

Program : <b>Diploma in Electrical and Electronics Engineering</b>	
Course Code : <b>6039A</b>	Course Title: <b>Applied Electrical Testing Lab</b>
Semester : <b>6</b>	Credits: <b>1.5</b>
Course Category: <b>Program Core</b>	
Periods per week: <b>3 (L:0 T:0 P:3)</b>	Periods per semester: <b>45</b>

### Course Objectives:

- To familiarise the applications of earth tester and insulation megger.
- To recognize standard testing procedures of electrical luminaires.
- To understand the installation and testing procedures of solar panels.

### Course Prerequisites:

Topic	Course code	Course name	Semester
Basic knowledge on electrical luminaires.		Elementary concepts of electrical systems	2
Measurement of earth resistance and insulation resistance		Electrical and Electronics measurements and instruments	3

### Course Outcomes:

On completion of the course, the students will be able to:

CO <sub>n</sub>	Description	Duration (Hours)	Cognitive Level
CO1	Identify the procedures for measuring earth resistance and soil resistivity.	9	Applying
CO2	Utilize standard testing procedures to examine electrical luminaires.	12	Applying
CO3	Choose the maintenance procedures incorporated in power and optical cables.	9	Applying
CO4	Identify practices followed in the installation of solar panels.	9	Applying
	Lab Exam	6	

## CO – PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1				3			
CO2				3			
CO3				3			
CO4				3			

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

## Course Outline:

Module Outcome	Description	Duration (Hours)	Cognitive level
<b>CO1</b>	<b>Identify the procedures for measuring earth resistance and soil resistivity.</b>		
M1.01	Summarize the applications of earth megger and familiarize its operation.	3	Understanding
M1.02	Apply three point method to measure earth resistance using earth megger	3	Applying
M1.03	Apply four point method to measure soil resistivity using earth megger.	3	Applying
<b>CO2</b>	<b>Utilize standard testing procedures to examine electrical luminaires.</b>		
M2.01	Identify different types of electric lamps and their operation (Incandescent lamps, Arc lamps, gas filled lamps, fluorescent lamps, CFL and LED lamps).	3	Applying
M2.02	Summarize the operation of lux meter.	1	Understanding
M2.03	Make use of lux meter to measure the luminous intensity of selected lamps.	2	Applying
M2.04	Identify the luminous efficacy of various lamps	3	Applying
M2.05	Measure the following parameters of LED street lighting system. (a) Starting voltage (b) Cut off voltage (c) Working current (d) Power at rated voltage (e) Power factor at rated voltage (e) Lux at specified distance.	3	Applying
	Lab Exam – I	3	

<b>CO3</b>	<b>Choose the maintenance procedures incorporated in power and optical cables.</b>		
M3.01	Summarize the applications of insulation megger and familiarize its operation.	1	Understanding
M3.02	Conduct an experiment to measure dielectric strength and continuity of 3 or 3.5 core cable (by using insulation megger/ hipot tester).	2	Applying
M3.03	Familiarize different types of fiber optic cables and their applications.	1	Understanding
M3.04	Summarize the applications of optical power meter, media converter, splicing machine and familiarize their operation.	2	Understanding
M3.05	Measure the power in an optical fibre cable using optical power meter	2	Applying
M3.06	Identify the breakage in optical fiber using visual fault locator.	1	Applying
<b>CO4</b>	<b>Identify practices followed in the installation of solar panels.</b>		
M4.01	Identify the working of solar power plants and their parts.	1	Applying
M4.02	Apply standard testing procedures on a solar panel.	2	Applying
M4.03	Apply standard procedures to select appropriate location and position for solar panel mounting.	3	Applying
M4.04	Measure the output voltage of solar panels in series , parallel,series-parallel combinations	3	Applying
	Lab Exam – II	3	

**Text / Reference:**

<b>T/R</b>	<b>Book Title/Author</b>
T1	Electrical Measurements & measuring instruments by A.K.Sawhney, Dhanpat Rai Publications
R1	A textbook of Electrical Technology: Volume 3 by B.L. Theraja and A.K. Theraja, S. Chand Publications
R2	Chetan Singh, - Solar Photovoltaics: Fundamentals, Technologies and Applications, PHI Learning, New Delhi, ISBN: 9788120351110
R3	Optical fiber communications: Principles and practice by John M. Senior, Pearson publications

**Online Resources:**

Sl.No	Website Link
1	<a href="http://www.youtube.com">www.youtube.com</a>
2	<a href="http://wikipedia.org">wikipedia.org</a>
3	<a href="http://www.circuitglobe.com">www.circuitglobe.com</a>
4	<a href="https://www.altenergy.org/renewables/solar/DIY/solar-panel-testing.html">https://www.altenergy.org/renewables/solar/DIY/solar-panel-testing.html</a>
5	<a href="https://greencoast.org/how-to-test-a-solar-panel/">https://greencoast.org/how-to-test-a-solar-panel/</a>
6	<a href="https://electrical-engineering-portal.com/">https://electrical-engineering-portal.com/</a>
7	<a href="https://www.cirris.com/">https://www.cirris.com/</a>

**Student Activity:****Suggested Open-ended Experiments:**

Students can do open ended experiments as a group of 3-5. There is no duplication in experiments in between groups. This is mainly for the purpose of continuous internal evaluation and a score of 15 marks. Students should prepare a separate report on open ended experiments of their choice.

**Example:**

1. Conduct an experiment to measure dielectric strength of electric cables using hipot testers.
2. Conduct an experiment to grade different insulators and prepare a chart comparing its dielectric strengths.
3. Conduct an experiment to splice a 4 core optical fiber.
4. Form a group of 4 or 5 students and prepare a daily output voltage tracking chart for any selected solar module in your college. Measure the output voltage at any two predetermined time (preferably noon & evening). Compare your weekly chart with other groups.