Introduction to Renewable Energy

Course Code:

ME 411

Course Type:

Area Elective

Credits:

3

Theoric:

3

Practice:

0

Laboratory Hour:

0

ECTS:

5

Prerequisite Courses:

Thermodynamics II [1]
Restricted Elective IV (Electrical Circuits Courses) [2]
Course Content:

Comprehensive overview of energy conversion, utilization and storage for renewable energies including solar energy (including photovoltaics and thermal systems), wind energy systems, geothermal, tidal and wave energy, small-scale hydraulic energy, biomass, fuel cells and alternative transportation options. Principles of solar home design, solar hot water pool and space heating, and solar cooling for both new and existing construction. Assessment to the viability of a wind power hydropower or biomass system for a given site. Extensive information on the current state of alternative vehicle technologies, with special focus on electric and hybrid electric vehicles, including their architectures, modeling, sizing, sub-system design and vehicle control. Vehicle dynamics, electric propulsion systems, energy storage sources with in-depth focus on cutting edge battery technologies, battery management and thermal management systems. Modeling

the aforementioned energy systems from the first and second laws of thermodynamics. Environmental consequences of energy conversion and how renewable energy can reduce air pollution and global climate change.