



Faculty of Engineering Technology, Information Technology and Science

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING TRAINING (DEEET)

SCHOOL OF SOLAR ENERGY

STUDY GUIDE FOR

COURSE: Basics of UPS Systems

COURSE CODE: UPS01

COURSE DURATION: Three hours

COURSE CREDITS: NIL

COMPILED BY: N.E Mabunda

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Dr. N.E Mabunda

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PRESENTATION LANGUAGE

ENGLISH	PORTOGUESE	SOTHO	TSONGA	VENDA	ZULU	OTHER

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1. INTRODUCTION

Welcome to the Short Learning Program (SLP) under the topic “Living with loadshedding”. This short course is aimed to enlighten the candidates about ways to conserve electrical energy, that as return will properly look after their daily electricity requirement. The candidates are not required to have any prior knowledge. The course will not dwell onto electrical engineering jargon such as ohm’s law, losses, power factors, etc. In the course, candidates will be given knowledge to; save electricity, estimate electrical energy requirement, optimize domestic appliances to match their electricity source, check a feasibility of specific UPS and incorporate back-up units to the grid supply. A certificate of participation will be issued at the end of this program.

Short history about loadshedding in South Africa.

In late 2007, South Africans experienced the first of what would become a recurring series of nationwide load shedding episodes. Load shedding refers to the deliberate shutdown of parts of the electricity distribution network to avoid damaging the electricity grid and to safeguard against a national blackout. It is usually implemented after alternative options to balance demand and supply have been exhausted. Load shedding is implemented to reduce electricity demand, preserve grid stability, and to prevent the collapse of the system. The first load shedding episode in October 2007, marked the beginning of a national electricity supply crisis that has persisted for over a decade. Weekly data from the Eskom’s system operator show that load shedding occurred during 33 months between 2007 and 2019. There have been three distinct periods of load shedding over the past 12 years – the first ran from 2007 to 2008, the second from 2013 to 2015, and the most recent from 2018 until today.

2. GENERAL INFORMATION

This course will be provided in a form of workshop.

Queries related to this course may be directed via WhatsApp **or physical call**.

Your instructor is Dr. Nkateko E Mabunda, Cellphone no: +2784 535 3108

3. PROGRAMME DEFINITION

SLP NAME	:	Basics of UPS Systems
CODE	:	UPS01
NQF LEVEL	:	NIL
MODULE PRE-REQUISITE	:	NONE
MODULE DURATION	:	3 HOURS
MODULE RANGE	:	The course will enhance the knowledge and skills of candidates in the area of electricity back-up systems.
PRE-KNOWLEDGE:	:	Presenting language
TEACHING AND LEARNING STRATEGIES	:	The program is presented as a workshop. The course will be offered in many languages. Certificates are issued. There will also be no formal assessments.

Books : Notes

4. GENERIC ENGINEERING STANDARDS

The following standards will be used in the presentation of this module:

- Proven Engineering philosophies, principles, processes, procedures and practices
- Industrial norms and standards and manufacturer specifications
- SABS Quality standards and parameters
- Occupational Health and Safety Act
- Quality assurance norms as established by HEQC and internal university assurance policies
- Quality assurance norms as established by The Engineering Council of South Africa (ECSA)

Please adhere to all covid-19 regulations

5. UNITS OF LEARNING

Unit (duration)	Syllabus	Reference
(1) Electricity cost and savings tips (½ hour)	On completion of this unit, the candidate will be able to: ▪ relate electrical energy to electricity tariff, ▪ estimate the cost to run various domestic electrical appliances, ▪ and identify bad habits that leads to irresponsible electricity consumptions.	Notes
(2) Low power electricity supply units (½ hour)	On completion of this unit, the candidate will be able to: ▪ describe the types of electricity waveforms, ▪ the meaning of power parameters ▪ and estimate electrical power that is produced by a given current.	Notes
(3) Matching available electrical appliances with the available electrical power. (½ hour)	On completion of this unit, the candidate will be able to: ▪ describe the properties of appliances that can be conveniently connected to UPS systems and ▪ determine the feasibility of back up units for a given budget under specified environmental conditions.	Notes
(4) Off grid appliances and electricity suppliers. (½ hour)	On completion of this unit, the candidate will be able to: ▪ make a choice between battery DC powered and ac powered appliances as influenced by the requirements ▪ and give a list of low power electrical sources and appliances.	Notes
(5) Incorporation of back-up electricity onto the grid supply. (½ hour)	On completion of this unit, the candidate will be able to: ▪ describe the differences between hybrid and normal inverters, ▪ choose a most suitable backup power generator for specified task, ▪ and understand the consequences of electrical current collisions and implement various techniques to prevent it.	Notes

6. ASSESMENT DETAILS

No formal assessments