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|--------------------------------|--|---|---|---|---|
| <b>PIPM 7004</b>               | <b>Energy Power Trading &amp; Network Administration</b> | L | T | P | C |
| <b>Version 1.0</b>             |  | 3 | 0 | 0 | 3 |
| <b>Pre-requisites/Exposure</b> | Science Graduate   |   |   |   |   |
| <b>Co-requisites</b>           | Good Command in MS Word and MS Powerpoint                |   |   |   |   |

### Course Objectives

- To study the scenario of power trading in India and also the world.
- To understand the importance of Power Trading.
- To know the various Legal & Regulatory Aspects of Power Trading in India
- To know about the Power Exchanges operating in India
- To know about the various Power Pools in the world and its operation.
- To make them aware of CDM, REC and related concepts like Carbon Trading.

### Course Outcomes

On completion of this course, the students will be able to

|            |   |
|------------|---|
| <b>CO1</b> | Understand issues & challenges in power trading and network administration.   |
| <b>CO2</b> | Develop the skills required for power business planning & formulation.  |
| <b>CO3</b> | Integrating optimization techniques for power trading and carbon business including renewable energy and climate control. |
| <b>CO4</b> | Analyzing power trading and related business execution and control.   |
| <b>CO5</b> | Appreciate the power trading process and network administration as applied in power and carbon business.                  |

### Catalog Description

The purpose of this course is to introduce to students of fundamental understanding of the Indian Power Sector as well as its functioning – both in public and private sector. The course will help the students to understand the power business processes along with its relativeness with other countries.

### Course Content

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#### **Unit I: 7.5 lecture hours**

Generation Scenario, T & D Scenario, Reforms in the Electricity Sector, Demand Supply Gap Analysis, Thermal Generation, Hydro Generation, Nuclear Generation, Solar Generation, Wind Generation , Other renewable sources, Comparison of various sources, Various Organizations of Power Sector Structure of the Electricity Industry, Network for Power Trading

#### **Unit II: 6 lecture hours**

The need of power trading, Benefits of power trading in India, Various changes in the power sector due to power trading.

#### **Unit III: 9 lecture hours**

Definition of Power Trading, Electricity Act 2003, Regulatory aspects that facilitate power trading, Rules & Regulations pertaining to power Trading, Power Trading Licenses, Eligibility to trade power, Prohibitions to trade power, Role of Regulatory Commissions, Open Access, Network Administration, PTC & Power Exchanges in India, IEX: Functions & operation, PXIL, Other upcoming Power

Exchanges- NPEX, Marquis Power Exchange, Joint Ventures of Power Exchanges, The dangers of marginal cost based electricity pricing

**Unit IV: 9 lecture hours**

Bilateral Trading, Trading through Exchange, Power Trading Instruments, Congestion Management, Technical aspects of Trading, Settlement of Contracts, Analysis of short term power trading in India 2012-13, Nord Pool, The Nordic Electricity, Exchange: Nord Pool Spot, PJM (Pennsylvania-New Jersey-Maryland), SAARC Energy

**Unit V: 4.5 lecture hours**

Clean Development Mechanism, The need of Clean Development Mechanism, Global Warming, International Initiatives to combat Climate Change, CDM Project Requisites, CDM Project Cycle, Recent International Conferences, Certified emission Reduction Certification, Crediting period

**Text Books and Journals**

1. Power Sector, Technology, Regulation & Functioning
2. Electricity Act 2003 with proposed amendments
3. CERC& SERCs Regulations
4. Electricity policy & National Tariff policy (Old & Proposed)
5. Ministry of Power & MNRE Website
6. Websites of various CEA & SEBs
7. Websites of IEX, PXIL and PTC
8. UNFCCC Website
9. Power Sector Structure & Functioning (Book)

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

| Components    | Presentation/Assignment/Projects etc | ESE |
|---------------|--------------------------------------|-----|
| Weightage (%) | 50                                   | 50  |

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


| Mapping between COs and POs |   |                               |
|-----------------------------|---|-------------------------------|
|                             | Course Outcomes (COs)   | Mapped Programme Outcomes     |
| <b>CO1</b>                  | Understand issues & challenges in power trading and network administration.   | PO 1,2, 4,7,8,9,10, 11,13, 12 |
| <b>CO2</b>                  | Develop the skills required for power business planning & formulation.  | PO 1,2, 3,7,8,9,10, 11,13     |
| <b>CO3</b>                  | Integrating optimization techniques for power trading and carbon business including renewable energy and climate control. | PO 1,2, 3, 8,9,10, 11, 13     |
| <b>CO4</b>                  | Analyzing power trading and related business execution and control.   | PO 4,5, 8,12,13, 11           |
| <b>CO5</b>                  | Appreciate the power trading process and network administration as applied in power and carbon business.                  | PO 1,2, 3, 4,8,13             |

| CourseOutcomes |              | CO 1   | CO 2   | CO 3   | CO 4   | CO5   |   |   |   |   |  |   |  |      |
|----------------|--------------|--|--|--|--|---|---|---|---|---|--|---|--|------|
| PO 1           |              | 3  | 3  | 3  | 2  | 3   |   |   |   |   |  |   |  |      |
| PO 2           |              | 3  | 3  | 3  | 2  | 3   |   |   |   |   |  |   |  |      |
| PO 3           |              | 2  | 3  | 3  | 2  | 3   |   |   |   |   |  |   |  |      |
| PO 4           |              | 3  | 1  | 1  | 3  | 3   |   |   |   |   |  |   |  |      |
| PO 5           |              | 2  | 2  | 1  | 3  | 1   |   |   |   |   |  |   |  |      |
| PO 6           |              | 2  | 2  | 2  | 2  | 1   |   |   |   |   |  |   |  |      |
| PO 7           |              | 3  | 3  | 1  | 2  | 2   |   |   |   |   |  |   |  |      |
| PO 8           |              | 3  | 3  | 3  | 3  | 3   |   |   |   |   |  |   |  |      |
| PSO 9          |              | 3  | 3  | 3  | 1  | 1   |   |   |   |   |  |   |  |      |
| PSO 10         |              | 3  | 3  | 3  | 2  | 1   |   |   |   |   |  |   |  |      |
| PSO 11         |              | 3  | 3  | 3  | 2  | 2   |   |   |   |   |  |   |  |      |
| PSO 12         |              | 1  | 1  | 1  | 3  | 2   |   |   |   |   |  |   |  |      |
| PSO 13         |              | 3  | 1  | 3  | 3  | 3   |   |   |   |   |  |   |  |      |
| PSO 14         |              | 3  | 3  | 3  | 3  | 3   |   |   |   |   |  |   |  |      |
|                |              | Students will be able to develop and evaluate alternate managerial choices and identify optimal solutions. | Students will demonstrate effective application capabilities of their conceptual understanding of power generation, transmission and distribution. | 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 be able to work effectively in teams and demonstrate team-working capabilities. | Students will exhibit leadership and networking skills. | Students will demonstrate sensitivity towards ethical and moral issues and have ability to address them in the context of power management. | Students will demonstrate employability traits in line with the needs of changing dynamics of the power industry. | Students will demonstrate strong conceptual knowledge in fuel management, power generation, transmission, distribution, trading, energy management, financing and Students will demonstrate effective understanding of functioning of power sector. | Students will demonstrate analytical skills in identification and resolution of issues pertaining to fuel management, power generation, transmission, distribution, trading, | Students will exhibit the ability to integrate technical, economic, social and regulatory frameworks for power sector planning and resource management. | Students will exhibit deployable skills pertinent to the power sector. |      |
| Course Code    | Course Title | PO1  | PO2  | PO3  | PO4  | PO5   | PO6   | PO7   | PO8   | PO9   | PO10   | PO11  | PO12   | PO13 |

|              |  |   |   |   |   |   |   |   |   |   |   |   |   |   |
|--------------|--|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PIPM<br>7004 | Energy<br>Power<br>Trading<br>&<br>Network<br>Administ<br>ration | 2 | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 3 | 3 |
|--------------|--|---|---|---|---|---|---|---|---|---|---|---|---|---|

1=weakly mapped  
2= moderately mapped  
3=strongly mapped

### Model Question Paper

|  |   |     |     |
|--|---|-----|-----|
| <b>Name:</b><br><br><b>Enrolment No:</b>   |  |     |     |
| <b>Course: PIPM 7004- Energy Power Trading &amp; Network Administration</b>  |   |     |     |
| <b>Programme: MBA PM</b><br><b>Time: 03 hrs.</b>   | <b>Semester: EVEN</b><br><b>Max. Marks:100</b>  |     |     |
| <b>Instructions:</b><br><b>Section A</b> (each carrying 2 marks); Attempt all questions from <b>Section B</b> (each carrying 5 marks). Any <b>Two Questions</b> from <b>Section C</b> (carrying 15 marks). Case Study <b>Section D</b> ( 30 Marks) |   |     |     |
| <b>Section A ( )</b><br><b>Define the following</b>  |   |     |     |
| 1  | Explain power system as per section 2 of the Electricity Act 2003.                    | [2] | CO1 |
| 2  | What is the full form of RfP, NIT & RfQ?  | [2] | CO5 |
| 3  | Define open access and cross subsidy.   | [2] | CO2 |
| 4  | Explain “Distribution and supply” concept in Indian Power Sector?                     | [2] | CO2 |
| 5  | What is current generation and transmission capacity in India?                        | [2] | CO3 |

|  |   |      |     |
|--|---|------|-----|
| 6  | What do you mean by Reactive power? How it is compensated?  | [2]  | CO1 |
| 7  | Name power secretary of Govt. of India and state of Uttrakhand.   | [2]  | CO2 |
| 8  | What is fuel charge component for a thermal plant?  | [2]  | CO4 |
| 9  | Give full form of FSA and ATE.  | [2]  | CO4 |
| 10   | What is ABT? Explain UI charge.   | [2]  | CO2 |
| <b>SECTION B (Attempt all Questions)</b>     |   |      |     |
| 11   | UI Charges.   | [5]  | CO4 |
| 12   | Force majeure in PPA  | [5]  | CO2 |
| 13.  | Regional Energy Account   | [5]  | CO5 |
|  | Collateral arrangement  | [5]  | CO1 |
| <b>SECTION C (Attempt any Two Questions)</b> |   |      |     |
| 14.  | Compare and contrast between scheduling outage and maintenance outage.  | [15] | CO4 |
| 15.  | What do you understand by tariff adjustment payment on account of change in law?  | [15] | CO4 |
| 16   | What are the Financial, Technical and Legal aspects of Power purchasing in India? Explain roles of Power-exchanges in power sector.   | [15] | CO5 |
| <b>SECTION D</b>                             |   |      |     |
|  | What are the various types of charges required to be paid for buying power by open access from a Plant in Jharkhand to a Consumer in Dehradun? Show calculations for a quantum of 1MW power purchase. | [30] | CO3 |