Faculty of Engineering & Technology
Master of Technology (M. Tech)
(W. E. F.: 2023-24)

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Name of Faculty	:	Faculty of Engineering & Technology
Name of Program	:	Master of Technology (M. Tech)
Course Code	:	2MEE04
Course Title	:	Energy Conversion and Environment
Type of Course	:	Programme Elective (PE)
Year of Introduction	:	2023-24

Prerequisite	:	Knowledge of environmental science provides a broader context for studying energy conversion and its impact on the environment. Topics such as environmental pollution, climate change, and sustainable development are typically covered.
Course Objective	:	Learn about different methods of energy conversion, including fossil fuels, renewable energy sources (such as solar, wind, hydro, and geothermal), and nuclear energy.
Course Outcomes	:	At the end of this course, students will be able to:
	CO1	A comprehensive understanding of various energy conversion technologies, including their principles, operational characteristics, and efficiency
	CO2	To analyse the environmental impacts of different energy sources and technologies, including greenhouse gas emissions, air and water pollution, land use, and resource depletion.
	CO3	To assess and evaluate sustainable energy solutions.
	CO4	Understand the role of government policies, international agreements, and market incentives in shaping the energy sector and promoting sustainable practices.

Teaching and Examination Scheme

Teaching Scheme (Contact Hours)			**Credits**	**Examination Marks**				
				Theory Marks		**Practical Marks**		**Total Marks**
L	**T**	**P**	**C**	**SEE**	**CIA**	**SEE**	**CIA**	
3	0	0	3	70	30	0	0	100

Legends: ***L****-Lecture;* ***T****–Tutorial/Teacher Guided Theory Practice;* ***P*** *– Practical,* ***C*** *– Credit,* ***SEE*** *– Semester End Examination,* ***CIA*** *- Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.))*

Course Content

Unit No.	Topics	Teaching Hours	Weightage	Mapping with CO
1	**Interlinkages of energy and environment:** Principles of energy conversion methods: thermal, nuclear, hydro, solar.	10	24%	CO1
2	An introduction to fuels, combustion fundamentals, thermodynamics, kinetics and properties of combustion products; combustion principles for gases, liquids and solids; Formation of pollutants, measurements and control.	10	24%	CO2
3	Automobile engines, operation and design, emissions, power production and emissions from waste incineration, Energy policies, economics related to energy along with cost factor, the renewable energy sources and conversion processes and sustainable energy.	12	28%	CO2 CO3
4	Energy externalities, Energy and climate change global issues; Alternative energy sources, economics, sustainability.	10	24%	CO4

Suggested Distribution of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyse	Evaluate	Create
Weightage	**10**	**40**	**30**	**20**	**0**	**0**

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

Suggested Learning Websites

Sr. No.	Name of Website
1	https://www.nrel.gov/
2	https://www.irena.org/
3	https://www.energy.gov/

Reference Books

Sr. No.	Name of Reference Books
1	International Energy Markets: Understanding Pricing, Policies and Profits by Carol A.Dahl, PennWell Corporation (2004) ISBN: 978-0-87814-799-1
2	Energy: Technology and directions for the future by John R. Franchi, Elsevier Academic Press (2004). ISBN: 0-12-248-291-3

3	Principles of Sustainable Energy by Frank Keith and Jan F Kreider, CRC press (Taylor and Francis group) (2011), ISBN: 978-1-4398-1407-9
4	Energy Economics: A Modern Introduction by Ferdinand E Banks. Kluwer Academic Publishers. 2nd ed. (2003), ISBN: 0-7923-7700-1
5	Fundamentals of Air Pollution Engineering, Prentice Hall, New Jersey, 1988. Kanury, A.M.
6	Introduction to Combustion Phenomena, Gordon and Breach Science Publishers, New York, 1992.
9	Control of Noise Pollution by N. S. Kamboj, Deep & Deep Publications
10	Noise Measurement and Control by Lord N Thomas, HEYWOOD & Company Ltd
11	Noise Control in Industry by E. & F. N. Spon, Sound Research Laboratories Ltd.