

## COURSE DESCRIPTION CARD

Faculty of Electrical Engineering									
Field of study	Electrical Engineering							Degree level and programme type	Bachelor's Degree
Specialization/ diploma path	-							Study profile	-
Course name	Electricity Market							Course code	IS-FEE-10066W
								Course type	elective
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	winter
	30							No. of ECTS credits	3
Entry requirements	-								
Course objectives	Enable students to understand the evolution of electric power industry and learn about the wholesale electricity market from the perspectives of energy, ancillary services and standing rules and regulations. Primary focus will be on European market; however, students will also learn about few prominent markets across the globe.								
Course content	Evolution of electric power industry, power system structure, power flow, economics of generation, transmission and distribution, economic dispatch, deregulation, regulation, market structure, entities in the deregulated electricity industry, market principles and electricity market economics, system security and ancillary services, contingency analysis, transmission system operation, fundamentals of renewable energy pricing and schemes.								
Teaching methods	Lectures with the support of media (video) and assignments.								
Assessment method	Assignments during the semester and a written test at the end of the semester.								
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study	
L01	Understand evolution of electric industry, market structure and economics related to generation, transmission, and distribution.								
L02	Analyze power flow, carry out economic dispatch and understand economics related to generation, transmission, and distribution.								
L03	Understand market structure, deregulation, and regulation of electricity markets with a focus on European markets.								
L04	Explain ancillary services, its significance and carry out contingency analysis								
L05	Understand the impact of transmission congestion on pricing, renewable energy pricing and schemes.								

Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed	
LO1	Assignments and test based on the lecture	L	
LO2	Assignments and test based on the lecture	L	
LO3	Assignments and test based on the lecture	L	
LO4	Assignments and test based on the lecture	L	
LO4	Assignments and test based on the lecture	L	
Student workload (in hours)		No. of hours	
Calculation	Class attendance	30	
	Assignments and self-study	30	
	Preparation and write tests	15	
		TOTAL:	75
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		30	1.5
Student workload – practical activities		45	1.5
Basic references	<ol style="list-style-type: none"> <li>1. D. Kirschen and G. Strbac, "Fundamentals of Power System Economics", 2<sup>nd</sup> Edition, John Wiley &amp; Sons Ltd., 2019.</li> <li>2. Steven Stoft, "Power System Economics: Designing Markets for Electricity", IEEE Press, John Wiley &amp; Sons Ltd., 2002.</li> <li>3. Barrie Murray, "Power Markets and Economics: Energy Costs, Trading, Emissions", Wiley, 2009.</li> </ol>		
Supplementary references	<ol style="list-style-type: none"> <li>1. Darryl R. Biggar and Mohammad R. Hesamzadeh, "The Economics of Electricity Markets", IEEE Press, John Wiley &amp; Sons Ltd., 2014.</li> <li>2. Tom James, "Energy Markets: Price Risk Management and Trading", Wiley Finance, Wiley, 2005.</li> <li>3. Kankar Bhattacharya, Math H. J. Bollen and Jaap E. Daalder, "Operation of Restructured Power Systems", Kluwer Academic Publishers, 2001.</li> <li>4. Geoffrey Rothwell and Tomas Gomez, "Electricity Economics: Regulation and Deregulation", Wiley-IEEE Press, 2003.</li> <li>5. Hadi Saadat, "Power System Analysis", McGraw Hill Publication, 2010.</li> </ol>		
Organisational unit conducting the course	Department of Electrotechnics, Power Electronics and Power Engineering	Date of issuing the programme	
Author of the programme	Andu Dukpa, PhD	20.1.2022	

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work,

S – seminar