| ECON-7013 | Energy Pricing | L | T | P | C |
|---|---|---|---|---|---|
| **Version 1.0** | | 3 | 0 | 0 | 3 |
| **Pre-requisites/Exposure** | Graduation | | | | |
| **Co-requisites** | | | | | |

**Course Objectives**

The objectives of this course are:
1. To understand the basic concepts of costs and its implications.
2. To explain pricing as a strategy in different market structures.
3. To develop habit of observation and try to relate the concepts.
4. To understand & develop skills of analysis with respect to the Energy Pricing.
5. To know, analyze and interpret various approaches and tools of energy pricing.
6. To help in understanding support mechanism for Energy Pricing in India and other countries.
7. To have understanding of elements of rate design.

**Course Outcomes**

Upon successful completion of the course a student will be able to:

CO1. To give **conceptual clarity** of cost and other aspects of market for pricing.
CO2. To **apply** the micro economics concepts for energy pricing decisions.
CO3. To know the **application** of tools of energy pricing.
CO4. To **comprehend** various market structure and its real world application.
CO5. To **extend** the theoretical energy pricing concepts to the energy sector in India.

**Course Content**

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**Unit I:** **7 lecture hours**

**Module: 1 The Cost Approach to Pricing**

Introduction, distinguishing between cost and price, the credibility of cost, total cost of operation as a whole, Joint-product cost, Economics of Fixed Overhead Cost. The Readiness to Service concept, Use of Service (Product) Concept, Relative Proportion of Fixed and variable cost. Decreasing, Constant and Increasing. Static and Dynamic Hypothesis. Direct/Common costs, Cost Causation, Utility Cost Allocation Theory, The Functionalization of Cost, Method of allocation, Postage Stamp Approach, Seaboard Formula and other methods. Tenneco allocations of rate design.

**Unit II:** **9 lecture hours**
**The Value Approach to Pricing:**

The "Upper and Lower Limit of Rates" Concept, the crucial importance of price elasticity, the revenue effects of elasticity, Repression and Stimulation, Monopoly pricing, Economics of pricing on a value of service basis, Theory of Class Price, Predatory pricing, Short run demand forecasts, Long Range Demand Forecast,, Public Policy Forecast, The social engineering approach to Pricing: California's Lifeline/Baseline Rate, Cost components of rates, Times Pricing, venture into Marginal Cost Regulation

**Unit III: 10 lecture hours**

**Elements of Rate Design & Tools of Trade**

Introduction to Rates, Unregulated market place, Element of rate design frequent features, Blocking principle, Single-Part Rate forms, Two-Part, Three- Parts. Introduction, Load Curves, Gauging the market: Diversity Factor, Load Factor, Capacity Factor, Utilization Factor, Demand Factor, Power Factor,

**Unit IV 10 lecture hours**

**Module:4 Oil and Gas Pricing**

Introduction, Oil – a Commodity Like No Other Crude Oil and Petroleum Products, Benchmark Crude Transactions, Price Formula, Netback Pricing, Refining Margins, Development of Oil Pricing Mechanism, Spot Market, Forward Market, Futures Market, Options Market, Hedging, Hedgers, Speculators and Arbitrageurs, Regulatory Authority. Gas Pricing Mechanism in India.

**Text Books**


1. Stern, J. (2014). International gas pricing in Europe and Asia: A crisis of fundamentals. Energy Policy, 64, 43-48.
2. Conkling, R. L. (2011). Energy Pricing: economics and principles. Springer Science & Business Media.


**Reference Books**


1. Stern, J. (2006). The Russian-Ukrainian gas crisis of January 2006. Oxford Institute for Energy Studies, 16, 5-12.
2. Stern, J. (2012). The pricing of internationally traded gas. Oxford University Press.


**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

| Components | Class Test | Assignment | Presentation | ESE |
|---|---|---|---|---|
| Weightage (%) | 10 | 20 | 20 | 50 |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

| Mapping between COs and POs | | |
|---|---|---|
| | Course Outcomes (COs) | Mapped Programme Outcomes |

| | | Students will be able to develop and evaluate alternate managerial decisions and identify optimal solutions | Students will demonstrate effective application capabilities of their conceptual understanding to the real world business situations | Students will be able to exhibit effective decision making skills, employing analytical and critical thinking ability | Students will demonstrate effective oral and written communication skills in the professional context | Students will able to work effectively in teams and demonstrate team building capabilities | Students will exhibit leadership and networking skills while handling business situations | Students will demonstrate sensitivity towards ethical and moral issues and have ability to address them in the course of business | Students will demonstrate employability traits in line with the changing dynamics of the industry | Students will demonstrate strong conceptual knowledge in the functional area of management as well as Energy Economics domain | Students will demonstrate effective understanding of relevant functional areas of management and their application in Energy Economics | Students will demonstrate analytical skills in identification and resolution of business problems pertaining to Energy Economics | Students will exhibit the ability to integrate functional areas of management with domain perspective for the purpose of planning, implementation & control of Energy Economics | Students will have global perspective towards business situations in the area of Energy Economics | Students will exhibit deployable skills pertinent to the Energy sector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Course Code | Course Title | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PSO 9 | PSO 10 | PSO 11 | PS12 | PSO 13 | PSO14 |
| **Econ 7013** | **Energy Pricing** | 3 | 2 | 2 | 2 | 1 | | 1 | 3 | 2 | 2 | 3 | 1 | 2 | 3 |

1 – Weakly mapped
2 – Moderately mapped
3 – Strongly mapped

**Model Question Paper**

| | |
|---|---|
| **Name:**<br>**Enrolment No:** | UPES |

**End Semester Examination----------**

**Program/course: MA Economics (With Specialization in Energy Economics)** **Semester : II**

**Subject: Energy Pricing** **Max. Marks : 100**

**Code : ECON-7013** **Duration : 3 Hrs**

| | | | |
|---|---|---|---|
| | **Section A ( attempt all)** | | |
| 1. | Explain definition of Crude Oil and Petroleum? | **[2]** | **CO1** |
| 2. | Explain the different concepts of Costs. | **[2]** | **CO2** |
| 3. | Explain the following concepts: (2.5 Marks each)<br>a) Seaboard Formula<br>b) Importance of Price Elasticity<br>c) Load Factor<br>d) Single Part Rate Design | **[10]** | **CO1** |
| 4. | State whether the following statements are True or False with reasons. **(4 Marks)**<br>1. Demand for energy is a derived demand.<br>2. All essential services are public utilities while all public utilities are not essential services. | **[4]** | **CO1** |
| 5. | Explain Trade Parity Concept in Petroleum Pricing. | **[2]** | **CO3** |
| | **SECTION B (Answer Any Four questions)** | | |
| 1. | Explain the concept of Spot Market and Forward Market? | **[5]** | **CO1** |
| 2. | Given Demand Function P = 70-Q, Supply Function P = 10+ 0.5Q, Equilibrium Price P = $ 30 and the government establishes a price ceiling of $ 20 per unit. Calculate equilibrium quantity (Q), and define & calculate Dead Weight Loss? | **[5]** | **CO3** |
| 3. | What are the differences between conventional and non-conventional energy sources and primary and secondary energy classifications? | **[5]** | **CO5** |
| 4. | A thermal power plant of 210 MW capacity has the maximum load of 160 MW. Its annual load factor is 0.6. The coal consumption is 1kg per kWh of energy generated and the cost of coal is Rs. 450.0 per tonne. Calculate (a) the annual revenue earned if energy is sold at Re.1 per kWh and (b) the capacity factor of the plant. | **[5]** | **CO1** |
| 5. | Share your understanding on Building Block of Petrol (Gasoline) Price in India . | **[5]** | **CO1** |
| | **SECTION C (Answer Any Two Questions )** | | |
| 7. | Calculate Cost of power generation from the source of your choice. By using the concept of Cost Sheet with the help hypothetical examples. | **[15]** | **CO2, CO3, CO5** |
| 8. | Calculate the effect of GST (if Petroleum Products are in the ambit of GST) on Energy Pricing. Give 05 Examples. | **[15]** | **CO2, CO3** |
| 9. | Categorize the companies and institutions of power sector and oil and gas sector on the continuum of producing to service providing. | **[15]** | **CO4, CO5** |
| 10. | How can you visualize the difference between process of pricing of energy products/services as per theoretical understanding in Indian Energy sector vis a vis pricing in practice. You can explain with the help of Two or more examples of energy products/services. | **[15]** | **CO1 to CO4** |
| | **Section D (Answer all the questions)** | | |

| | | | |
|---|---|---|---|
| 2. | The following table is providing information, as per CERC guidelines, regarding tariff components of Biomass Gasification based power generation project. | **[30]** | **CO2-CO5** |

| | | |
|---|---|---|
| Capacity | 1 | MW |
| Project Life | 20 | years |
| PLF | 60 | % |
| Auxiliary Consumption | 10 | % |
| Plant Cost (without subsidy) | 572.66 | Rs. In Lakh/MW |
| Capital Cost | 422.66 | Rs. In Lakh/MW |
| Depreciation for first 12 years | 5.83 | % |
| Depreciation from 13th year onwards | 2.51 | % |
| Debt | 295.862 | Rs. In Lakh |
| Equity | 126.798 | Rs. In Lakh |
| Interest on Loan | 13 | % |
| Fuel | | |
| Fuel Requirement | 1.25 | kg/kWh |
| Feedstock Price | 3000 | Rs/MT |
| Fuel Cost Escalation | 3% | |
| O&M | | |
| O&M Cost | 42.29 | lakhs/MW |
| O&M Cost Escalation | 5.72 | % |
| Maintenance Spares | 15 | % of yearly O&M cost |

Applicable Tariff for FY 2013-2014 for Biomass Power Projects

| States | Applicable Tariff |
|---|---|
| Andhra Pradesh | Rs. 5.55 |
| Haryana | Rs. 6.05 |
| Maharashtra | Rs. 6.15 |
| Punjab | Rs. 6.24 |
| Rajasthan | Rs. 5.52 |
| Tamilnadu | Rs. 5.49 |
| Uttar Pradesh | Rs. 5.61 |
| Others | Rs. 5.80 |

Assumptions:

1. Tariff Rs. 6.5
2. Fuel cost four months equivalent of annual generation.
3. Operating and Maintenance expenses One month equivalent of O &M expenses
4. Receivables two month equivalent of annual charge.

You are required to calculate the following:

a. Annual Net Generation

| | | | |
|---|---|---|---|
| | b. Working Capital<br>c. Fixed and Variable expenses<br>d. Share of tariff components<br>e. Also compare the calculated tariff with applicable tariff in the state of your choice and give your opinion about tariff fixation of biomass based power projects. | | |