

**STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI**  
**COURSE PLAN June - November 2024**

**Department** : B.Voc Sustainable Energy Management  
**Name/s of the Faculty** : Dr.R.Vincent Femilaa  
**Course Title** : Forms of Energy and Energy Crisis  
**Course Code** : 23VS/VM/FC16  
**Shift** : II

**COURSE OUTCOMES (COs)**

| <b>COs</b> | <b>Description</b>   | <b>CL</b> |
|------------|--|-----------|
| <b>CO1</b> | remember the introduction to various forms of energy, energy consumption, resources, crisis and fundamental energy units   | K1        |
| <b>CO2</b> | understand the various energy, economic growth, energy routes, over consumption and energy crisis  | K2        |
| <b>CO3</b> | strengthen the types of energy sources, global energy consumption, age of renewables, unexplored renewable energies, global scenario of energy crisis and basic first aid and safety at work place | K3        |
| <b>CO4</b> | explore the primary and cumulative energy demand, energy requirements, commissioning of power plants, energy calculations and energy storage.  | K4        |
| <b>CO5</b> | experiment the future prospects of energy, technology and strategies to meet energy requirements and study the power consumptions.   | K5 & K6   |

| Week                                       | Unit No. | Content   | Cognitive Level | Teaching Hours | COs | Teaching Learning Methodology | Assessment Methods   |
|--|----------|---|-----------------|----------------|-----|-------------------------------|--|
| Jun 24 – 26, 2024<br>(Day Order 4 - 6)     | 1        | Introduction to the forms of energy<br>1.1 Introduction – various forms of energy – thermal, sound, light electrical, magnetic, chemical. | K1-K4           | 3              | 1-4 | Board and Chalk method        | Group Discussion   |
| Jun 27 – July 4, 2024<br>(Day Order 1 - 6) | 1        | 1.1 Introduction – various forms of energy – nuclear, mechanical, Elastic, Gravitational energy.  | K1-K4           | 6              | 1-4 | Board and Chalk method        | Quiz   |
| July 5 – 12, 2024<br>(Day Order 1 - 6)     | 1        | 1.2 Types of energy sources – Renewable – Non – Renewable sources   | K1-K4           | 3              | 1-4 | Board and Chalk method        | (3 <sup>rd</sup> component)<br>Assignment<br><br>Problem Solving |
|  | 2        | Energy Consumption and Demand<br>2.1 Energy consumption – energy consumption (per capita) and economic growth                             | K1-K4           | 3              | 1-4 | Board and Chalk method        |  |
| July 15 – 23, 2024<br>(Day Order 1 - 6)    | 2        | 2.2 Global energy consumption – Energy demand – primary energy demand and cumulative energy demand  | K1-K4           | 6              | 1-4 | PowerPoint presentation       | Case Study   |
| July 24 – 31, 2024<br>(Day Order 1 - 6)    | 3        | Energy Resources<br>3.1 Energy routes for non-renewable energy resources  | K1-K6           | 6              | 1-4 | PowerPoint presentation       | Assignment   |

|   |                      |  |       |   |     |                         |  |
|---|----------------------|--|-------|---|-----|-------------------------|--|
| Aug 1 – 5, 2024<br>(Day Order 1 - 3)    | 3                    | 3.1 Age of renewables and alternatives   | K1-K6 | 3 | 1-4 | Board and Chalk method  | Assignment                                   |
| Aug 6 – 10, 2024                        | <b>C.A. Test - I</b> |  |       |   |     |                         |  |
| Aug 12 – 14, 2024<br>(Day Order 4-6)    | 3                    | 3.2 Energy requirements and future prospects of energy   | K1-K6 | 3 | 1-4 | PowerPoint presentation | Group Discussion                             |
| Aug 16 – 23, 2024<br>(Day Order 1-6)    | 4                    | Energy Crisis its Causes and Solutions<br>4.1 Introduction: Causes of energy crisis: Over consumption, over population | K1-K6 | 3 | 1-5 | PowerPoint presentation | (3 <sup>rd</sup> component)<br>Survey Report |
|   | 5                    | Site Analysis:<br>Fundamental Energy Calculations and work place safety<br>5.1 Energy calculations: units              | K1-K6 | 3 | 1-5 | Board and Chalk method  | Problem Solving                              |
| Aug 27 – Sep 3, 2024<br>(Day Order 1-6) | 4                    | 4.1 Infrastructure Unexplored Renewable Energy Options – Commissioning of Power Plants                                 | K1-K6 | 3 | 1-5 | PowerPoint presentation | Group Discussion                             |
|   | 5                    | Site Analysis:<br>Fundamental Energy Calculations and work place safety<br>5.1 Energy calculations: units              | K1-K6 | 3 | 1-5 | Board and Chalk method  | Problem Solving                              |

|                                      |                       |  |       |   |     |                         |                  |
|--------------------------------------|-----------------------|--|-------|---|-----|-------------------------|------------------|
| Sep 4 – 11, 2024<br>(Day Order 1-6)  | 4                     | 4.2 Moving toward renewable energy sources – energy conservation practices   | K1-K6 | 3 | 1-5 | Board and Chalk method  | Group Discussion |
|                                      | 5                     | Site Analysis:<br>Fundamental Energy Calculations and work place safety<br>5.1 Energy calculations: conversion dimensional equations – Joules, kWh/units | K1-K6 | 3 | 1-5 | Board and Chalk method  | Problem Solving  |
| Sep 12 - 20, 2024<br>(Day Order 1-6) | 5                     | Site Analysis:<br>Fundamental Energy Calculations and work place safety<br>5.1 Energy calculations: conversion dimensional equations – Joules, kWh/units | K1-K6 | 6 | 1-5 | Board and Chalk method  | Problem Solving  |
| Sep 23 - 26, 2024<br>(Day Order 1-4) | 5                     | 5.2 Energy crisis: Global scenario   | K1-K6 | 2 | 1-5 | PowerPoint presentation | Study Report     |
|                                      |                       | 5.2 Energy crisis of developing countries – Report   | K1-K6 | 2 | 1-5 | PowerPoint presentation | Study Report     |
| Sep 27 – Oct 3, 2024                 | <b>C.A. Test – II</b> |  |       |   |     |                         |                  |
| Oct 4 – 5, 2024<br>(Day 5 & 6)       | 5                     | 5.2 Energy crisis of developing countries – Report   | K1-K6 | 2 | 1-5 | PowerPoint presentation | Study Report     |

|   |                 |   |       |   |     |                         |   |
|---|-----------------|---|-------|---|-----|-------------------------|---|
| Oct 7 - 15, 2024<br>(Day Order 1 to 6)  | 5               | 5.3 Energy storage –<br>Various energy storage<br>systems and Energy<br>savings | K1-K6 | 3 | 1-5 | Board and Chalk method  | Quiz                                      |
|   |                 | 5.4 Basic First aid &<br>Safety at work place                                   | K1-K6 | 3 | 1-5 | PowerPoint presentation | Practical and<br>Demonstration            |
| Oct 16 - 22, 2024<br>(Day Order 1 to 6) | 5               | 5.3 Comparative study of<br>power consumption in<br>electrical appliances       | K1-K6 | 3 | 1-5 | Board and Chalk method  | (3 <sup>rd</sup> component)<br>Case Study |
|   |                 | 5.4 Basic First aid &<br>Safety at work place                                   | K1-K6 | 3 | 1-5 | PowerPoint presentation | Practical and<br>Demonstration            |
| Oct 23 - 24, 2024<br>(Day Order 1 to 2) | <b>REVISION</b> |   |       |   |     |                         |   |

**STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI**  
**COURSE PLAN June - November 2024**

**Department** : Sustainable Energy Management  
**Name/s of the Faculty** : Dr. P. Anto Christy  
**Course Title** : Solar Energy  
**Course Code** : 23VS/VM/SE16  
**Shift** : II

**COURSE OUTCOMES (COs)**

|     |  |         |
|-----|--|---------|
| CO1 | define fundamentals on solar radiation, introduction to semiconductors, fundamentals of solar collectors, Solar cooking, and solar photovoltaic cell for energy utilization  | K1      |
| CO2 | classify nature of solar radiation, photovoltaic principles structure of collectors, solar system for process heat, solar pond and I-V characteristics of solar cell to deliver solar energy, different types of solar panels. | K2      |
| CO3 | identify radiation on earth's surface, operation of solar cell, solar concentrating collectors, solar thermos mechanical refrigeration system and solar energy spectrum to harness applications of solar energy.               | K3      |
| CO4 | discover solar power plants, sun tracking mechanism, solar, solar pumping and solar cell fabrication for solar energy usage  | K4      |
| CO5 | access solar mapping, solar distillation and solar panel experiment for solar energy efficiency  | K5 & K6 |

| Week                                       | Unit No. | Content   | Cognitive Level | Teaching Hours | COs            | Teaching Learning Methodology | Assessment Methods   |
|--|----------|---|-----------------|----------------|----------------|-------------------------------|--|
| Jun 24 – 26, 2024<br>(Day Order 4 - 6)     | 1        | Unit 1<br>1.1 Fundamentals of Solar Radiation – The Nature of Solar Radiation – Radiation on Earth’s Surface  | 1-3             | 3              | 1-3            | PPT & lecture                 | Question/Answer session                                      |
| Jun 27 – July 4, 2024<br>(Day Order 1 - 6) | 1        | 1.1 Sun path Chart<br>1.2 Historical Perspective - Solar Energy; Obstacles and Outlook - Global   | 1-3             | 6              | 1-3            | PPT & lecture                 | Quiz session   |
| July 5 – 12, 2024<br>(Day Order 1 - 6)     | 1 & 2    | 1.2 Indian solar energy scenario - Potential and power generation<br>Unit 2<br>2.1 Introduction to semiconductors-<br>Photovoltaics Principles-                   | 1-3<br><br>1-4  | 6              | 1-3<br><br>1-4 | Chalk and talk                | Interactive Discussion on portions covered<br><br>Assignment |
| July 15 – 23, 2024<br>(Day Order 1 - 6)    | 2        | 2.1 Conversion of DC power to AC power through inverters<br>2.2 Solar panels - Solar power plants – (CIGS panels/CSPV-Poly Crystalline-Mono Crystalline-Bifacial) | 1-4             | 6              | 1-4            | Chalk and talk                | <b>IIIrd component Assignment</b>                            |

|   |                      |  |                |   |                |                                       |                                      |
|---|----------------------|--|----------------|---|----------------|---------------------------------------|--------------------------------------|
| July 24 – 31, 2024<br>(Day Order 1 - 6) | 2 &<br>3             | 2.3 Various parameters and work safety for solar PV installation<br>Unit 3<br>3.1 Fundamentals of solar collectors as devices to convert solar energy to heat.   | 1-3<br><br>1-6 | 6 | 1-3<br><br>1-5 | Chalk and talk<br><br>PPT and lecture | Report writing<br><br>Micro projects |
| Aug 1 – 5, 2024<br>(Day Order 1 - 3)    | 3                    | 3.1 Design and structure of collectors for heating liquids and air.  | 1-6            | 3 | 1-5            | PPT and lecture                       | Quiz                                 |
| Aug 6 – 10, 2024                        | <b>C.A. Test - I</b> |  |                |   |                |                                       |                                      |
| Aug 12 – 14, 2024<br>(Day Order 4-6)    | 3                    | 3.2 Solar concentrating collectors - Sun tracking mechanisms – Solar mapping   | 1-6            | 3 | 1-5            | Chalk and talk                        | IIIrd component assignment           |
| Aug 16 – 23, 2024<br>(Day Order 1-6)    | 4                    | Unit 4<br>4.1 Solar thermo-mechanical refrigeration system-Solar systems for process heat production<br>Solar cooking – Performance and testing of solar cookers | 1-6            | 6 | 1-5            | PPT and lecture                       | Interactive session                  |
| Aug 27 – Sep 3, 2024<br>(Day Order 1-6) | 4                    | 4.1 Power generation - drying<br>4.2 Solar Pond – Solar greenhouse   | 1-6            | 6 | 1-5            | PPT and lecture                       | Quiz                                 |
| Sep 4 – 11, 2024<br>(Day Order 1-6)     | 4                    | 4.2 – Solar Pumping – Solar Distillation   | 1-6            | 6 | 1-5            | PPT and lecture                       | Group Discussion                     |



|   |                       |  |     |   |     |                 |  |
|---|-----------------------|--|-----|---|-----|-----------------|--|
| Sep 12 - 20, 2024<br>(Day Order 1-6)    | 5                     | Unit 5<br>5.1 Solar panel experiment and study of Solar photovoltaic cells-IV characteristics.<br><br>5.2 Solar energy spectrum calculation of Rydberg's constant. | 1-6 | 6 | 1-5 | Chalk and talk  | IIIrd component Assignment                 |
| Sep 23 - 26, 2024<br>(Day Order 1-4)    | 5                     | 5.3 Solar cell fabrication   | 1-6 | 6 | 1-5 | PPT and lecture | Question/Answer session                    |
| Sep 27 – Oct 3, 2024                    | <b>C.A. Test - II</b> |  |     |   |     |                 |  |
| Oct 4 – 5, 2024<br>(Day 5 & 6)          | 4                     | 4.2 Solar Pond – Solar greenhouse – Solar Pumping – Solar Distillation   | 1-6 | 6 | 1-5 | Chalk and talk  | Interactive Discussion on portions covered |
| Oct 7 - 15, 2024<br>(Day Order 1 to 6)  | 5                     | 5.1 Solar panel experiment and study of Solar photovoltaic cells-IV characteristics  | 1-6 | 6 | 1-5 | Chalk and talk  | Question/Answer session                    |
| Oct 16 - 22, 2024<br>(Day Order 1 to 6) | 3                     | 3.2 Solar concentrating collectors - Sun tracking mechanisms – Solar mapping   | 1-6 | 3 | 1-5 | Chalk and talk  | Assignment                                 |
| Oct 23 - 24, 2024<br>(Day Order 1 to 2) | <b>REVISION</b>       |  |     |   |     |                 |  |

**STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI**  
**COURSE PLAN June - November 2024**

**Department** : B.Voc Sustainable Energy Management

**Name/s of the Faculty** : Dr. B. Keerthana and Guest faculty

**Course Title** : Energy Economics

**Course Code** : 23VS/VA/EE15

**Shift** : II

**COURSE OUTCOMES (COs)**

| <b>COs</b> | <b>Description</b>   | <b>CL</b> |
|------------|--|-----------|
| CO1        | identify the basic principles of Micro Economics , Energy economics, SDG, Energy security and natural gas markets                            | K1        |
| CO2        | summarize the basic problems of economy, post industrialization, electricity markets, Energy triangle and energy usage at home               | K2        |
| CO3        | demonstrate the role of market, energy needs in countries, goals of renewable energy and Indian environmental policies and energy calculator | K3        |
| CO4        | examine elastic demand curves, Clean energy, Solar and wind energy prospectus , International policies and energy consumption calculation    | K4        |
| CO5        | evaluate the factors affecting demand supply, SDG 7, Future of renewable energy , regulations and Industry power management                  | K5        |

| <b>Week</b>                                | <b>Unit No.</b> | <b>Content</b>   | <b>Cognitive Level</b> | <b>Teaching Hours</b> | <b>COs</b>     | <b>Teaching Learning Methodology</b> | <b>Assessment Methods</b>               |
|--|-----------------|--|------------------------|-----------------------|----------------|--------------------------------------|---|
| Jun 24 – 26, 2024<br>(Day Order 4 - 6)     | 2 & 1           | Unit 2<br>2.1 Definition - Energy Economics<br>2.2 Historical Context – post industrialization- growth of the developed countries unit 1<br><br>1.1 Definition of Economics – Scarcity | 1-5<br><br>1-4         | 2                     | 1-5<br><br>1-4 | Lecture& PPT<br><br>PPT and lecture  | Mind map preparation<br><br>Quiz        |
| Jun 27 – July 4, 2024<br>(Day Order 1 - 6) | 2 & 1           | 2.1 growing energy needs of less developed countries<br>2.3 Overview of energy use and energy consumption<br>1.2 Basic problems of economy   | 1-5<br>1-4             | 2                     | 1-5<br>1-4     | Lecture &GD<br><br>Chalk and talk    | Micro projects<br><br>Group Discussion  |
| July 5 – 12, 2024<br>(Day Order 1 - 6)     | 2 & 1           | 2.4 Introduction to the Sustainable Development Goal–Clean energy - SDG 7<br>1.3 Role of market in organizing economic activity<br>1.4 Demand – Demand curve                           | 1-5<br>1-4             | 2                     | 1-5<br>1-4     | Chalk and talk<br><br>Lecture &GD    | Problem solving<br><br>Group Discussion |

|   |                      |   |                |   |                |  |  |
|---|----------------------|---|----------------|---|----------------|--|--|
| July 15 – 23, 2024<br>(Day Order 1 - 6) | 3 &1                 | Unit 3<br>3.1 Natural Gas –<br>Introduction to Natural<br>Gas Markets – Future<br>1.4Factors affecting<br>demand,<br>shift of demand curve. | 1-5<br><br>1-4 | 6 | 1-5<br><br>1-4 | Lecture &GD<br><br>PowerPoint presentation | Micro project<br><br>IIIrd Component<br>Assignment |
| July 24 – 31, 2024<br>(Day Order 1 - 6) | 3 &1                 | 3.2 Electricity and Coal<br>Markets<br>1.5 Supply – Supply curve<br>Factors affecting supply,<br>shift<br>of supply curve                   | 1-5<br><br>1-4 | 6 | 1-5<br><br>1-4 | Lecture &GD<br><br>PowerPoint presentation | Survey report<br><br>Quiz                          |
| Aug 1 – 5, 2024<br>(Day Order 1 - 3)    | 3 &1                 | 3.2 Electricity and Coal<br>Markets<br>1.5shift<br>of supply curve  | 1-5<br><br>1-4 | 6 | 1-5<br><br>1-4 | Lecture &GD<br><br>PowerPoint presentation | IIIrd Component<br>Assignment<br><br>Case study    |
| Aug 6 – 10, 2024                        | <b>C.A. Test - I</b> |   |                |   |                |  |  |
| Aug 12 – 14, 2024<br>(Day Order 4-6)    | 3&4                  | 3.3 Renewable Energy –<br>Solar and Wind Energy<br>Unit 4<br>4.1 Introduction to Energy<br>Security– Energy triangle                        | 1-5<br><br>1-5 | 6 | 1-5<br><br>1-5 | Lecture& video<br><br>Lecture &GD          | Mind map<br>preparation<br><br>Quiz                |

|   |                       |   |                |   |                |   |   |
|---|-----------------------|---|----------------|---|----------------|---|---|
| Aug 16 – 23, 2024<br>(Day Order 1-6)    | 3 &4                  | 3.3 Prospects and Future<br>4.2 Indian Environmental<br>Policies – Renewable<br>energy-<br>policies                                   | 1-5<br><br>1-5 | 6 | 1-5<br><br>1-5 | Lecture& video<br><br>Lecture &GD             | Group discussion<br><br>Quiz                |
| Aug 27 – Sep 3, 2024<br>(Day Order 1-6) | 5 &4                  | Unit 5<br>5.1Energy use by<br>individuals and households<br>4.2 energy efficiency<br>policies<br>4.3 International Energy<br>policies | 1-5<br><br>1-5 | 6 | 1-5<br><br>1-5 | Lecture& video<br><br>Lecture &GD             | Mini projecct<br><br>Survey report          |
| Sep 4 – 11, 2024<br>(Day Order 1-6)     | 5 &4                  | 5.1Energy use by<br>individuals and households<br>4.3UNFCCC<br>4.4 Regulations  | 1-5<br><br>1-5 | 6 | 1-5<br><br>1-5 | Lecture &video<br><br>PowerPoint presentation | IIIrd Component<br>Assignment<br><br>Debate |
| Sep 12 - 20, 2024<br>(Day Order 1-6)    | 5 &4                  | 5.1 energy<br>calculator–energy<br>consumption<br>4.3command and control  | 1-5<br><br>1-5 | 6 | 1-5<br><br>1-5 | Lecture &video<br><br>PowerPoint presentation | Group discussion<br><br>Quiz                |
| Sep 23 - 26, 2024<br>(Day Order 1-4)    | 5 &4                  | 5.2 Industry Power<br>management<br>4.3command and control  | 1-5<br><br>1-5 | 6 | 1-5<br><br>1-5 | Lecture &video<br><br>PowerPoint presentation | Mini projecct<br><br>Survey report          |
| Sep 27 – Oct 3, 2024                    | <b>C.A. Test - II</b> |   |                |   |                |   |   |

|   |                 |   |            |   |            |   |                                 |
|---|-----------------|---|------------|---|------------|---|---------------------------------|
| Oct 4 – 5, 2024<br>(Day 5 & 6)          | 3 &1            | 3.2 Electricity and Coal Markets<br>1.5 Supply – Supply curve<br>Factors affecting supply, shift of supply curve                | 1-5<br>1-4 | 6 | 1-5<br>1-4 | Lecture &GD<br><br>PowerPoint presentation    | Survey report<br><br>Quiz       |
| Oct 7 - 15, 2024<br>(Day Order 1 to 6)  | 3 &1            | Unit 3<br>3.1 Natural Gas – Introduction to Natural Gas Markets – Future<br>1.4Factors affecting demand, shift of demand curve. | 1-5<br>1-4 | 6 | 1-5<br>1-4 | Lecture &video<br><br>PowerPoint presentation | Assignment<br><br>Survey report |
| Oct 16 - 22, 2024<br>(Day Order 1 to 6) | 2 &<br>1        | 2.4 Introduction to the Sustainable Development Goal–Clean energy - SDG 7<br>1.4 Demand – Demand curve                          | 1-5<br>1-4 | 2 | 1-5<br>1-4 | Lecture &video<br><br>PowerPoint presentation | Group discussion<br><br>Quiz    |
| Oct 23 - 24, 2024<br>(Day Order 1 to 2) | <b>REVISION</b> |   |            |   |            |   |                                 |