Hydrogen Energy (ONLINE)

ECTS Credits	3,0
Teaching hours	30
Workplace learning hours	78
Total hours of student learning	108

Pre-requisites	The course is opened for Russian and foreign Bachelor, Master and PhD students with specialized background in Chemical 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 Chemical Engineering (Hydrogen / Nuclear) • Graduate Diploma in Chemical Engineering (Hydrogen / Nuclear) • Diploma in Chemical Engineering (Hydrogen / Nuclear)
Core transferable skills	At the end of the course, the student will have the following professional skills: - Ability to draw up technical specifications for the production of hydrogen. - Ability to solve problems of increasing the efficiency of production processes, collection and storage of energy resources. - Ability to prepare technical documentation. - Practical skills in applying new knowledge in interdisciplinary group projects. - Ability to work effectively in a team, develop and make collective decisions, presentations and self-presentation, time management, generate ideas and assess all types of risks that arise during the implementation of projects.
Course aim	The main goal of the program is to acquire a set of theoretical knowledge, as well as skills and practical skills necessary to solve the main tasks caused by the onset of the fourth industrial revolution and the transition of mankind to renewable and alternative energy sources.
Indicative content	Content may include but is not limited to: • Introduction to hydrogen energy; • Hydrogen storage, transportation and utilization; • Hydrogen economy and financial market opportunities; • Safety analyses of co-generation plants for hydrogen production; • Fuel cells.

LEARNING OUTCOMES

On successful completion of this course students will be able to:	
1	Know the chemical and physical foundations of hydrogen fuel production.
2	Know technical English in the field of hydrogen energy
3	Know principles of industrial biotechnology in the production of energy carrier
4	Understand hydrogen economy and financial market opportunities.
5	Work with scientific and educational literature in your specialty.
6	Know fundamentals of mathematical modelling in energy processes.
7	Know theory of hydrogen engineering
8	Apply methods of safety analysis of cogeneration plants for hydrogen production.
9	Analyze the best Russian and foreign experience in solving the assigned tasks.

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