

## 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	Power Systems							Course code	IS-FEE-10014W	
								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	Getting knowledge of power system operation under normal and abnormal conditions. Getting knowledge of per unit system and symmetrical components method to be used in power system analysis. Getting knowledge of the methods and approaches to be used in analysis of load flow, faults and transients analysis.									
Course content	Introduction to power systems. General requirements and conditions in power system operation. Fundamentals of power generation, transmission and distribution. The per-unit system and symmetrical components Power flow analysis. Symmetrical and unsymmetrical faults analysis. Power system transients. Voltage and power control. Protective relays. Individual solving of four case studies which involves: per unit system, and symmetrical and unsymmetrical faults.									
Teaching methods	lecture, case studies									
Assessment method	final test, case studies revision									
Symbol of learning outcome	Learning outcomes								Reference to the learning outcomes for the field of study	
LO1	Student knows and understands the issue of power system operation under normal and abnormal conditions									
LO2	Student is able to gather the information based on different sources involving power system operation under normal and abnormal conditions									
LO3	Student is able to apply the different methods and approaches to power system analysis purposes									
LO4	Student is able to work on the subject individually									
LO5										
Symbol of learning outcome	Methods of assessing the learning outcomes								Type of tuition during which the outcome is assessed	
LO1	final test, case studies evaluation								L	
LO2	final test, case studies evaluation								L	
LO3	final test, case studies revision								L	
LO4	final test, case studies evaluation								L	
LO5	case studies evaluation								L	
Student workload (in hours)									No. of hours	

<b>Calculation</b>			
	<b>attending the class sessions</b>	<b>30</b>	
	<b>elaboration of case studies</b>	<b>30</b>	
	<b>preparation for and participation in exams/tests</b>	<b>15</b>	
	<b>TOTAL:</b>	<b>75</b>	
<b>Quantitative indicators</b>		<b>HOURS</b>	<b>No. of ECTS credits</b>
<b>Student workload – activities that require direct teacher participation</b>		<b>30</b>	<b>1</b>
<b>Student workload – practical activities</b>		<b>30</b>	<b>1</b>
<b>Basic references</b>	1. Grigsby L.L.: Power Systems. CRC Press, 2007. 2. Kothari D.P., Nagroth I.J.: Modern Power System Analysis. McGraw-Hill, 2008. 3. Wayne B.H., Santoso S.: Handbook of electric power calculations. New York, McGraw-Hill Education, 2015. 4. Bevtani H., Watanabe M., Mitani Y.: Power system monitoring and control. John Wiley and Sons, 2014. 5. Gonen T.: Modern power system analysis. CRC/Taylor and Francis, 2013. 6. Hase Yoshihide: Handbook of power systems engineering with power electronics applications. John Wiley and Sons, 2013. 7. Glover D.J., Sarma M., Overbye T.J.: Power system analysis and design. Cengage Learning, 2012. 8. Grigsby L.L.: Power systems. CRC/Taylor and Francis, 2012. 9. Grigsby L.L.: Electric power generation, transmission and distribution. CRC/Taylor and Francis, 2012. 10. Gomez-Exposito A., Conejo A., Canizares C.: Electric Energy systems: analysis and operation. CRC/Taylor and Francis 2009. 11. Crappe M.: Electric power systems. ISTE, Wiley, 2008. 12. El-Hawary M.E.: Introduction to electrical power systems. John Wiley and Sons, 2008. 13. Gonen T.: Electric power distribution system engineering. CRC/Taylor and Francis, 2008. 14. Xi-Fan Wang, Yonghua Song, Irving M: Modern power systems analysis. Springer, 2008. 15. Grigsby L.L.: Power systems. CRC/Taylor and Francis 2007. 16. Saadat H.: Power system analysis. McGraw-Hill, 2004.		
<b>Supplementary references</b>	1. Crow M.: Computational methods for electric power systems. CRC Press, 2003. 2. Kothari D.P., Nagrath I.J.: Modern power system analysis. McGraw-Hill, 2003.		
<b>Organisational unit conducting the course</b>	<b>Department of Electrotechnics, Power Electronics and Power Engineering</b>	<b>Date of issuing the programme</b>	
<b>Author of the programme</b>	<b>Robert Sobolewski, PhD.</b>	<b>02.02.2020</b>	

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