

With effect from the Academic Year 2019-20

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Electrical & Electronics Engineering

Couse Name: Non-Conventional Energy Sources (Open Elective –I)

SYLLABUS FOR B.E. III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: U18OE310EE
Credits :2	CIE Marks:40	Duration of SEE: 3Hours

COURSE OBJECTIVES	COURSE OUTCOMES <i>On completion of the course, students will be able to</i>
1. To provide a survey of the most important renewable energy resources and the technologies for harnessing these resources within the framework of a broad range of simple to state- of -the-art energy systems.	1. Demonstrate the generation of electricity from various Non-Conventional sources of energy, have a working knowledge on types of fuel cells.
	2. Estimate the solar energy, Utilization of it, Principles involved in solar energy collection and conversion of it to electricity generation.
	3. Explore the concepts involved in wind energy conversion system by studying its components, types and performance.
	4. Illustrate ocean energy and explain the operational methods of their utilization.
	5. Acquire the knowledge on Geothermal energy.

UNIT-I: Fuel cells:

Need for Non-conventional energy sources, Types of Non-Conventional energy sources

Fuel cells: Definition-Classification of fuel cells-Design and Principle of operation with special reference to H₂O₂-Ion- Exchange membrane fuel cell- Molten carbonate fuel cell-Solid oxide electrolyte cells- Comparison of

fuel cells- Advantages and Disadvantages of fuel cells-Applications of Fuel cells.

UNIT-II: Solar Energy and Biomass Energy:

Solar Energy : Solar radiation and its measurements-Solar energy collectors: Flat Plate and Concentrating Collectors- solar pond - Applications of Solar energy.

Biomass Energy: Definition-Biomass conversion technologies: Incineration- Thermo chemical conversion- Bio- chemical conversion

UNIT-III: Wind Energy:

Nature of wind-Basic components of Wind Energy Conversion System(WECS)-Wind energy collectors: Horizontal and vertical axis rotors- Advantages and Disadvantages of WECS - Applications of wind energy.

UNIT-IV: Ocean Energy and Geothermal Energy:

Ocean Energy: Ocean thermal electric conversion (OTEC) methods: Open cycle and Closed cycle- Principles of tidal power generation- Advantages and limitations of tidal power generation. Wave energy conversion devices

Geothermal Energy: Geothermal resources- Vapour dominated geothermal plant- Liquid dominated geothermal plant- Applications of Geothermal Energy.

Learning Resources:

1. G.D. Rai, Non-Conventional Energy Sources ,Khanna Publishers, New Delhi, 2011.
2. B H KHAN, Non-Conventional Energy Resources, McGraw Hill, 2nd Edition, 2009.
3. Ashok Desai V, Non-Conventional Energy, Wiley Eastern Ltd, 1990.
4. Mittal K.M, Non-Conventional Energy Systems, Wheeler Publishing Co. Ltd, 1997.
5. Ramesh R, Kurnar K.U, Renewable Energy Technologies, Narosa Publishing House, New Delhi, 1997.

M. Chakravarty

for G. Pranava
(P. Rajasekhara Reddy)

With effect from the Academic Year 2019-20

The break-up of CIE: Internal Tests+ Assignments + Quizzes

- | | | | | |
|---|------------------------|---|------------------------------------|---|
| 1 | No. of Internal Tests: | <div style="border: 1px solid black; padding: 2px 10px;">02</div> | Max.Marks for each Internal Tests: | <div style="border: 1px solid black; padding: 2px 10px;">30</div> |
| 2 | No. of Assignments: | <div style="border: 1px solid black; padding: 2px 10px;">03</div> | Max. Marks for each Assignment: | <div style="border: 1px solid black; padding: 2px 10px;">05</div> |
| 3 | No. of Quizzes: | <div style="border: 1px solid black; padding: 2px 10px;">02</div> | Max. Marks for each Quiz Test: | <div style="border: 1px solid black; padding: 2px 10px;">05</div> |

Duration of Internal Test: **1 Hour 30 Minutes**

M. Chakraborty

for G. Pranova