratory reports
- 3. Use concepts to explain phenomena
- 4. Apply learnt concepts to calculate unknown quantities
- 5. Describe how man's activities could be harming the environment
- 6. Plan and carryout projects

CONTENT

WK	TOPICS	DESCRIPTION	
1	atics	■Origin of charge	
	rosta	■Types of charge	
	Elect	Law of electrostatics; and conservation of charge	
		Charging by friction, by conduction and by induction	
		Project 1: Construction of own electroscopes	
		 detection of charge using the electroscope, effects and applications of electrostatics including lightening 	

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2	Review vector addition and resolution
	Coulombs law (1D and 2D) up to three point charges
3	 Qualitative treatment of electric field due to point charges
	\circ On a straight line \circ On a surface
	■Electric field due to point charges o calculation
	using $E = KQ/r^2$ or $E = F/Q \circ$ Field patterns due
	to one or two point charges
4	■Electric potential (qualitative and quantitative - V= Ed up to three point
	charges)
	■Capacitance

		• Definition of		
		• Capacitors in series and in parallel		
		Energy stored in a capacitor		
		 Qualitative use of dielectrics in capacitors 		
	TEST 1* To be written in the first week of face-to-face session			
PROJE	PROJECT ON MOTORS AND/OR GENERATORS*** students will be expected to conceptualize			
	the projec	t while they are on campus. For submission just before examinations.		
5	city	Definitions: current, potential difference, emf (including internal resistance of		
	ctri	the battery).		
	•Measurement of current, potential difference, emf.			
6	rren	•Ohms law and resistance		
	Cu	Resistivity and its applications (filament bulbs, heating elements)		
		Practical 1: Investigating resistivity		
7		•Calculations of current, potential difference, emf, and resistance in parallel,		
		series, and combined circuits; including Kirchhoff's Rules.		
		Practical 2: Verification of behavior of current and voltage in series and in parallel		

8		Electric power and costing		
		Assignment 1: Safety precautions against electricity		
TEST 2* To be written in the last week of face-to-face session				
9 Magnetism		Properties of magnets		
		Magnetic properties of iron and steel		
		Magnetization and demagnetization		
		■Electromagnetism		
		Uses of magnets		
10	tic	Magnetic effect of current carrying conductor (including field patterns and		
	agne	directions): straight wires and solenoid		
	rom:	•Electromagnetic Induction: Lenz's Law and Faraday's Law (qualitative)		
	clectinduc	Generators (both A. C. & D. C.)		
11		Transformers and their use in distribution of electricity		
		Principles of electrical distribution (3 phase, 2 phase, etc) and wiring		
		 Motor effect and its practical applications 		
12		Conductors, semiconductors and insulators		
		■N- and P- semiconductors		
		■P-N junctions		
		Diodes and half wave rectification		
		TEST 3* To be written online		

COURSE ASSESSMENT			
Assessment method	Description	Weight	Aligned course learning outcome
Tests	 covers all electrostatics content Covers current electricity Covers magnetism and electromagnetic induction. 	15%	See topic break down
Practical	See table above	5%	_
Assignmen t	See table above	5%	

Project	See table above	15%	
Course work contribution		40%	
Examination		60%	all course objectives.

REFERENCES

Serway, R., & Vuille, C. (2009). College Physics (8th Ed). Brooks/Cole: Belmont, USA

ADDITIONAL INFORMATION

- Note that all practicals and projects will be assessed. This may include assessment of the plan, execution and report of the activity.
- □ Test (two best tests will form part of assessment)
- □ References include relevant books in the library and e- books.

FOR OFFICE USE

Lecturer's Signature	Date
HOD's Signature	Date