

COURSE PLAN

Course Title	Solar PV Design Module 2 – Off Grid Solar Photovoltaic (PV) System Design																											
Course duration	5 days																											
Course Fee	RM4,500.00																											
Re-sit fee	RM400.00																											
Passing mark	85% and above																											
Course Status	Core																											
Prerequisite	Solar PV Design Module 1 – Introduction to solar PV design																											
Entry requirement	Completed and passed Solar PV Design Module 1 – Introduction to solar PV design																											
Synopsis	This course explores the core design of off-grid connected solar PV specifically the calculation for matching all the balance of system to the main solar PV array. It also discusses the pre-design aspects such as the relevant standards and community engagement perspectives.																											
Course Outcomes (CO)	<p>By the end of this course, students should be able to:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2"></th> <th colspan="3">Level of Domain</th> </tr> <tr> <th colspan="2"></th> <th>C</th> <th>P</th> <th>A</th> </tr> </thead> <tbody> <tr> <td>CO1</td> <td>Conduct load demand and resource availability study</td> <td>5</td> <td></td> <td></td> </tr> <tr> <td>CO2</td> <td>Design the off-grid system based on components compatibility</td> <td>5</td> <td></td> <td></td> </tr> <tr> <td>CO3</td> <td>Suggest appropriate ratings for the balance of system.</td> <td>5</td> <td></td> <td></td> </tr> </tbody> </table> <p><i>C: Cognitive ; P: Psychomotor ; A: Affective ; S: Soft-skills (CT: Critical Thinking)</i></p>					Level of Domain					C	P	A	CO1	Conduct load demand and resource availability study	5			CO2	Design the off-grid system based on components compatibility	5			CO3	Suggest appropriate ratings for the balance of system.	5		
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Day	Topics	Teaching Activities	Assessment/Evaluation Method
1	INTRODUCTION <ul style="list-style-type: none"> Introduction Community engagement Standards OGPV topologies 	Lecture	Test / Final Assessment
2	BALANCE OF SYSTEM <ul style="list-style-type: none"> Batteries Solar Charge controller Off-grid inverter Load demand Resource availability 	Lecture	Test / Final Assessment
3	DESIGN <ul style="list-style-type: none"> Battery capacity Matching PV to charge controller Matching inverter to load Matching genset to battery charger Designing balance of system 	Lecture	Test / Final Assessment
4	TUTORIAL <ul style="list-style-type: none"> Tutorial covering topics in Day 1 until Day 3 Case study 	Tutorial	Test / Final Assessment
5	TEST <ul style="list-style-type: none"> Final Assessment 	Test	Test / Final Assessment
6	PRACTICAL <ul style="list-style-type: none"> Hands-on Practical 	Hands-on Practical	Test / Final Assessment
7	TEST <ul style="list-style-type: none"> Final Assessment on Hands-on Practical 	Hands-on Practical Examination	Test / Final Assessment

Teaching - Learning Approach	Hours per modules	
	Lectures	24
	Tutorial	8
	Laboratory/Practical	
	Test	3
	Student-Centered Learning (Teamwork, Reading, Guided Assignments, Practices/Discussion, etc.)	15
	Total	50
Assessment	Percentage	
	Final Exam	100
	Total	100
Resources	<ol style="list-style-type: none"> 1. SEDA Malaysia Off-Grid Photovoltaic System Design Course, 2nd edition, 2017 2. Majid Jamil, M Rizwan, D P Kothari, Grid integration of Solar Photovoltaic System, CRC Press, Taylor and Francis, 2018 3. G N Tiwari, Arvind Tiwari, Handbook of Solar Energy, Theory, Analysis and Application, Springer, 2016 4. MS-IEC 61194:2009 Characteristic parameters of Stand-Alone Photovoltaic (PV) Systems 5. MS-IEC 62124:2009 Photovoltaic (PV) Stand-Alone Systems - Design Verification 6. MS 62257:2009 Recommendation for Small Renewable Energy and Hybrid Systems for Rural Electrification (Part 1 : General Introduction to Rural Electrification) 7. MS 62257:2009 Recommendation for Small Renewable Energy and Hybrid Systems for Rural Electrification (Part 2 : From Requirements to a Range of Electrification Systems) 8. MS 62257:2009 Recommendation for Small Renewable Energy and Hybrid Systems for Rural Electrification (Part 3 : Project Development and Management) 9. MS 62257:2009 Recommendation for Small Renewable Energy and Hybrid Systems for Rural Electrification (Part 4 : System Selection and Design) 10. MS 62257:2009 Recommendation for Small Renewable Energy and Hybrid Systems for Rural Electrification (Part 5 : Protection againsts Electrical Hazards) 11. MS 62257:2009 Recommendation for Small Renewable Energy and Hybrid Systems for Rural Electrification (Part 6 : Acceptance, operation, maintenance and replacement) 12. MS1837:2018 Installation of Grid-Connected Photovoltaic (PV) System 	
Prepared by: Ir. Dr Hazrul bin Mohamed Basri Date:	Moderated by : Ir. Dr Kasumawati binti Lias Date:	Moderated by : Prof. Dr Wan Azlan bin Wan Zainal Abidin Date:
Checked and certified by: Assoc. Prof Ir. Ts. Dr. Kismet Anak Hong Ping (Head, Department of Electrical and Electronic) Date:.....	Approved by: (EIU Representative) Date:.....	

