

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

Course Schedule: June - November 2023

Department : B.VOC. SUSTAINABLE ENERGY MANAGEMENT

Name/s of the Faculty : DR. B. KEERTHANA

Course Title : NOVEL MATERIALS FOR SUSTAINABILITY

Course Code : 16VS/VM/NM56

Shift : II

Week & No. of hours	Units & Topics	Teaching Methodology	Text & References	Method of Evaluation
June 19 – June 26, 2023 (Day Order 1 to 6)	Unit 1 Energy Sustainability and Management 1.1. Introduction-Definition-Basic components of sustainable habitat-Sustainability of Fuel, electricity and water	Lecture and PPT	Purohit, S.S., <i>Green technology – An approach for Sustainable environment</i> , Jodhpur, Agrobios Publications, 2016	Test
June 27 – July 04, 2023 (Day Order 1 to 6)	1.2. Root causes of Non-sustainability Existing Strategies-Resource utilization and impacts of a sustainable design on environment	Lecture and PPT	Purohit, S.S., <i>Green technology – An approach for Sustainable environment</i> , Jodhpur, Agrobios Publications, 2016	Assignment and Test Component - III
July 05– July 12, 2023 (Day Order 1 to 6)	1.3. Need for novel materials-Definition Evolutionary materials such as metals and metal oxides - Revolutionary materials such as Carbon Nanotubes, Dendrimers, Fullerenes and Combination materials such as composites - Materials with potential biological impact- Applications of novel materials	Lecture and PPT	Purohit, S.S., <i>Green technology – An approach for Sustainable environment</i> , Jodhpur, Agrobios Publications, 2016	Group Presentation

July 13 – July 20, 2023 (Day Order 1 to 6)	Unit 2 Basics and principle of Functional Materials for Sustainable Energy Applications: 2.1. Materials for sustainable fuel production: Materials for water splitting-catalysis and photocatalysis - Use of Titanium dioxide as catalyst	Lecture and PPT	Ni Bin Chang, <i>Systems Analysis for sustainable Engineering: Theory and Applications</i> , USA, McGraw-Hill Professional, 2011	Assignment
July 21 – July 28, 2023 (Day Order 1 to 6)	2.2. Newer Energy Materials for renewable energy storage and conversion: Polymers and composites for dye-sensitized solar cells and polymer solar cells plastic solar cells- Perovskites -current status- Novel electrode and electrolyte materials for batteries, Supercapacitors, Fuel cells and photovoltaics - Metal oxides framework	Lecture and PPT	Ni Bin Chang, <i>Systems Analysis for sustainable Engineering: Theory and Applications</i> , USA, McGraw-Hill Professional, 2011	Test and Assignment
July 31 – Aug 03, 2023 (Day Order 1 to 4)	2.3. Energy storage materials: Importance of hydrogen as fuel- Hydrogen storage- Zeolites	Lecture and PPT	Ni Bin Chang, <i>Systems Analysis for sustainable Engineering: Theory and Applications</i> , USA, McGraw-Hill Professional, 2011	Assignment
Aug 04 – Aug 09, 2023	C.A. Test – I			
Aug 10 – Aug 11, 2023 (Day Order 5 to 6)	Unit 3 Thermoelectric materials 3.1. Basic principle of thermoelectrics - Seebeck and Peltier effects	Lecture and PPT	Twidell, J.W. and Weir, A.D., <i>Renewable Energy Resources</i> , UK, Wiley, 2015	Test and Assignment
Aug 14 – Aug 22, 2023 (Day Order 1 to 6)	3.2. Properties of thermoelectric materials- Thermoelectric materials for heating and	Lecture and PPT	Twidell, J.W. and Weir, A.D., <i>Renewable Energy Resources</i> , UK, Wiley, 2015	Test

	cooling applications - Waste heat recovery			
Aug 23 – Aug 31, 2023 (Day Order 1 to 6)	3.3. Recent advances in the field of thermoelectricals	Lecture and PPT	Twidell, J.W. and Weir, A.D., <i>Renewable Energy Resources</i> , UK, Wiley, 2015	Assignment
Sept 01 – Sept 11, 2023 (Day Order 1 to 6)	Unit 4 Smart Materials for Sustainability: 4.1. Smart materials – Definition of Characteristics of smart materials	Lecture and PPT	Allen D.T. and Shonnard, D.R. <i>Sustainability Engineering: Concepts, Design and case Studies</i> , USA, Prentice Hall, 2012	Test and Assignment
Sept 12 – Sept 19, 2023 (Day Order 1 to 6)	4.2 Energy saving materials - Energy efficient materials for lightings and screens Energy efficient material for LEDs- Organic LEDs and Polymer LEDs	Lecture and PPT	Allen D.T. and Shonnard, D.R. <i>Sustainability Engineering: Concepts, Design and case Studies</i> , USA, Prentice Hall, 2012	Test and Assignment Component - III
Sept 20 - Sept 27, 2023 (Day Order 1 to 6)	4.3 Waste water treatment: Agricultural byproducts as sorbants for ammonia and organic substances	Lecture and PPT	Allen D.T. and Shonnard, D.R. <i>Sustainability Engineering: Concepts, Design and case Studies</i> , USA, Prentice Hall, 2012	Test and Assignment
Sept 29 – Oct 03, 2023 (Day Order 1 to 3)	Zeolite stuff and other natural materials	Lecture and PPT	Allen D.T. and Shonnard, D.R. <i>Sustainability Engineering: Concepts, Design and case Studies</i> , USA, Prentice Hall, 2012	Test and Assignment
Oct 04 – Oct 09, 2023	C.A. Test – II			
Oct 10 – Oct 12, 2023 (Day Order 4 to 6)	Unit 5 Materials for Energy Efficient Buildings: 5.1. Energy Saving Foundations: Structural Insulated Panels - Insulated Concrete Forms- Use of expanded polystyrene (EPS) and extruded polystyrene (XPS)- Plastic composite lumbar	Lecture and PPT	Bradley, A.S. , Adebayo, A. O. Maria, P., <i>Engineering applications in sustainable design and development</i> , Canada, Cengage Learning, 2014	Assignment Component - III

Oct 13 – Oct 20, 2023 (Day Order 1 to 6)	5.2. Insulation materials Importance of insulation-R-Value of insulation materials- Functional uses of polyurethane- polyurethane health and safety-Plant based polyurethane foams from bamboo, hemp, kelp and straw bales- Foam Plastic Insulation Sheathing- Thermal Doors-Cool roofings – Vacuum insulation panels	Lecture and PPT	Bradley, A.S. , Adebayo, A. O. Maria, P., <i>Engineering applications in sustainable design and development</i> , Canada, Cengage Learning, 2014	Test and Assignment
Oct 25 – Oct 27, 2023 (Day Order 1 to 3)	5.3. Energy Efficiency and Conservation Roofings and membranes-Energy conserving windows- Low e-windows- Earth walls-Energy efficient landscaping of gardens-Xeriscaping	Lecture and PPT	Bradley, A.S. , Adebayo, A. O. Maria, P., <i>Engineering applications in sustainable design and development</i> , Canada, Cengage Learning, 2014T	Group Presentation
Oct 28- Nov 04, 2023	REVISION			

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

Course Schedule: June - November 2023

Department : B. VOC SUSTAINABLE ENERGY MANAGEMENT

Name/s of the Faculty : DR. R. VINCENT FEMILAA & DR.B.KEERTHANA

Course Title : SOFTWARE TOOLS FOR ENERGY ANALYSIS

Course Code : 16VS/VM /ST56

Shift : II

Week & No. of hours	Units & Topics	Teaching Methodology	Text & References	Method of Evaluation
June 19 – June 26, 2023 (Day Order 1 to 6)	Unit 1: Overview of effective tools for energy systems Unit 2: Demonstration of the software to study the sizing	Powerpoint presentation Demonstration through desktop using respective software tool	http://www.trnsys.com /	Execution of Projects
June 27 – July 04, 2023 (Day Order 1 to 6)	Unit 1: Overview of effective tools for energy systems Unit 2: Demonstration of the software to study the sizing	Powerpoint presentation Demonstration through desktop using respective software tool	http://www.trnsys.com /	Execution of Projects
July 05– July 12, 2023 (Day Order 1 to 6)	Unit 1: Analysis Of Software Parameters – PVSYST Unit 2: Simulation and data analysis of the PV systems.	Demonstration through desktop using respective software tool	http://www.pvsyst.com/en/software	Execution of Projects (3 rd Component)
July 13 – July 20, 2023 (Day Order 1 to 6)	Unit 1: Analysis of Software Parameters – PVSYST Unit 2: Preliminary design	Demonstration through desktop using respective software tool	http://www.pvsyst.com/en/software	Execution of Projects
July 21 – July 28, 2023 (Day Order 1 to 6)	Unit 1: Analysis of Software Parameters - RETScreen Unit 2: Project Design	Demonstration through desktop using respective software tool	http://www.retscreen.net/ang/home.php	Execution of Projects

July 31 – Aug 03, 2023 (Day Order 1 to 4)	Unit 1: Analysis of Software Parameters – RETScreen Unit 2: Economic evaluation of the PV systems	Demonstration through desktop using respective software tool	http://www.retscreen.net/ang/home.php	Execution of Projects (3 rd Component)
Aug 04 – Aug 09, 2023	C.A. Test – I			
Aug 10 – Aug 11, 2023 (Day Order 5 to 6)	Unit 1: Analysis of Software Parameters – eQUEST Unit 2: Analysis of Standalone system.	Demonstration through desktop using respective software tool	http://www.trnsys.com /	Execution of Projects (3 rd Component)
Aug 14 – Aug 22, 2023 (Day Order 1 to 6)	Unit 3: Identification assessment and optimisation of the technical viability of potential clean energy projects. Unit 4: Evaluation of Building Technologies	Demonstration through desktop using respective software tool	http://www.trnsys.com /	Execution of Projects
Aug 23 – Aug 31, 2023 (Day Order 1 to 6)	Unit 3: Measurement and verification of actual energy performance Unit 4: Analysis of Building design	Demonstration through desktop using respective software tool	http://www.trnsys.com /	Execution of Projects
Sept 01 – Sept 11, 2023 (Day Order 1 to 6)	Unit 3: Evaluation of additional energy savings/production opportunities. Unit 4: Study of Energy Efficiency measures	Demonstration through desktop using respective software tool Powerpoint presentation	http://www.trnsys.com /	Execution of Projects
Sept 12 – Sept 19, 2023 (Day Order 1 to 6)	Unit 5: Analysis of solar array electrical behavior using software Unit 4: Study of Energy Efficiency measures	Demonstration through desktop using respective software tool	http://www.trnsys.com /	Execution of Projects (3 rd Component)
Sept 20 - Sept 27, 2023 (Day Order 1 to 6)	Unit 5: Simulation of panel installation in building using software	Demonstration through desktop using respective	http://www.trnsys.com /	Execution of Projects

	Unit 4: Study of Energy Efficiency measures	software tool		
Sept 29 – Oct 03, 2023 (Day Order 1 to 3)	Unit 5: Real time analysis of power generation using software	Demonstration through desktop using respective software tool	http://www.trnsys.com /	Execution of Projects
Oct 04 – Oct 09, 2023	C.A. Test – II			
Oct 10 – Oct 12, 2023 (Day Order 4 to 6)	Unit 5: Economic evaluation – ‘Return on investment study’	Demonstration through desktop using respective software tool	http://www.trnsys.com /	Execution of Projects
Oct 13 – Oct 20, 2023 (Day Order 1 to 6)	Unit 4: Study of Energy Efficiency measures	Demonstration through desktop using respective software tool	http://www.trnsys.com /	Execution of Projects
Oct 25 – Oct 27, 2023 (Day Order 1 to 3)	Unit 4: Study of Energy Efficiency measures	Demonstration through desktop using respective software tool	http://www.trnsys.com /	Execution of Projects
Oct 28- Nov 04, 2023	REVISION			

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

Course Schedule: June - November 2023

Department : Sustainable Energy Management

Name/s of the Faculty : Dr. P. Anto Christy

Course Title : Solar Power Plant Designing

Course Code : 16VS/VM/PD56

Shift : II

Week & No. of hours	Units & Topics	Teaching Methodology	Text & References	Method of Evaluation
June 19 – June 26, 2023 (Day Order 1 to 6)	Unit 1 1.1. Basics of electricity and the structure of the electricity supply system- Alternating currents - AC Generator - AC Power	PPT & lecture	Solanki C.S, <i>Solar Photovoltaics - Fundamentals, Technologies and Applications</i> , Delhi, PHI Learning Private Limited, 2015	Question/Answer session
June 27 – July 04, 2023 (Day Order 1 to 6)	1.1 Three phase Ac generation and distribution 1.2. Electrical power system components: Substations and transformers –Overhead lines and underground cables – Faults, circuit breakers	PPT & lecture	Solanki C.S, <i>Solar Photovoltaics - Fundamentals, Technologies and Applications</i> , Delhi, PHI Learning Private Limited, 2015	Question/Answer session
July 05– July 12, 2023 (Day Order 1 to 6)	1.2 fuses and electrical protection 1.3. Study of site survey and soil test reports 1.4 Design and documentation: Plant Infrastructure - overall plant layout	PPT & lecture	Solanki C.S, <i>Solar Photovoltaics - Fundamentals, Technologies and Applications</i> , Delhi, PHI Learning Private Limited, 2015	Interactive Discussion on portions covered
July 13 – July 20, 2023	1.4 solar module mounting and other components - switchyard and power transmission	PPT & lecture	Solanki C.S, <i>Solar Photovoltaics - Fundamentals,</i>	Quiz

(Day Order 1 to 6)	system unit 2: 2.1 Design the capacity of solar power plant.		<i>Technologies and Applications, Delhi, PHI Learning Private Limited, 2015</i>	
July 21 – July 28, 2023 (Day Order 1 to 6)	2.2 Design and selection of solar modules 2.3. Selection of other components: Inverters, Strings, Combiner boxes, switchgear, batteries and Inverters	PPT & lecture	<i>Solanki C.S, Solar Photovoltaics - Fundamentals, Technologies and Applications, Delhi, PHI Learning Private Limited, 2015</i>	Quiz
July 31 – Aug 03, 2023 (Day Order 1 to 4)	Unit 3: 3.1 Design of combiner boxes, switchgear, batteries and Inverters 3.2. Energy simulation report for the design of combiner boxes	PPT & lecture	<i>Kapur A S., Practical Guide for Total Engineering of MW capacity Solar PV Power Project, Chandigarh, White Falcon Publishing, 2016</i>	IIIrd Component Assignment
Aug 04 – Aug 09, 2023	C.A. Test – I			
Aug 10 – Aug 11, 2023 (Day Order 5 to 6)	3.2 switchgear. 3.3. Energy simulation report for the design of batteries and Inverters	PPT & lecture	<i>Kapur A S., Practical Guide for Total Engineering of MW capacity Solar PV Power Project, Chandigarh, White Falcon Publishing, 2016</i>	Questioning on content taught
Aug 14 – Aug 22, 2023 (Day Order 1 to 6)	4.1. Establish and Follow safe work procedure - Use and maintain personal protective equipment	PPT & lecture	<i>Kapur A S., Practical Guide for Total Engineering of MW capacity Solar PV Power Project, Chandigarh, White Falcon Publishing, 2016</i>	IIIrd Component Assignment
Aug 23 – Aug 31, 2023	4.2 Identify and mitigate safety hazards - Demonstrate safe and	PPT & lecture	<i>Solanki C.S, Solar Photovoltaic</i>	Quiz

(Day Order 1 to 6)	proper use of required tools and equipment		<i>Technology and Systems: A Manual for Technicians, Trainers and Engineers, Delhi, PHI Learning Private Limited, 2013</i>	
Sept 01 – Sept 11, 2023 (Day Order 1 to 6)	4.3. Identify work safety procedures and instructions for working at height Unit 5: 5.1 5.1. Design plan for Earthing pits,	PPT & lecture	Solanki C.S., <i>Solar Photovoltaic Technology and Systems: A Manual for Technicians, Trainers and Engineers, Delhi, PHI Learning Private Limited, 2013</i>	Discussion session
Sept 12 – Sept 19, 2023 (Day Order 1 to 6)	5.1 lightning arrestor foundation, 5.2. Design of Street light foundation and switchyard	PPT & lecture	Solanki C.S., <i>Solar Photovoltaics - Fundamentals, Technologies and Applications, Delhi, PHI Learning Private Limited, 2015</i>	Interactive session on portions taught
Sept 20 - Sept 27, 2023 (Day Order 1 to 6)	5.3. Design of power transmission system and structure of the transmission tower	PPT & lecture	Solanki C.S., <i>Solar Photovoltaics - Fundamentals, Technologies and Applications, Delhi, PHI Learning Private Limited, 2015</i>	Questioning on content taught
Sept 29 – Oct 03, 2023 (Day Order 1 to 3)	3.2 switchgear. 3.3. Energy simulation report for the design of batteries and Inverters	PPT & lecture	Kapur A S., <i>Practical Guide for Total Engineering of MW capacity Solar PV Power Project, Chandigarh, White Falcon Publishing, 2016</i>	Quiz
Oct 04 – Oct 09, 2023	C.A. Test – II			

Oct 10 – Oct 12, 2023 (Day Order 4 to 6)	5.4. Design of mounting structures for Rooftop	PPT & lecture	Solanki C.S, <i>Solar Photovoltaics - Fundamentals, Technologies and Applications,</i> Delhi, PHI Learning Private Limited, 2015	IIIrd Component Assignment
Oct 13 – Oct 20, 2023 (Day Order 1 to 6)	Unit 1: 1.1 Alternating currents - AC Generator - AC Power	PPT & lecture	Solanki C.S, <i>Solar Photovoltaics - Fundamentals, Technologies and Applications,</i> Delhi, PHI Learning Private Limited, 2015	Quiz
Oct 25 – Oct 27, 2023 (Day Order 1 to 3)	1.2 Overhead lines and underground cables – Faults, circuit breakers- fuses and electrical protection	PPT & lecture	Solanki C.S, <i>Solar Photovoltaics - Fundamentals, Technologies and Applications,</i> Delhi, PHI Learning Private Limited, 2015	Discussion
Oct 28- Nov 04, 2023	REVISION			

STELLA MARIS COLLEGE (AUTONOMOUS),CHENNAI

Course Schedule: June - November 2023

Department :B. Voc. Sustainable Energy Management

Name/s of the Faculty :Dr. R.Vincent Femilaa & Dr. P. Anto Christy

Course Title :Green Building and Passive Architecture

Course Code : 16VS/VM/PA56

Shift : II

Week & No. of hours	Units & Topics	Teaching Methodology	Text & References	Method of Evaluation
June19 – June 26, 2023 (Day Order 1 to 6)	Unit 1 1.1 Concepts of energy efficient buildings. Calculation of heating and cooling loads of the building. Unit 3 3.1 Space Heating - Liquid and Air Systems - System Design Principles	PowerPoint presentation and Videos	Boecker J. <i>“Integrative Design Guide to Green Building”</i> , UK, Wiley, 2009.	Mind map preparation Group discussion
June27 – July 04, 2023 (Day Order 1 to 6)	1.1 Building’s energy balance accounting for solar energy gain 3.1 System design Principles	PowerPoint presentation and Videos	Boecker J. <i>“Integrative Design Guide to Green Building”</i> , UK, Wiley, 2009.	Micro projects Quiz
July 05– July 12, 2023 (Day Order 1 to 6)	1.1 Heat losses 1.2 Internal heat sources. Study of climate and its influence in building design for energy requirement 3.1 thermal storage	PowerPoint presentation and Videos	Boecker J. <i>“Integrative Design Guide to Green Building”</i> , UK, Wiley, 2009.	Quiz Assignment
July 13 – July 20, 2023 (Day Order 1 to 6)	1.2 Low energy and zero energy buildings. Unit 22.1 Thermal comfort - Heat transmission in buildings - Bioclimatic classification 3.1 Sizing of Collectors and Thermal Storage	Board and Chalk method	Krieder. J and Rabi, A. <i>Heating and Cooling of Buildings: Design for Efficiency</i> , USA, McGraw-Hill, 1994.	Group discussion Assignment
July 21 – July 28, 2023	2.2 Passive heating concepts - Direct heat gain - Solar Windows	Board and Chalk method	Krieder. J and Rabi, A. <i>Heating and</i>	Case study

(Day Order 1 to 6)	- indirect heat gain 3.2 Domestic Hot Water Heating		<i>Cooling of Buildings: Design for Efficiency</i> , USA, McGraw-Hill, 1994.	Quiz
July 31 – Aug 03, 2023 (Day Order 1 to 4)	2.2 Masonry and Water Thermal Storage Wall 3.2 Domestic Hot Water Heating Loads	Board and Chalk method	Krieder. J and Rabi, A. <i>Heating and Cooling of Buildings: Design for Efficiency</i> , USA, McGraw-Hill, 1994.	III Component Assignment Group Discussion
Aug 04 – Aug 09, 2023	C.A. Test – I			
Aug 10 – Aug 11, 2023 (Day Order 5 to 6)	Unit 5 5.1 Green building features - Green materials 3.2 Sizing of System Components	Lecture& PPT	Attmann O. <i>“Green Architecture”</i> , USA, McGraw-Hill, 2010.	Interactive Discussion on portions covered III component Assignment
Aug 14 – Aug 22, 2023 (Day Order 1 to 6)	5.1 Window coating – Roof top coating – Protective coatings 3.2 System Installation Principles	Board and Chalk method	Attmann O. <i>“Green Architecture”</i> , USA, McGraw-Hill, 2010.	Quiz Group Discussions
Aug 23 – Aug 31, 2023 (Day Order 1 to 6)	5.1 integrated ecological design 4.1 Cooling Requirements	Lecture& PPT	Attmann O. <i>“Green Architecture”</i> , USA, McGraw-Hill, 2010.	Question/Answer session Discussion
Sept 01 – Sept 11, 2023 (Day Order 1 to 6)	5.2 The National green building rating system GRIHA 4.1 Cooling Load Calculations	Board and Chalk method	Krieder. J and Rabi, A. <i>Heating and Cooling of Buildings: Design for Efficiency</i> , USA, McGraw-Hill, 1994.	Role play Quiz
Sept 12 – Sept 19, 2023 (Day Order 1 to 6)	5.2 indoor environment quality. 4.1 Cooling Load Calculations	Lecture& PPT	Krieder. J and Rabi, A. <i>Heating and Cooling of Buildings:</i>	Question/Answer session Assignment

			<i>Design for Efficiency</i> , USA, McGraw-Hill, 1994.	
Sept 20 - Sept 27, 2023 (Day Order 1 to 6)	5.2 IGBC rating systems 4.2 Absorption Refrigeration	PowerPoint presentation and Videos	Gevorkian P. <i>“Alternative Energy Systems in Building Design”</i> , USA, McGraw-Hill, 201	
Sept 29 – Oct 03, 2023 (Day Order 1 to 3)	5.2 IGBC rating systems 4.2 Heat Pumps		Gevorkian P. <i>“Alternative Energy Systems in Building Design”</i> , USA, McGraw-Hill, 201	Survey report Role play
Oct 04 – Oct 09, 2023	C.A. Test – II			
Oct 10 – Oct 12, 2023 (Day Order 4 to 6)	1.1 Building’s energy balance accounting for solar energy gain 3.1 Sizing of Collectors and Thermal Storage	PowerPoint presentation and Videos	Boecker J. <i>“Integrative Design Guide to Green Building”</i> , UK, Wiley, 2009.	III component Assignment Discussion
Oct 13 – Oct 20, 2023 (Day Order 1 to 6)	2.2 Passive heating concepts - Direct heat gain - Solar Windows - indirect heat gain 3.2 Domestic Hot Water Heating Loads	Lecture& PPT	Krieder. J and Rabi, A. <i>Heating and Cooling of Buildings: Design for Efficiency</i> , USA, McGraw-Hill, 1994.	Quiz Interactive session
Oct 25 – Oct 27, 2023 (Day Order 1 to 3)	5.1 integrated ecological design 4.2 Absorption Refrigeration - Heat Pumps	Board and Chalk method	Attmann O. <i>“Green Architecture”</i> , USA, McGraw-Hill, 2010.	Debate Group Discussions
Oct 28- Nov 04, 2023	REVISION			