**ECON 6116 Energy Economics**

This course is the study of economic relationships in energy production, consumption, demand and supply, pricing and conservation, energy policy and the development of new and renewable energy sources. This course aims to provide students with the opportunity to study and develop a broader understanding of the economics of energy. There is mounting evidence that the current global energy system has been growing far beyond what is globally sustainable and already poses a serious, and potentially irreversible, threat to global environmental quality and stability in future decades.

*Contents*

1. Overview and Fundamental Concepts:

1. Energy in the Economy; Global Energy Problems and Issues
2. Fundamental Concepts: Energy, Power; Measuring energy: units and conversion factors,
3. Laws of Thermodynamics, 1st Law and Entropy law, Input and output energy, energy efficiency, Energy conversions (technologies)
4. Energy markets and energy prices; competitive market valuation and social valuation,

2. Oil Resources and Economic Issues:

1. Discounted cash flow analysis,Reserve and resources, resource substation
2. Forecasting prices and speculation, Natural resource (oil) demand and supply, OPEC

3. Overview of Energy Economics and Global Energy Sustainability:

1. Primary energy supply, secondary energy and energy end use demand/consumption,
2. Economic activity, and growth: energy intensity, global energy use forecasts
3. Energy conversion, energy transportation and/or transmission, and clean energy use,
4. Conditions for a sustainable global energy system, climate change and clean energy

4. Clean Energy Supply from Non-Conventional, Alternative and Renewable sources:

1. Climate change and primary and secondary energy use
2. Energy Conservation policies,Demand side management
3. Non-conventional and renewable alternative energy: Solar, Biomass, Wind, Geothermal, Tidal & other, Hydrogen energy, fuel cells

5. Energy Supply from Non-Renewable Fossil Fuel Resources:

1. Fossil fuel resources and reserves model,Cartel models of global energy markets
2. Overview of Oil, Natural gas, and Coal industries,Backstop technologies and Non-renewable resource Pricing (Hotelling model),Clean fossil fuel use; carbon sequestration

6. Energy Conversion and Supply by Electric Utility Industries:

1. Electric Power demand and load duration vs. Electric energy consumption
2. Electricity production technologies and electricity production cost trade-offs, Thermal, hydro, nuclear and renewable production and transmission of electricity
3. Electricity pricing issues, regulation and deregulation issues
4. Nuclear energy issues and prospects

7. Sustainable Energy Policy:

1. Jaccard’s Sustainable Energy System in 2100, Energy Policy of Pakistan
2. Sustainable energy options and criteria for comparison, Sustainable Energy Policy Alternatives and Climate Change,International Policy Initiatives.

*Recommended Books*

1. Mark Jaccard, *Sustainable Fossil Fuels: The Unusual Suspects in the Quest for Clean and Enduring Energy*, Cambridge University Press (2005)

2. Subhes C. *Bhattacharyya Energy Economics Concepts, Issues, Markets and Governance* Springer-Verlag London Limited (2011)

*Suggested Books*

1. J. M. Griffin, and H. B. Steele (1985): *Energy Economics and Policy*, Academic Press

2. Tom Tietenberg and Lynne Lewis Environmental &Natural Resource Economics Pearson Education, Inc., 9th Edition 2012