



FACULTY OF ENGINEERING & TECHNOLOGY

First Year Master of Technology

Semester II

Course Code: 102450208

Course Title: OCEAN ENERGY AND TIDAL ENERGY

Type of Course: Program Elective IV

Course Objectives: Understand the working of ocean and tidal energy systems.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Internal		External		Total
				Theory	J/V/P*	Theory	J/V/P*	
3	2	0	4	30/15	20/10	70/35	30/15	150/75

* J: Jury; V: Viva; P: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	OCEAN ENERGY TECHNOLOGIES: Introduction to Energy form oceans, Oceans energy Resources, Off shore and on-shore oceans energy conversion technology, Advantage and limitation of oceans energy conversion technology, The guide lines for oceans energy conversion plant, Ocean energy routes, High voltage direct current power transmission from Off shore oceans energy conversion plant to land based load centers	8
2	OCEAN THERMAL ENERGY CONVERSION: Introduction, Principle of OTEC, Ocean surface temperature, Deep water temperature, Efficiencies of OTEC plants and their influence on plants size, Open cycle, Limitation of Open cycle OTEC system, Historical review of Open cycle OTEC plants, India's first oceans thermal energy conversion, Modified Open cycle OTEC plants, Cogeneration of electricity and fresh water from open cycle OTEC, Closed cycle OTEC	10
3	OCEAN WAVE ENERGY CONVERSION: Introduction, Ocean waves, Parameters of a progressive wave, Equation of a progressive wave, Energy and power in ocean waves, Summary of Equation Motion of water particles in the waves, Wave data collection, Routes of energy conversion of wave energy, Wave machines, Dolphin-buoy type of ocean wave energy converter, Oscillating float-air pump type wave machine Three-raft energy converter, Nodding duck Oscillating cam wave machine	11



4	TIDAL ENERGY CONVERSION: Introduction tidal Current, High and Low Tides, Tidal Energy conversion, Tidal power, Average theoretical Power per tide (rise and fall), Summary of Expressions Tidal Work or Energy Conversion, Ocean tidal energy conversion schemes, Terms and definitions, Single basin tidal schemes, Double basin scheme and multi basin scheme, Details about plant and equipment, Economic aspects about tidal energy conversion plant, Tidal power plant in the world, Tidal energy resources in India, The rance tidal power plants in france, Kislayaguna plants Russia, Interaction between tidal power plant and electrical grid	10
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Suggested Specification table with Marks (Theory) (Revised Bloom’s Taxonomy):

Distribution of Theory Marks						R: Remembering; U: Understanding; A: Application, N: Analyze; E: Evaluate; C: Create
R	U	A	N	E	C	
20	15	25	15	10	15	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1	Renewable Energy Sources and Emerging Technologies , D. P. Kothari, K. C. Singal, Rakesh Ranjan, PHI Learning Private Limited, New Delhi
2	Alternative Energy Resources: The Quest for Sustainable Energy, Paul Kruger.
3	Non-conventional Energy Sources, S.Hasan Saeed, Sharma, D K. S.K. Kataria & Sons.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Understanding of ocean and tidal energy system	30 %
CO-2	To know the ocean and tidal energy conversion system.	55 %
CO-3	Ability to evaluate tidal energy conversion systems	15 %

List of Practicals / Tutorials:

1	To study present scenario of the ocean and tidal energy power generation in India and across the globe.
2	To study different ocean energy technologies.
3	Performance analysis of the hydraulic turbines.
4	Performance analysis of the hydraulic pumps.
5	To study different ocean thermal energy conversion systems.
6	Co-generation in the ocean thermal energy conversion systems.
7	To study ocean wave energy conversion systems.
8	To study different wave machines.
9	To study different Tidal Energy conversion system.
10	Economic aspects of ocean and tidal energy conversion systems.

Supplementary learning Material:



CVM
UNIVERSITY

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Curriculum Revision:	
Version:	1
Drafted on (Month-Year):	Apr-20
Last Reviewed on (Month-Year):	Jul-20
Next Review on (Month-Year):	Apr-22