Course Code ESE-820	Credit Hours (Th-Pr) 3-0	**Energy and Environment (Elective)**	Contact Hrs/Week (Th-Pr) 3-0	Total Contact Hrs (Th-Pr) 45-0

Course Outline:

Energy and its forms & energy resources

Merits & demerits of development & use of energy resources

Energy resources of Pakistan

Patterns of energy consumption in Pakistan,

Future energy scenario of world and Pakistan,

Sustainable energy management or agriculture, transport,

Industry & domestic sectors

Merits & demerits of wind, solar, hydropower, bio-energy resources.

Eligibility Criteria: B.E (Chemical, Mechanical, Electrical, Environmental and Materials)

Recommended Books:

S. No.	Title	Author(s)	Assigned Code	Remarks
1.	Towards a sustainable Energy Future	OECD/IEA, Paris, 2001	OI	Reference
2.	Environmental science: Earth as a living planet	Botkin, D.B and Keller, E.A. 6th Edition. John Wiley and Sons. 2007	BD	Reference
3.	Environmental Science: Systems and solutions	Mckinney, M.L., Schoch, R.M. and Yonavjak, L. 4th Edition. Jones & Bartlett Publishers, 2007.	ML	Reference

Course Objectives:

Generate awareness and interest in energy and related issues and explain the environmental consequences of energy production and consumption. Discuss

current energy problems and alternate energy sources available in the country and their environmental concerns.

Learning outcome:

The student will be abreast of the various energy options and resource types available for exploitation with special emphasis on renewable energy resources and their use in the light of environmental implications such as green house effect and its mitigation methodologies. The students will be able to evaluate the potential of the project incentives offered by CDM.

Topics Covered

No.	Topics	Book	Contact Hours
1.	Energy and its forms & energy resources Its types & uses Merits & demerits of development & use of energy resources	OI & ML	8
2.	Energy resources of Pakistan Scope of renewable & non-renewable energy resources Patterns of energy consumption in Pakistan	BD & ML	8
3.	Future energy scenario of world and Pakistan Alternate energy resources Environmental impact of alternative energy resources	ML & BD	8
4.	**Sustainable energy management in** Agriculture Transport Industry Domestic sectors Green energy resources	BD& OI	7
5.	**Environomical Pathways for Sustainable Energy Systems:** Hydropower Wind Solar Bio energy	ML & OI	6

6.	Overall analysis of energy, environmental and cost efficiency of an energy conversion scheme Sustainable Energy Utilisation	ML & OI	8