SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Marine Engineering		LP: **OE18007**
B.E/B.Tech/M.E/M.Tech : **Marine Engg**	Regulation: **2018**	Rev. No: 00
PG Specialisation : **N.A**		Date:16/07/2021
Sub. Code / Sub. Name : **OE 18007 BASICS OF ENERGY RESOURCES**		
Unit : **I**		

UNIT SYLLABUS: ENERGY RESOURCES 9

Energy generation in coal based, nuclear based, diesel and gas based power plants, world energy flows, energy and economic growth, supply and availability; Electric utilities and regulations, cost structure analysis, economics of energy use in agriculture, transport, building, Industry and energy substitution, cost benefit analysis –carbon credit and footprint.

Objective: To impart knowledge on various sources of energy and associated environmental impact

Session No *	Topics to be covered	Ref	Teaching Aids
1.	Introduction to the subject and Overview of syllabus	Sl. No. 10	PPT/BB/Online
2.	Energy generation in coal based power plants	Sl.No.7	PPT/BB/Online
3.	Energy generation in Nuclear based power plants	Sl.No.7	PPT/BB/Online
4.	Energy generation in Gas based power plants	Sl.No.7	PPT/BB/Online
5.	World and Indian energy scenario and energy flows, energy and economic growth, supply and availability	Sl. No. 10	PPT/BB/Online
6.	Electric utilities and regulations, cost structure analysis	Sl. No. 10	PPT/BB/Online
7.	Economics of energy use in agriculture, transport and in buildings	Sl. No. 10	PPT/BB/Online
8.	Industry and energy substitution, cost benefit analysis	Sl. No. 10	PPT/BB/Online
9.	Carbon credit and footprint and Revision of topics covered	Sl. No. 07	PPT/BB/Online

Content beyond syllabus covered (if any): Indian energy scenario

* Session duration: 50 minutes

Sub. Code / Sub. Name: **OE18007 – Basics of Energy Resources**
Unit : II

Unit Syllabus: ENVIRONMENTAL IMPACTS OF ENERGY USE 9

Global warming -sources of emissions, CO_2 emissions, impacts, mitigation and sustainability. environmental standards, legislation and audits, air pollution -SOx, NOx, CO, particulates, solid and water pollution, formation of pollutants, measurement and controls.

Objective: To impart knowledge on environmental impacts associated with usage of traditional energy sources.

Session No *	Topics to be covered	Ref	Teaching Aids
10.	Environmental impacts of energy use - Overview	Sl. No. 07,10	PPT/BB/Online
11.	Global warming - Contributing factors	Sl. No. 07,10	PPT/BB/Online
12.	Sources of emissions	Sl. No. 07,10	PPT/BB/Online
13.	CO_2 emissions, impacts, mitigation and sustainability	Sl. No. 07,10	PPT/BB/Online
14.	Environmental standards, legislation and audits	Sl. No. 07,10	PPT/BB/Online
15.	Air pollution -SOx, NOx, CO, particulate emission	Sl. No. 07,10	PPT/BB/Online
16.	Solid (Land) and water pollution	Sl. No. 07,10	PPT/BB/Online
17.	Formation of pollutants, measurement and controls	Sl. No. 07,10	PPT/BB/Online
18.	Revision of topics covered	Sl. No. 07,10	PPT/BB/Online

Content beyond syllabus covered (if any): Methods of reducing emissions

* Session duration: 50 mins

Sub. Code / Sub. Name: **OE18007 – Basics of Energy Resources**
Unit : **III**

Unit Syllabus: RENEWABLE ENERGY

9

Solar PV cell; Wind energy - HAWT; Biomass energy - Bio digesters, Bio-diesel; OTEC

Objective: To impart knowledge on various techniques used in effective conversion of renewable sources of energy.

Session No *	Topics to be covered	Ref	Teaching Aids
19.	Renewable energy resources overview	Sl. No. 07,10	PPT/BB/Online
20.	Solar PV cell, principle of energy conversion & methods of conversion of Solar energy	Sl. No. 07,10	PPT/BB/Online
21.	Potential, advantages & limitations of Solar energy	Sl. No. 07,10	PPT/BB/Online
22.	Wind energy - Potential, advantages & limitations	Sl. No. 07,10	PPT/BB/Online
23.	Horizontal Axis Wind Turbine (HAWT) - construction	Sl. No. 07,10	PPT/BB/Online
24.	Horizontal Axis Wind Turbine (HAWT) - working principle	Sl. No. 07,10	PPT/BB/Online
25.	Biomass energy - Potential, advantages & limitations	Sl. No. 07,10	PPT/BB/Online
26.	Bio digesters, Biodiesel - Potential, advantages & limitations	Sl. No. 07,10	PPT/BB/Online
27.	Ocean Thermal Energy Conversion (OTEC), Revision of topics covered	Sl. No. 07,10	PPT/BB/Online

Content beyond syllabus covered (if any): Global renewable energy utilization scenario

* Session duration: 50 mins

Sub. Code / Sub. Name: **OE18007 – Basics of Energy Resources**
Unit : **IV**

Unit Syllabus: ENERGY STORAGE

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Potential energy, Pumped hydro storage; KE and Compressed gas system: Flywheel storage, compressed air energy storage; Electrical and magnetic energy storage: Capacitors, electromagnets; Chemical Energy storage: Thermo-chemical, photo-chemical, bio-chemical, Superconducting Magnet Energy Storage (SMES) systems.

Objective: To impart knowledge on storage of energy in different forms.

Session No *	Topics to be covered	Ref	Teaching Aids
28.	Energy storage - overview	Sl. No. 10	PPT/BB/Online
29.	Potential energy, Pumped hydro storage	Sl. No. 10	PPT/BB/Online
30.	Kinetic Energy and Compressed gas system	Sl. No. 10	PPT/BB/Online
31.	Flywheel storage, compressed air energy storage	Sl. No. 10	PPT/BB/Online
32.	Electrical and magnetic energy storage, Capacitors, electromagnets	Sl. No. 10	PPT/BB/Online
33.	Chemical Energy storage: Thermo - chemical,	Sl. No. 10	PPT/BB/Online
34.	Photo-chemical, Bio-chemical energy storage	Sl. No. 10	PPT/BB/Online
35.	Superconducting Magnet Energy Storage (SMES) systems	Sl. No. 10	PPT/BB/Online
36.	Revision of topics covered	Sl. No. 10	PPT/BB/Online
Content beyond syllabus covered (if any): Advantages of decentralization of energy production			

* Session duration: 50 mins

Sub. Code / Sub. Name: **OE18007 – Basics of Energy Resources**
Unit : V

Unit Syllabus: ENERGY ECONOMICS 9

Simple payback period, time value of money, IRR, NPV, life cycle costing, cost of saved energy, and cost of energy generated, examples from energy generation and conservation, energy chain, primary energy analysis, life cycle assessment, net energy analysis, case studies on life cycle costing

Objective: To impart knowledge to assess the life cycle and cost analysis.

Session No *	Topics to be covered	Ref	Teaching Aids
37.	Introduction to Energy economics	Sl. No. 10	PPT/BB/Online
38.	Time value of money, Internal Rate of Return (IRR), Net Present Value (NPV)	Sl. No. 10	PPT/BB/Online
39.	Life cycle costing, cost of saved energy and cost of energy generated	Sl. No. 10	PPT/BB/Online
40.	Examples from energy generation and conservation	Sl. No. 10	PPT/BB/Online
41.	Energy chain, primary energy analysis	Sl. No. 10	PPT/BB/Online
42.	Life cycle assessment, net energy analysis	Sl. No. 10	PPT/BB/Online
43.	Case studies on life cycle costing	Sl. No. 10	PPT/BB/Online
44.	Case studies on life cycle costing – contd.	Sl. No. 10	PPT/BB/Online
45.	Revision of all the 5 units	Sl. No. 10	PPT/BB/Online
Content beyond syllabus covered (if any): Energy economics - COVID - 19 pandemic scenario			

* Session duration: 50 mins

Sub Code / Sub Name: **OE18007 – Basics of Energy Resources**

TEXT BOOKS:

1. Energy and the Challenge of Sustainability, World energy assessment, UNDP New York, 2004.
2. AKN Reddy, RH Williams, TB Johansson, Energy after Rio, Prospects and challenges, UNDP, United Nations Publications, New York, 1997

REFERENCES :

3. Nebojsa Nakicenovic, Arnulf Grubler and Alan McDonald "Global energy perspectives", Cambridge University Press, 1999.
4. Fowler, J.M ., "Energy and the environment", McGraw Hill,1984.5.Robert Ristirer, and Jack P. Kraushaar., "Energy and the environment",Willey,2005
5. Yves Brunet., "Energy storage", Wiley publications, 2013.
6. Rai, G.D., "Non-conventional Energy Sources", Khanna Publishers, 2002.
7. S.K.Garg, Dr.Ranjini Garg, "Environmental Studies and Green Technologies", Khanna Publishers, 2008

WEB RESOURCES:

8. https://nptel.ac.in/courses/108105058/
9. https://nptel.ac.in/courses/121106014/
10. https://www.iea.org and other related websites

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Designation	Associate Professor	Professor & HoD
Date	16 /07/2021	16 /07/2021

Remarks *: * since there is no change in the syllabus, same lesson plan shall be followed for Academic years 2022-2023 for the subject OE18007/BER.

A. Mohan 22/7/2021 S.K. 04/8/22

Remarks *:

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD