

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

Course Schedule: June - November 2024

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
Jun 19 – 26, 2024 (Day Order 1 - 6)	Unit 1.1: Introduction- Definition-Basic components of sustainable habitat- Sustainability of Fuel, electricity and water	Board and Chalk method	Purohit, S.S., Green technology – An approach for Sustainable environment, Jodhpur, Agrobios Publications, 2016	(3rd component) Case Study
	Unit 1.2: Root causes of Non-sustainability Existing Strategies- Resource utilization and impacts of a sustainable design on environment	Board and Chalk method	Purohit, S.S., Green technology – An approach for Sustainable environment, Jodhpur, Agrobios Publications, 2016	Group discussion
Jun 27 – July 4, 2024 (Day Order 1 - 6)	Unit 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	Board and Chalk method	Ni Bin Chang, Systems Analysis for sustainable Engineering: Theory and Applications, USA, McGraw-Hill Professional, 2011	Assignment

July 5 – 12, 2024 (Day Order 1 - 6)	Unit 2.1: Materials for sustainable fuel production: Materials for water splitting-catalysis and photocatalysis - Use of Titanium dioxide as catalyst	Board and Chalk method	Twidell, J.W. and Weir, A.D., Renewable Energy Resources, UK, Wiley, 2015	Quiz and group discussion
July 15 – 23, 2024 (Day Order 1 - 6)	Unit 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	Board and Chalk method	Twidell, J.W. and Weir, A.D., Renewable Energy Resources, UK, Wiley, 2015	Quiz and group discussion
July 24 – 31, 2024 (Day Order 1 - 6)	Unit 2.2: Novel electrode and electrolyte materials for batteries, Supercapacitors, Fuel cells and photovoltaics - Metal oxides framework	PowerPoint presentation	Allen D.T. and Shonnard, D.R. Sustainability Engineering: Concepts, Design and case Studies, USA, Prentice Hall, 2012	(3 rd component) Assignment
Aug 1 – 5, 2024 (Day Order 1 - 3)	Unit 2.3: Energy storage materials: Importance of hydrogen as fuel-Hydrogen storage-Zeolites	Board and Chalk method	Bradley, A.S. , Adebayo, A. O. Maria, P., Engineering applications in sustainable design and development, Canada, Cengage Learning, 2014	Group discussion
Aug 6 – 10, 2024	C.A. Test – I			
Aug 12 – 14, 2024 (Day Order 4-6)	Unit 3.1: Basic principle of thermoelectrics - Seebeck and Peltier effects	Board and Chalk method	Bradley, A.S. , Adebayo, A. O. Maria, P., Engineering applications in sustainable design and development, Canada, Cengage Learning, 2014	Practical and Demonstration

Aug 16 – 23, 2024 (Day Order 1-6)	Unit 3.2: Properties of thermoelectric materials- Thermoelectric materials for heating and cooling applications -Waste heat recovery	PowerPoint presentation	Bradley, A.S. , Adebayo, A. O. Maria, P., Engineering applications in sustainable design and development, Canada, Cengage Learning, 2014	Group discussion
Aug 27 – Sep 3, 2024 (Day Order 1-6)	Unit 3.3: Recent advances in the field of thermoelectricals Unit 4.1: Smart materials – Definition of Characteristics of smart materials	PowerPoint presentation Board and Chalk method	Bradley, A.S. , Adebayo, A. O. Maria, P., Engineering applications in sustainable design and development, Canada, Cengage Learning, 2014 Allen D.T. and Shonnard, D.R. Sustainability Engineering: Concepts, Design and case Studies, USA, Prentice Hall, 2012	Group discussion Case study
Sep 4 – 11, 2024 (Day Order 1-6)	Unit 4.2: Energy saving materials - Energy efficient materials for lightings and screens Energy efficient material for LEDs- Organic LEDs and Polymer LEDs	PowerPoint presentation and Videos	Allen D.T. and Shonnard, D.R. Sustainability Engineering: Concepts, Design and case Studies, USA, Prentice Hall, 2012	Case study
Sep 12 - 20, 2024 (Day Order 1- 6)	Unit 4.3: Waste water treatment: Agricultural byproducts as sorbants for ammonia and organic substances- Zeolites-tuff and other natural materials	Board and Chalk method	Ni Bin Chang, Systems Analysis for sustainable Engineering: Theory and Applications, USA, McGraw-Hill Professional, 2011	(3 rd component) Micro projects

		method	Sustainable environment, Jodhpur, Agrobios Publications, 2016	discussion
Oct 23 - 24, 2024 (Day Order 1 to 2)	REVISION			

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

Course Schedule: June - November 2024

Department : B.Voc Sustainable Energy Management
Name/s of the Faculty : Dr.B.Keerthana and Dr.R.Vincent Femilaa
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
Jun 19 – 26, 2024 (Day Order 1 - 6)	Unit 1: Overview of effective tools for energy systems Unit2: Demonstration of the software to study the sizing	Powerpoint presentation Demonstration through desktop using respective software tool	http://www.trnsys.com/	Execution of Projects
Jun 27 – July 4, 2024 (Day Order 1 - 6)	Unit 1: Overview of effective tools for energy systems Unit2: 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 5 – 12, 2024 (Day Order 1 - 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 15 – 23, 2024 (Day Order 1 - 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 24 – 31, 2024 (Day Order 1 - 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
Aug 1 – 5, 2024 (Day Order 1 - 3)	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 6 – 10, 2024	C.A. Test – I			
Aug 12 – 14, 2024 (Day Order 4-6)	Unit 1: Analysis of Software Parameters – eQUEST Unit 2: Analysis of Stand alone system.	Demonstration through desktop using respective software tool	http://www.trnsys.com/	Execution of Projects (3 rd Component)
Aug 16 – 23, 2024 (Day Order 1-6)	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 27 – Sep 3, 2024 (Day Order 1-6)	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
Sep 4 – 11,	Unit 3: Evaluation of additional energy	Demonstration	http://www.trnsys.com/	Execution of

2024 (Day Order 1-6)	savings/production opportunities. Unit 4: Study of Energy Efficiency measures	through desktop using respective software tool Powerpoint presentation		Projects
Sep 12 - 20, 2024 (Day Order 1- 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)
Sep 23 - 26, 2024 (Day Order 1-4)	Unit 5: Simulation of panel installation in building using software Unit 4: Study of Energy Efficiency measures	Demonstration through desktop using respective software tool	http://www.trnsys.com/	Execution of Projects
Sep 27 – Oct 3, 2024	C.A. Test – II			
Oct 4 – 5, 2024 (Day 5 & 6)	Unit 5: Economic evaluation – ‘Return on investment study’ Unit 4: Study of Energy Efficiency	Demonstration through desktop using respective software tool	http://www.trnsys.com/	Execution of Projects

	measures			
Oct 7 - 15, 2024 (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 16 - 22, 2024 (Day Order 1 to 6)	Revision of Units 1- 5			
Oct 23 - 24, 2024 (Day Order 1 to 2)	REVISION			

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

Course Schedule: June - November 2024

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
Jun 19 – 26, 2024 (Day Order 1 - 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, Solar Photovoltaics - Fundamentals, Technologies and Applications, Delhi, PHI Learning Private Limited, 2015	Question/Answer session
Jun 27 – July 4, 2024 (Day Order 1 - 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, Solar Photovoltaics - Fundamentals, Technologies and Applications, Delhi, PHI Learning Private Limited, 2015	Question/Answer session
July 5 – 12, 2024 (Day Order 1 - 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, Solar Photovoltaics - Fundamentals, Technologies and Applications, Delhi, PHI Learning Private Limited, 2015	Interactive Discussion on portions covered
July 15 – 23, 2024 (Day Order 1 - 6)	1.4 solar module mounting and other components - switchyard and power transmission system unit 2: 2.1 Design the capacity of solar power plant.	PPT & lecture	Solanki C.S, Solar Photovoltaics - Fundamentals, Technologies and Applications, Delhi, PHI Learning Private	Quiz

Aug 12 – 14, 2024 (Day Order 4-6)	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	Kapur A S., Practical Guide for Total Engineering of MW capacity Solar PV Power Project, Chandigarh, White Falcon Publishing, 2016	Mini project
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			Limited, 2015	
July 24 – 31, 2024 (Day Order 1 - 6)	1.4 solar module mounting and other components - switchyard and power transmission system unit 2: 2.1 Design the capacity of solar power plant.	PPT & lecture	Solanki C.S, Solar Photovoltaics - Fundamentals, Technologies and Applications, Delhi, PHI Learning Private Limited, 2015	Quiz
Aug 1 – 5, 2024 (Day Order 1 - 3)	2.2 Design and selection of solar modules 2.3. Selection of other components: Inverters, Strings, Combiner boxes, switchgear, batteries and Inverters	PPT & lecture	Solanki C.S, Solar Photovoltaics - Fundamentals, Technologies and Applications, Delhi, PHI Learning Private Limited, 2015	IIIrd Component Assignment
Aug 6 – 10, 2024	C.A. Test – I			

Aug 16 – 23, 2024 (Day Order 1-6)	3.2 switchgear. 3.3. Energy simulation report for the design of batteries and Inverters	PPT & lecture	Kapur A S., Practical Guide for Total Engineering of MW capacity Solar PV Power Project, Chandigarh, White Falcon Publishing, 2016	Questioning on content taught
Aug 27 – Sep 3, 2024 (Day Order 1-6)	4.1. Establish and Follow safe work procedure - Use and maintain personal protective equipment	PPT & lecture	Kapur A S., Practical Guide for Total Engineering of MW capacity Solar PV Power Project, Chandigarh, White Falcon Publishing, 2016	IIIrd Component Assignment
Sep 4 – 11, 2024 (Day Order 1-6)	4.2 Identify and mitigate safety hazards - Demonstrate safe and proper use of required tools and equipment	PPT & lecture	Solanki C.S, Solar Photovoltaic Technology and Systems: A Manual for Technicians, Trainers and Engineers, Delhi, PHI Learning Private Limited, 2013	Quiz
Sep 12 - 20, 2024 (Day Order 1- 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, Solar Photovoltaic Technology and Systems: A Manual for Technicians, Trainers and Engineers, Delhi, PHI Learning Private Limited, 2013	Demonstration session
Sep 23 - 26, 2024 (Day Order 1-4)	5.1 lightning arrester foundation, 5.2. Design of Street light foundation and	PPT & lecture	Solanki C.S, Solar Photovoltaics - Fundamentals, Technologies and Applications, Delhi, PHI Learning Private	IIIrd Component Assignment

	switchyard		Limited, 2015	
Sep 27 – Oct 3, 2024	C.A. Test – II			
Oct 4 – 5, 2024 (Day 5 & 6)	3.3. Energy simulation report for the design of batteries and Inverters	PPT & lecture	Kapur A S., Practical Guide for Total Engineering of MW capacity Solar PV Power Project, Chandigarh, White Falcon Publishing, 2016	Questioning on content taught
Oct 7 - 15, 2024 (Day Order 1 to 6)	1.4 Design and documentation: Plant Infrastructure - overall plant layout	PPT & lecture	Solanki C.S, Solar Photovoltaics - Fundamentals, Technologies and Applications, Delhi, PHI Learning Private Limited, 2015	Interactive Discussion on portions covered
Oct 16 - 22, 2024 (Day Order 1 to 6)	2.3. Selection of other components: Inverters, Strings, Combiner boxes, switchgear, batteries and Inverters	PPT & lecture	Solanki C.S, Solar Photovoltaics - Fundamentals, Technologies and Applications, Delhi, PHI Learning Private Limited, 2015	IIIrd Component Assignment
Oct 23 - 24, 2024 (Day Order 1 to 2)	REVISION			

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

Course Schedule: June - November 2024

Department : 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
Jun 19 – 26, 2024 (Day Order 1 - 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 Board and Chalk method	Boecker J. <i>“Integrative Design Guide to Green Building”</i> , UK, Wiley, 2009. Krieder. J and Rabi, A. <i>Heating and Cooling of Buildings: Design for Efficiency</i> , USA, McGraw-Hill, 1994.	Mind map preparation Group discussion
Jun 27 – July 4, 2024 (Day Order 1 - 6)	1.1 Building’s energy balance accounting for solar energy gain 3.1 System design Principles	PowerPoint presentation and Videos Board and Chalk method	Boecker J. <i>“Integrative Design Guide to Green Building”</i> , UK, Wiley, 2009. Krieder. J and Rabi, A. <i>Heating and Cooling of Buildings: Design for Efficiency</i> , USA, McGraw-Hill, 1994.	Micro projects Quiz
July 5 – 12, 2024 (Day Order 1 - 6)	1.1 Heat losses 1.2 Internal heat sources. Study of climate and its influence in building design	PowerPoint presentation and Videos	Boecker J. <i>“Integrative Design Guide to Green Building”</i> , UK, Wiley, 2009.	Quiz

	for energy requirement	Board and Chalk method	Krieder. J and Rabi, A. <i>Heating and Cooling of Buildings: Design for Efficiency,</i> USA, McGraw- Hill, 1994.	Assignment
	3.1 thermal storage			

<p>July 15 – 23, 2024 (Day Order 1 - 6)</p>	<p>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</p>	<p>Board and Chalk method PowerPoint presentation</p>	<p>Krieder. J and Rabi, A. <i>Heating and Cooling of Buildings: Design for Efficiency</i>, USA, McGraw-Hill, 1994. Gevorkian P. “<i>Alternative Energy Systems in Building Design</i>”, USA, McGraw-Hill, 201</p>	<p>Group discussion Assignment</p>
<p>July 24 – 31, 2024 (Day Order 1 - 6)</p>	<p>2.2 Passive heating concepts - Direct heat gain - Solar Windows - indirect heat gain 3.2 Domestic Hot Water Heating</p>	<p>Board and Chalk method PowerPoint presentation and Videos</p>	<p>Krieder. J and Rabi, A. <i>Heating and Cooling of Buildings: Design for Efficiency</i>, USA, McGraw-Hill, 1994. Gevorkian P. “<i>Alternative Energy Systems in Building Design</i>”, USA, McGraw-Hill, 201</p>	<p>Case study IIIrd Component Assignment</p>
<p>Aug 1 – 5, 2024 (Day Order 1 - 3)</p>	<p>2.2 Masonry and Water Thermal Storage Wall 3.2 Domestic Hot Water Heating Loads</p>	<p>Board and Chalk method PowerPoint presentation and Videos</p>	<p>Krieder. J and Rabi, A. <i>Heating and Cooling of Buildings: Design for Efficiency</i>, USA, McGraw-Hill, 1994. Gevorkian P. “<i>Alternative Energy Systems in Building Design</i>”,</p>	<p>Quiz Group Discussion</p>

			USA, McGraw-Hill, 2011	
Aug 6 – 10, 2024	C.A. Test – I			

Aug 12 – 14, 2024 (Day Order 4-6)	Aug 12 – 14, 2024 (Day Order 4-6)	Unit 5 5.1 Green building features - Green materials 3.2 Sizing of System Components	Lecture& PPT PowerPoint presentation and Videos	Attmann O. “ <i>Green Architecture</i> ”, USA, McGraw-Hill, 2010. Gevorkian P. “ <i>Alternative Energy Systems in Building Design</i> ”, USA, McGraw-Hill, 2011
Aug 16 – 23, 2024 (Day Order 1-6)	Aug 16 – 23, 2024 (Day Order 1-6)	5.1 Window coating – Roof top coating – Protective coatings 3.2 System Installation Principles	Board and Chalk method Lecture and PPT	Attmann O. “ <i>Green Architecture</i> ”, USA, McGraw-Hill, 2010. Gevorkian P. “ <i>Alternative Energy Systems in Building Design</i> ”, USA, McGraw-Hill, 2011
Aug 27 – Sep 3, 2024 (Day Order 1-6)	Aug 27 – Sep 3, 2024 (Day Order 1-6)	5.1 integrated ecological design 4.1 Cooling Requirements	Lecture& PPT PowerPoint presentation and Videos	Attmann O. “ <i>Green Architecture</i> ”, USA, McGraw-Hill, 2010. Gevorkian P. “ <i>Alternative Energy Systems in Building Design</i> ”, USA, McGraw-

				Hill, 201
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<p>Sep 4 – 11, 2024 (Day Order 1-6)</p>	<p>Sep 4 – 11, 2024 (Day Order 1-6)</p>	<p>5.2 The National green building rating system GRIHA</p> <p>4.1 Cooling Load Calculations</p>	<p>Board and Chalk method</p> <p>PowerPoint presentation and Videos</p>	<p>Krieder. J and Rabi, A. <i>Heating and Cooling of Buildings: Design for Efficiency</i>, USA, McGraw-Hill, 1994.</p> <p>Gevorkian P. “<i>Alternative Energy Systems in Building Design</i>”, USA, McGraw-Hill, 2011</p>
<p>Sep 12 - 20, 2024 (Day Order 1- 6)</p>	<p>Sep 12 - 20, 2024 (Day Order 1- 6)</p>	<p>5.2 indoor environment quality.</p> <p>4.1 Cooling Load Calculations</p>	<p>Lecture& PPT</p> <p>PowerPoint presentation and Videos</p>	<p>Krieder. J and Rabi, A. <i>Heating and Cooling of Buildings: Design for Efficiency</i>, USA, McGraw-Hill, 1994.</p> <p>Gevorkian P. “<i>Alternative Energy Systems in Building Design</i>”, USA, McGraw-Hill, 2011</p>
<p>Sep 23 - 26, 2024 (Day Order 1-4)</p>	<p>Sep 23 - 26, 2024 (Day Order 1-4)</p>	<p>5.2 IGBC rating systems</p> <p>4.2 Absorption Refrigeration</p>	<p>PowerPoint presentation and Videos</p> <p>Chalk and talk</p>	<p>Gevorkian P. “<i>Alternative Energy Systems in Building Design</i>”, USA, McGraw-Hill, 2011</p> <p>Krieder. J and Rabi, A. <i>Heating and Cooling of Buildings: Design for Efficiency</i>, USA, McGraw-Hill, 1994.</p>

Sep 27 – Oct 3, 2024	C.A. Test – II			
Oct 4 – 5, 2024 (Day 5 & 6)	5.2 IGBC rating systems 4.2 Heat Pumps	PowerPoint presentation and Videos Chalk and talk	Gevorkian P. “ <i>Alternative Energy Systems in Building Design</i> ”, USA, McGraw-Hill, 2011 Krieder. J and Rabi, A. <i>Heating and Cooling of Buildings: Design for Efficiency</i> , USA, McGraw-Hill, 1994.	Survey report Role play
Oct 7 - 15, 2024 (Day Order 1 to 6)	5.1 integrated ecological design 4.2 Absorption Refrigeration - Heat Pumps	Board and Chalk method PPT and lecture	Attmann O. “ <i>Green Architecture</i> ”, USA, McGraw-Hill, 2010. Krieder. J and Rabi, A. <i>Heating and Cooling of Buildings: Design for Efficiency</i> , USA, McGraw-Hill, 1994.	Debate Group Discussions
Oct 16 - 22, 2024 (Day Order 1 to 6)	2.2 Passive heating concepts 3.2 Domestic Hot Water Heating Loads	Lecture& PPT Chalk and talk	Krieder. J and Rabi, A. <i>Heating and Cooling of Buildings: Design for Efficiency</i> , USA, McGraw-Hill, 1994. Attmann O. “ <i>Green Architecture</i> ”, USA, McGraw-Hill, 2010.	Quiz Interactive session

Oct 23 - 24, 2024 (Day Order 1 to 2)	REVISION			