

Institution has Publicly committed to net Zero

Number of innovative program(s) in Energy and Climate Change (EC.9)

- 1. Usage of the solar energy panels in the campus to produce some of the energy for the campus needed.
- 2. Effective implementation of Rainwater harvesting system
- 3. Explicit policy on Energy
- 4. Usage of Energy Efficient appliances
- 5. Academic programs on Energy and Climate change
- 6. Campaign on energy saving for reducing of electricity consumption
- 7. Usage of E-Vehicles for campus shuttle services

Description:

1. Usage of the renewable energy sources through solar energy panels in the campus

To tap the alternate energy sources, KARE has installed 1124.22kWp rooftop solar power panels on top of nine blocks. About 45% of the energy consumption is met by the solar energy leading to the reduction in carbon foot print. The institution has also installed 152 solar street lights throughout the campus which amounts to a saving of about 9.56 kWh per annum. Further, solar water heaters are installed in the hostels and solar pumps are installed in the agriculture farms to tap solar energy.



2. Explicit policy on energy management.

KARE understands the importance of energy and has a policy in place for managing it. The university also provides training to teach staff and students about proper energy management practices. This helps raise awareness and ensures everyone follows the correct guidelines. As a result, the university achieves high energy efficiency in a consistent and practical way.

Policy URL: <u>https://kalasalingam.ac.in/wp-content/uploads/2021/11/Energy-Policy.pdf</u>

https://kalasalingam.ac.in/wp-content/uploads/docs/Sustainable_Environment.pdf

3. Academic programs:

To ensure the success of its energy efficiency initiative, the institute offers various programs on energy and climate change. These programs aim to raise awareness among the student community.

- M.Tech programme on Renewable Energy Technologies URL: <u>https://kalasalingam.ac.in/course/m-tech-renewable-energy-technologies/</u>
- Program Elective courses: <u>B.Tech., EEE Curriculum and syllabi</u>

| S.No | Course Code | Course Name | Dept |
|------|--------------------|---|------|
| 1. | 213EEE3132 | Solar Photovoltaic Systems | EEE |
| 2. | 213EEE3133 | Wind Power Generation | EEE |
| 3. | 213EEE3134 | Biomass Energy System | EEE |
| | 213EEE3135 | Geothermal and Ocean Energy Conversion | EEE |
| 4. | 213EEE3136 | Industrial & Commercial Aspects of Renewable Energy | EEE |
| | | Sources | |
| 5. | 213EEE2137 | Renewable Energy Sources | EEE |
| 6. | 213EEE3138 | Fuel Cell Technology | EEE |
| 7. | 213EEE3139 | Smart Grid | EEE |
| 8. | 213EEE2150 | Solar and Wind Energy Conversion | EEE |

• Foundation course on Sustainable development that aimed at educating the campus community about the importance of energy conservation:

Name of the Course with course code: 211MEC1401 - Sustainable Design and Manufacturing

Curriculum & Syllabi R2021 Department of Mechanical Engineering

| 211ME | C1401 | L | Р | X | С | |
|-------------------|---|---|---|---|---|--|
| SUSTAINABLE DESIG | 1 | 2 | 3 | 3 | | |
| Prerequisite: Nil | Course Category: Foundation Core Course Type: Integrated Course with Practical | | | | | |

Course Objectives:

To gain knowledge about the methods, tools and techniques for development of a product in the most sustainable way

Course Outcomes:

| CO1 | Able to apply the sustainable design practices to improve the existing product. | | | | | |
|-------------------------------|---|--|--|--|--|--|
| CO2 | Able to perform design analysis | | | | | |
| CO3 | Perform optimization on design and materials selections | | | | | |
| CO4 | Capable to prepare process layouts for the optimized products | | | | | |
| CO5 | Choose appropriate method of manufacturing the products | | | | | |
| Mapping of Course Outcome(s): | | | | | | |

| | | | (| r | | 1 | | | | | | | | | |
|-------|---|---|---|---|-----|---|---|---|---|----|----|----|-----|-------|-----|
| PO | 1 | 2 | 3 | 4 | wn, | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | - 14 | 15 |
| ASO | 1 | 2 | М | 3 | 6 | 5 | 5 | 5 | 7 | 4 | 6 | 6 | 1,2 | 3,4,7 | 2,6 |
| - CO1 | 3 | з | 3 | 2 | 3 | | 2 | 2 | 2 | 2 | 1 | 2 | | | |
| CO2 | 3 | 3 | - | з | 3 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 3 | | 2 |
| CO3 | 3 | 3 | 3 | 2 | 3 | | 2 | 2 | 2 | 2 | 1 | 2 | 3 | 3 | 3 |
| C04 | 3 | 1 | 3 | 2 | | 2 | 1 | 2 | 2 | 3 | 2 | 2 | 3 | | |

Course Topics

UNIT I-INTRODUCTION TO SUSTAINABILITY

Introduction to sustainability (for all engineering fields with an emphasis on design and manufacturing), basic elements of sustainability- Global norms and sustainable development goals-Process of product realizations

UNIT II: CONCEPTUALIZATION AND DESIGN

Need Analysis, brainstorming and strategic development – Product design (free hand sketching)- Design optimization and decision making

UNIT III: DESIGN TESTING AND VALIDATION: MODELING AND ANALYSIS

Dimensioning andtolerance, 2D sketching - 3D model, meshing- Material selection and simulation

UNIT IV: SUSTAINABLE MANUFACTURING: RESEARCH AND DEVELOPMENT

Sustainable manufacturing process- Identification of governing factors through case study

analysis - Manufacturing layout preparation with justifications and alternative solutions

UNIT V: SUSTAINABLE MANUFACTURING: EXECUTION

Product(prototype)development - Mechanisms and Actuators- Performance assessment

Practical:

Unit I

Case study - 1: on mechanical engineering topic for everyone

Case study - 2: on the respective discipline

Case study - 3: on inter- disciplinary topic

Unit II

Brainstorming sessions for a real time need/demand (now on students practice it for their projects) Preparation of freehand sketching with necessary details Concept optimization and decision making through example

Unit III

Dimensioning and sketching practice for engineering component CAD 3D model with some exercise Execution of performance evaluation modelling

Unit IV

Identification of required manufacturing processes Sustainability assessment: cost estimation, energy consumption, environmental effects and other factors Report and job order preparation for sustainable manufacturing

Unit V

Product fabrication: Manufacturing Product fabrication: Assembly and other processes Real time functioning/demonstration

X Component:

| 1. | Introduction to Altair Inspire |
|-----|--|
| 2. | Introduction to Finite element analysis. |
| 3. | CAE driven design Process (examples with industry) |
| 4. | Basic Interaction with Inspire Graphical User Interface File Management (in every simulation |
| | different file are created) Practice Work |
| 5 | How to select and edit objects Practice Work |
| 6. | Units and Measurements Practice Work |
| 7. | Geometry Building and Sketching Geometry (2D and 3D model) |
| 8. | Sketch constraints with examples |
| 9. | Sketch simplification with some exercise |
| 10. | Meshing and boundary conditions |
| 11. | Application of loadings |
| 12. | Motion Analysis |
| 13. | Design Optimization and 3D printing for the selected product |
| 14. | CAD model development for the project |
| | |

15. Analysis and Simulation results of the Final Model.

4. KARE recognizes the importance of climate change and is dedicated to helping reduce greenhouse gas emissions to support nations' goals. KARE has **banned the entry of vehicles** inside the academic arena. This policy encourages walking or biking for short distances within the campus to cut down on fuel use and reduce carbon dioxide emissions.



5. Campaign on energy saving for reducing of electricity consumption

Office equipment such as computers, printers, and copiers can contribute significantly to energy usage. Sign boards are kept to adopt the following practices to reduce their energy consumption:



6. Usage of E-Vehicles for campus shuttle services

Faculty members and students are encouraged to use bicycles inside the campus. The parking lots for bicycles are provided at various locations in the campus. To reduce air pollution and save fuel, battery-powered vehicle facility is available in the campus. People can use the shuttle service that is provided with the use of electric vehicles.



Environmental Awareness in school linkage Programme:







