University of Mauritius

Photovoltaic Energy Systems

Short Course

MQA APPROVED

Photovoltaic Energy Systems
Short Course

This course aims at introducing the principles of photovoltaics, principles of holistic PV systems' component sizing, selection, and safety requirements. Through a combination of highly interactive lecture sessions, experimental sessions with PV equipment, computer based simulations, case studies and site visits, the participants will gain in depth understanding of PV technologies and develop competence in PV energy systems.Participants will be provided with PV system design sheets and modelling tool.

Duration – 36 Hours (12 sessions of 3hrs), once a week on Saturdays (from 0900 – 1030 and 1100 - 1230)

Certificate - Certificate of Attendance issued by the University of Mauritius.

Start Date – Saturday 03 May 2025

Venue – Innovative Solar Energy Laboratory

Resource Person - Dr Yatindra Kumar Ramgolam

Course Fee – **MUR 25,000**

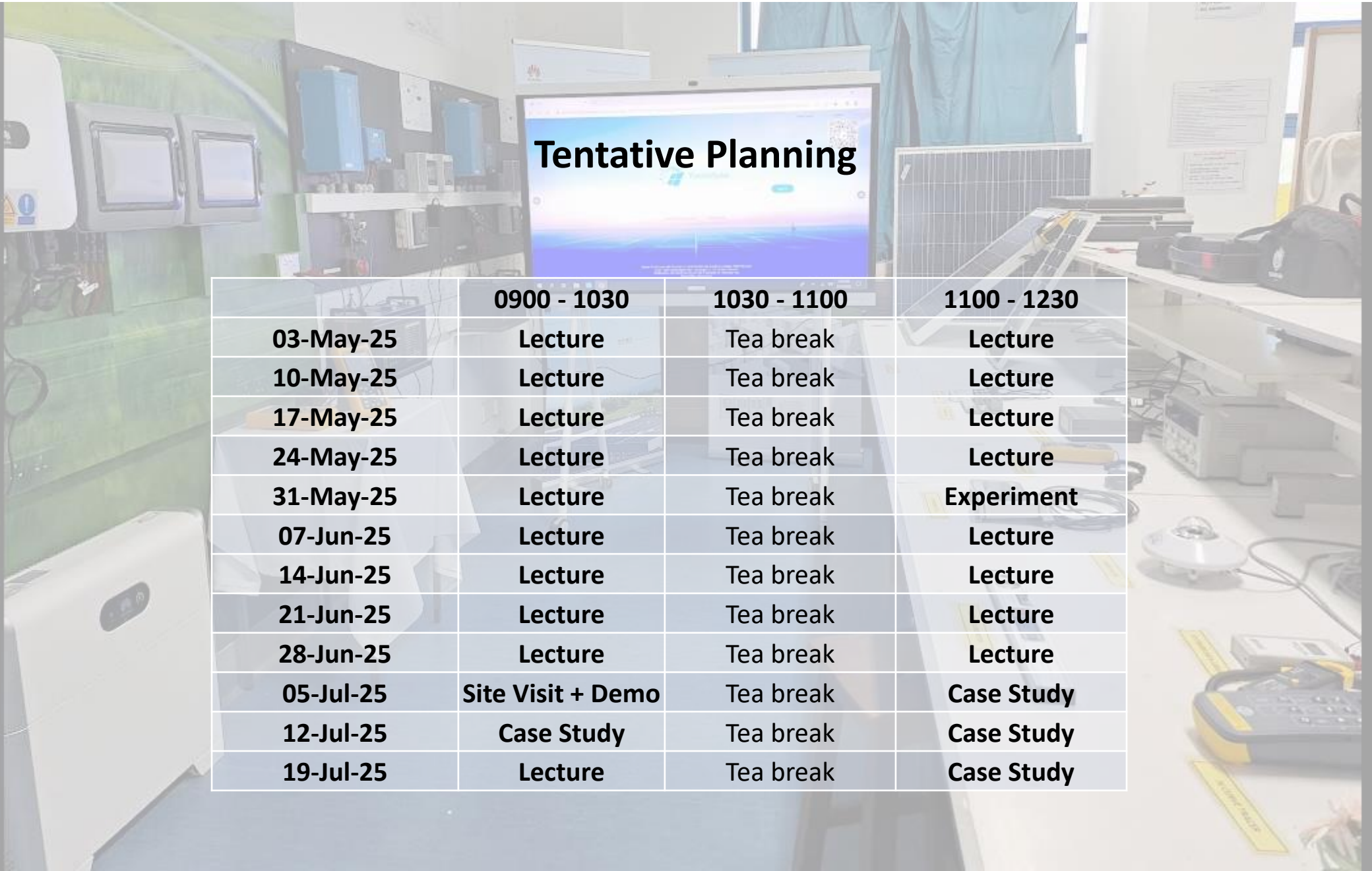
Application Form Link:

https://forms.gle/CxRxbwr4hrX9zapa8

Application Deadline – **18 April 2025**

Registration Deadline – **25 April 2025**

Venue – Innovative Solar Energy Laboratory, University of Mauritius



Tentative Planning

	0900 - 1030	1030 - 1100	1100 - 1230
03-May-25	Lecture	Tea break	Lecture
10-May-25	Lecture	Tea break	Lecture
17-May-25	Lecture	Tea break	Lecture
24-May-25	Lecture	Tea break	Lecture
31-May-25	Lecture	Tea break	Experiment
07-Jun-25	Lecture	Tea break	Lecture
14-Jun-25	Lecture	Tea break	Lecture
21-Jun-25	Lecture	Tea break	Lecture
28-Jun-25	Lecture	Tea break	Lecture
05-Jul-25	Site Visit + Demo	Tea break	Case Study
12-Jul-25	Case Study	Tea break	Case Study
19-Jul-25	Lecture	Tea break	Case Study

MQA APPROVED - Photovoltaic Energy Systems Short Course

N	Topics	Duration
1	Need for Renewable energy and introduction to Photovoltaics Status and evolution of Photovoltaics Globally and Locally Solar cell technologies and evolution Applications of Photovoltaics Types of PV power systems (PVPS) and balance of system components	3 hrs
2	Solar Engineering fundamentals Sun path diagrams: Apparent motion of the sun Estimating Solar Energy on horizontal and inclined planes Sunshine hours, peak sun hours and sky clearness index Sources of Solar energy data Solar Maps – Solar energy and power variations in Mauritius Mounting structures – Design configurations for optimised energy input	3 hrs
3	Technologies of Solar cells Principle of operation Electrical properties of Solar cells Solar modules and arrays (Series /Parallel Connections) Types of modules and technological characteristics Reading cell/module datasheets Cell efficiency tables	3 hrs
4	Comparative analysis of commercially available cell technologies Quality of Solar Panels and related standards Effect of environment on cell/module performance and power output Effect of shading, series and shunt resistance on electrical characteristics. Protection Requirements for PV modules.	3 hrs
5	Balance of system (BoS) components: Module Level power electronics, Inverters, Charge Controllers, Battery Energy Storage, DC/AC switchgear. Quality of BoS components. Experimental session on PV technologies.	3 hrs
6	Introduction to System Design Standards and Best Practice for PV system Design Regulatory Requirements Grid CODEs/Promotion Mechanisms /Schemes	3 hrs

N	Topics	Duration
7	Component Sizing and Selection System Voltage Selection System selection PV Component selection and sizing Array Sizing Battery Sizing and Selection Regulator Sizing and selection Inverter Sizing and Selection Cable Sizing Metering and Electrical Protection	3 hrs
8	Installation and Safety Requirements of PV systems Performance monitoring and optimisation Maintenance, Testing and Commissioning of PV Systems	3 hrs
9	Introduction to simulation software NREL SAM and PV SYST System simulation parameters Performance models parameters Case studies on Simulation of PV systems	3 hrs
10	Case study 1 - Design of Regulated stand alone with battery and DC load Case study 2 - Design of Regulated stand alone with battery and DC/AC loads	3 hrs
11	Case study 3 - Design of Grid Tied PV System (SSDG and MSDG) Implementation of Stand Alone system and monitoring of operation. Site visit to grid tied PV system	3 hrs
12	Financial Evaluation of PV Projects Simple Payback Period (SPP) Life Cycle Costing (LCC) Annualised LCC/Unit Cost of Electricity FiT/Levelised Cost of Electricity (LCOE) Case Studies – Calculation of LCOE/FiT for PV projects	3 hrs