Electrical Engineering (ONLINE)

Version **Effective from**	26/10/20 18 January 2021
Previous version	-

ECTS Credits	4,0
Teaching hours	50
Workplace learning hours	50
Total hours of student learning	144

Pre-requisites	The course is opened for Russian and foreign Bachelor, Master and PhD students with specialized background in Electrical Engineering or equivalent skills and knowledge.
Alignment to graduate profiles	This course contributes to achievement of the graduate outcomes of the following qualifications: • Bachelor in Electrical Engineering (Electronic / Mechanical) • Graduate Diploma in Electrical Engineering (Electronic / Mechanical) • Diploma in Electrical Engineering (Electronic / Mechanical)
Core transferable skills	This course contributes towards the development of the following core transferable skills categories: Self/Others - Learning to Learn, Specialist skills, Literacy, Numeracy, Digital Literacy.
Course aim	The School provides the unique opportunity to attend intensive academic program, which is composed of different lectures in nuclear engineering with experience from professors of European countries, with different opinions and approach. The program lectures cover general terms of power systems; basic concept of power system stability, electrical 3-phase system. Fundamental terms of short-circuit currents calculations are introduced. Temporary and surge overvoltages, reactive power compensation means and high voltage cable lines application issues are also considered. Additionally, the course focuses on load flow analysis methods, synchronous machines' excitation systems and automatic voltage regulators principles of operation and root causes of power system blackouts. Special attention will be paid to the topic Grid Integration of Renewable Energies and e-Mobility. Active teamwork in small groups on projects of the course will bring deeper understanding of the subject.
Indicative content	Content may include but is not limited to: • Digital technologies in the Energy Industry • Renewable Energy Sources. Introduction • The introduction to heat transfer mechanisms and calculation techniques • The basics of analytical calculation methods • Guest Speakers Day • The basics of a finite-element analysis • Digital technologies in Renewable Engineering • Introduction to MATLAB/Simulink • MATLAB/Simulink Support Package for Microcontrollers. Project development • Code generation in MATLAB/Simulink • External connection of Microcontroller with Simulink • Project implementation in Simulink (Feedback mode)

LEARNING OUTCOMES

On successful completion of this course students will be able to:	
1	Search for information on specified parameters in Russian and foreign databases
2	Analyze the advanced Russian and foreign experience in solving the assigned tasks
3	Perform calculations of short circuit currents
4	Analyze the flow of AC power
5	Know three-phase electrical circuits
6	Know modern technologies for transmission of alternating current
7	Know principles of operation of automatic voltage regulators of synchronous generators
8	Know principle of operation of transformers
9	Know basic conditions of short-circuit currents
10	Know causes of overvoltage in power supply networks

11	Know causes of major system outages

ASSESSMENTS

Basis of assessment	Achievement based assessment		
Methods of assessment	**Learning Outcomes**	**Pass criteria (Minimum)**	**% Weightings**
Summative review	1, 4	40%	40%
Portfolio – summative of practices	2, 3, 5	40%	60%

REQUIREMENTS FOR SUCCESSFUL COURSE COMPLETION

Requirements	• Mark of 40% or more in every summative assessment • Gain a course result of C (50%) or higher

RESULTS

Assessment results	• Results for assessments are given in percentage marks
Course results	• Individual assessments may cover one or more of the learning outcomes. • Each summative assessment is assigned a percentage weighting. • The overall percentage mark for the course is calculated by adding the weighted results for all summative assessments. • To derive the course result the overall percentage mark is converted into a grade using Course Result Key AC-NMIT-06

LEARNING AND TEACHING

Learning and teaching approaches	Lectures, group discussions, tutorials, learner managed activities, laboratories, presentations, research, projects and case studies.
Learning and teaching resources	Textbooks, journals and Library Learning Centre resources; use of Internet; computer laboratory and specialist software.
Learner managed activities	• Completion of course work, set assignments/projects • Reading of course materials • Study group work • Preparation for classes • Homework • Research - (e.g. exploration, location and selection of relevant information, review/ evaluation/analysis of information, recording information) • Discussions with colleagues/subject matter experts • Review application of information to course work • Practicing relevant practical and technical skills/methods/techniques • Self-evaluation of course work • Gathering relevant contextual information/ issues/ideas to build knowledge of the subject