PIPM 8005	Integrated Power Resources Management and Power Sector Planning	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Graduate in Engineering/Science discipline				
Co-requisites	Basic understanding about power sector				

Course Objectives

1. To facilitate the students to achieve a clear conceptual understanding of technical and commercial aspects of Integrated Power Resources Management and Power Sector Planning.
2. To enable the students to develop managerial skills to assess feasibility of alternative approaches and drive strategies regarding Integrated Power Resources Management and Power Sector Planning.

Course Outcomes

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

CO1. Conceptual knowledge of the technology, economics and regulation related issues associated with Integrated Power Resources Management and Power Sector Planning.

CO2. Ability to analyse the viability of integrated power resources management options

CO3. Capability to integrate various options and assess the business and policy environment regarding integrated power resources management

CO4. Advocacy of strategic and policy recommendations on Integrated Power Resources Management and Power Sector Planning

Catalog Description

Power (Electricity) is critical to the socio-economic development of any society. The demand and supply of electricity are dynamic in nature as they vary due to its dependence on various factors. Additionally, power can't be stored at large scale and thus there is imminent need to ensure balance between its demand and supply to ensure commercial viability. Moreover, due to climate change and pollution concerns, nations worldwide are integrating more and more renewable energy options for power generation. For a stable grid, it is imminent to optimally apply integrated power resources management and power sector planning. In this course, students will be engaged to help them acquire technical and commercial knowledge and skills associated with integrated power resources management and power sector planning. Classroom activities will be designed to encourage students to play an active role in the construction of their own knowledge and in the design of their own learning strategies. We will combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems, quizzes, presentations, etc. Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation. Students will be expected to interact with media resources, such as, web sites, YouTube videos, blogs, and newspapers articles.

Course Content

Unit I: 12.0 lecture hours

Introduction; Economy Theory for Planning; Study of Basic terminologies; Current scenario of Power availability; Demand Supply Gap; Relevant economic concepts; Various subsidies; Cross subsidies; Pricing & Tariffs; The importance of Economic Figures of Merit Used in The energy Sector; Net Present Value; Internal Rate of Return; Various Financial terms & Methods;

Unit II: 6.0 lecture hours

Tariff Structure in Power Sector; Different types of tariffs; Method of Tariff calculation; Rules & Regulation for Tariff Calculation; Different Authorities; Role of Regulatory Commissions; Understanding risks

Unit III: 9.0 lecture hours

Government Policy & Regulatory Framework; Environmental & Societal Benefits; Government Policies; Regulatory Framework; Need for Energy Forecasting; Methods of energy forecasting; Energy Value Chain; Equipment for Electricity; Nuclear Equipment; Various Fuels; Coal, LNG & Gas; Need of Renewable Energy; Study of various Renewable Energy Sources

Unit IV: 9.0 lecture hours

Integrated Energy Policy and Planning - Tools & Methodology; Integrated Energy Policy of India; Demand Side Management; Distributed generation; Network Planning; IT & communication for IEP; Macro integrated Energy Planning For India; National Electricity Plan of India

Text Books

1. Dhupper R. (2015). Energy Resources and Management. CBS. ISBN: 8123925751
2. Twidell J., Weir T. (2015). Renewable Energy Resources (3rd Edition). Routledge. ISBN: 0415584388.

Reference Books

1. Kandpal T.C., Garg H.P. (2003). Financial Evaluation of Renewable Energy Technologies. Macmillan Publishers India Limited. ISBN: 1403909520.

Modes of Evaluation (100 Marks)

Quiz: 20 marks
Assignment/Presentation: 30 marks
Written Exam (End-semester): 50 marks

Examination Scheme

Components	Internal Assessment (Quiz/Assignment/Presentation/Extempore)	End-Semester Exam (Written Exam)
Weightage (%)	50%	50%

Relationship between the Course Outcomes (COs) and Program Outcomes (POs/PSOs)

Mapping between COs and POs		
	Course Outcomes	**Mapped Programme Outcomes**
CO1	Conceptual knowledge of the technology, economics and regulation related issues associated with Integrated Power Resources Management and Power Sector Planning.	**PO1, PO8, PSO1, PSO2**
CO2	Ability to analyse the viability of integrated power resources management options	**PO2, PSO3, PSO5**
CO3	Capability to integrate various options and assess the business and policy environment regarding integrated power resources management	**PO3, PSO4, PSO5**
CO4	Advocacy of strategic and policy recommendations on Integrated Power Resources Management and Power Sector Planning	**PO4, PO6, PO8 , PSO4, PSO5**

Program Outcome / Course Outcome Mapping

Course Outcomes	**CO 1**	**CO 2**	**CO 3**	**CO 4**
PO 1	3	3	3	3
PO 2	3	3	2	3
PO 3	3	3	3	2
PO 4	1	1	1	1
PO 5	1	1	1	1
PO 6	2	1	2	2
PO 7	1	1	1	1
PO 8	3	3	2	3
PSO 1	3	3	3	3
PSO 2	3	2	3	3
PSO 3	3	3	3	2
PSO 4	3	3	3	3
PSO 5	3	2	3	3

Course Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
PIPM 8005	Integrated Power Resources Management and Power Sector Planning	3	3	3	1	1	2	1	3	3	3	3	3	3

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

Model Question Paper

Name: **Enrolment No:**	UPES

Course: PIPM 8005 – Integrated Power Resources Management and Power Sector Planning
Programme: MBA (Power Management) **Semester: EVEN-2017-18**
Time: 03 hrs. **Max. Marks: 100**

Section – A (5 marks * 6 = 30 Marks)

Discuss the following in brief:

1.	Cross subsidy	**[5]**	**CO1**
2.	Sustainable development	**[5]**	**CO1**
3.	AT&C losses	**[5]**	**CO1**
4.	Lifeline energy schedule	**[5]**	**CO1**
5.	Electricity GDP elasticity	**[5]**	**CO1**
6.	Smart grid	**[5]**	**CO1**
	Section – B (10 marks * 5 = 50 Marks)		
7.	Discuss the factors that are used to forecast energy demand in future.	**[10]**	**CO2, CO3**
8.	Briefly explain the objectives that are generally used in integrating various power resources.	**[10]**	**CO2, CO3**
9.	What do you mean by Electricity-GDP elasticity? How Electricity-GDP elasticity is used by planning agencies to plan for India's power generation capacity requirement in future?	**[10]**	**CO2, CO3**

10.	Sustainable development policies have changed the entire landscape of India's power sector. Justify.	**[10]**	**CO3**
11.	Municipal solid waste has immense potential to address energy and non-energy issues of the cities in India. Justify.	**[10]**	**CO4**
	Section – C (20 marks * 1 = 20 Marks)		
12.	Based on current trends, forecast the role of various power resources in India's future electricity market.	**[20]**	**CO1, CO2, CO3, CO4**