Jordan University of Science and Technology

Faculty of Engineering

Electrical Engineering Department

EE733 Power Systems Planning - JNQF Level: 9

Second Semester 2023-2024

Course Catalog
3 Credit Hours. 3 Credit hours (3 h lectures).Power flow, economic dispatch, optimal power flow, optimization and economic concepts for power systems, modular view of individual electric energy processing components, physical and market operations.
Teaching Method: On Campus

Text Book	
Title	Fundamentals of Power System Economics
Author(s)	D.S. Kirschen and G. Strbac
Edition	1st Edition
Short Name	Textbook
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref #1	Power Generation, Operation, and Control	Allen. J. Wood and Bruce F. Wollenberg	3rd Edition	
Ref #2	Published papers assigned by the instructor	NA	1st Edition	

Instructor	
Name	**Dr. AHMAD ABU ELRUB**
Office Location	E1L2

Office Hours	Sun : 11:00 - 12:30 Mon : 11:30 - 13:00 Tue : 11:00 - 12:30 Wed : 11:30 - 13:00
Email	amabuelrub@just.edu.jo

Class Schedule & Room
Section 2: Lecture Time: Tue : 14:30 - 17:30 Room: LAB

Tentative List of Topics Covered		
Weeks	**Topic**	**References**
Week 1	Revision to DC power flow and economic dispatch	From **Ref #1**
Week 2	Revision to optimal power flow	From **Ref #1**
Weeks 3, 4	Basic Concepts from Economics	From **Textbook**
Week 5	Flexible Electricity Demands in Smart Grids	From **Textbook**
Week 6	Balancing Supply and Demand in the Regulated Industry and Electricity Markets	From **Textbook**
Week 7	Ancillary Service Markets as a Means of Balancing Demand Deviations from Forecast in the Changing Industry	From **Textbook**
Weeks 8, 9	Participating in Markets for Electric Energy	From **Textbook**
Weeks 10, 11	Transmission Networks and Electricity Markets	From **Textbook**
Week 12	Nodal Markets: LMP Fundamentals	From **Textbook**
Weeks 13, 14	Financial Transmission Rights	From **Textbook**
Week 15	Coordinating Variable Generation Through Flexible Demands	From **Textbook**

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Explain fundamental principles of DC power flow, economic dispatch, and optimal power flow, illustrating their roles in modern electricity markets. [1L9K1]	15%	Midterm exam

Analyze the effects of flexible electricity demands and ancillary service markets on balancing supply and demand, especially under deviations from forecasted values. [1L9K2]	15%	Project, Final exam
Evaluate the structure of nodal markets, including locational marginal pricing (LMP) and financial transmission rights, to assess their impact on electricity prices and market efficiency. [1L9K1]	15%	Final exam
Design strategies for coordinating variable generation with flexible demands to improve stability and efficiency within the electricity grid. [1L9K1]	15%	
Demonstrate effective participation in electricity markets, showcasing knowledge of market dynamics, transmission network constraints, and regulatory considerations. [1L9K1]	15%	
Conduct in-depth research on a specific topic related to power system economics. [1L9C3, 1L9C4, 1L9C5, 1L9C6]	25%	

Relationship to Program Student Outcomes (Out of 100%)						
SO1	SO2	SO3	SO4	SO5	SO6	SO7

Relationship to NQF Outcomes (Out of 100%)					
L9K1	L9K2	L9C3	L9C4	L9C5	L9C6
60	15	6.25	6.25	6.25	6.25

Evaluation	
Assessment Tool	**Weight**
Midterm exam	25%
Project	25%
Final exam	50%

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