

## NUCLEAR ENGINEERING (ONLINE)

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

|                                       |   |
|---------------------------------------|---|
| <b>Pre-requisites</b>                 | The course is opened for Russian and foreign Bachelor, Master and PhD students with specialized background in Nuclear Engineering or equivalent skills and knowledge.   |
| <b>Alignment to graduate profiles</b> | This course contributes to achievement of the graduate outcomes of the following qualifications: <ul style="list-style-type: none"> <li>• Bachelor in Nuclear Engineering (Chemical / Mechanical)</li> <li>• Graduate Diploma in Nuclear Engineering (Chemical / Mechanical)</li> <li>• Diploma in Nuclear Engineering (Chemical / Mechanical)</li> </ul>   |
| <b>Core transferable skills</b>       | This course contributes towards the development of the following core transferable skills categories: Self/Others - Learning to Learn, Specialist skills, Literacy, Numeracy, Digital Literacy  |
| <b>Course aim</b>                     | 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. During two / three weeks students get practical skills in modelling of different modes of nuclear power plant (will be used specialized software); deep knowledge in nuclear engineering, technologies, legislation, and innovations in Russian Federation and abroad.   |
| <b>Indicative content</b>             | Content may include but is not limited to: <ul style="list-style-type: none"> <li>• Introduction to nuclear power plants</li> <li>• Neutronic concepts of nuclear reactor</li> <li>• Thermal-hydraulics of nuclear reactor</li> <li>• Thermal-hydraulics of nuclear reactor</li> <li>• Nuclear desalination</li> <li>• Guest Speakers Day</li> <li>• Modern situation in Russian / world nuclear sector</li> <li>• Chernobyl disaster</li> <li>• Generation IV reactors. Introduction</li> <li>• Generation III reactors</li> <li>• Small Modular Reactors</li> <li>• GenIV reactors: modelling and simulation</li> <li>• GenIV: Molten Salt Reactor (MSR)</li> <li>• Economics of Nuclear Power Plants (+ numerical exercise)</li> </ul> |

### LEARNING OUTCOMES

| On successful completion of this course students will be able to: |   |
|---|---|
| 1   | To own methods of economic assessment of the fuel cycle.                                      |
| 2   | Be able to analyze the advanced Russian and foreign experience in solving the assigned tasks. |
| 3   | Be able to make a probabilistic safety assessment.  |
| 4   | To know main elements of a nuclear power plant.   |
| 5   | To know types of nuclear reactors and their main characteristics.                             |
| 6   | To know main reactions taking place in a nuclear reactor.                                     |
| 7   | To know fundamentals of NPP Safety.   |
| 8   | To know fundamentals of economic analysis of nuclear power plants.                            |
| 9   | To know fundamentals of the fuel cycle at nuclear power plants.                               |
| 10  | To know issues of thermal hydraulics in relation to nuclear power plants.                     |

## ASSESSMENTS

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

## REQUIREMENTS FOR SUCCESSFUL COURSE COMPLETION

|                     |   |
|---------------------|---|
| <b>Requirements</b> | <ul style="list-style-type: none"><li>• Mark of 40% or more in every summative assessment</li><li>• Gain a course result of C (50%) or higher</li></ul> |
|---------------------|---|

## RESULTS

|                           |  |
|---------------------------|--|
| <b>Assessment results</b> | <ul style="list-style-type: none"><li>• Results for assessments are given in percentage marks</li></ul>  |
| <b>Course results</b>     | <ul style="list-style-type: none"><li>• Individual assessments may cover one or more of the learning outcomes.</li><li>• Each summative assessment is assigned a percentage weighting.</li><li>• The overall percentage mark for the course is calculated by adding the weighted results for all summative assessments.</li><li>• To derive the course result the overall percentage mark is converted into a grade using Course Result Key AC-NMIT-06</li></ul> |

## LEARNING AND TEACHING

|   |  |
|---|--|
| <b>Learning and teaching approaches</b> | Lectures, group discussions, tutorials, learner managed activities, laboratories, presentations, research, projects and case studies.  |
| <b>Learning and teaching resources</b>  | Textbooks, journals and Library Learning Centre resources; use of Internet; computer laboratory and specialist software.   |
| <b>Learner managed activities</b>       | <ul style="list-style-type: none"><li>• Completion of course work, set assignments/projects</li><li>• Reading of course materials</li><li>• Study group work</li><li>• Preparation for classes</li><li>• Homework</li><li>• Research - (e.g. exploration, location and selection of relevant information, review/evaluation/analysis of information, recording information)</li><li>• Discussions with colleagues/subject matter experts</li><li>• Review application of information to course work</li><li>• Practicing relevant practical and technical skills/methods/techniques</li><li>• Self-evaluation of course work</li><li>• Gathering relevant contextual information/ issues/ideas to build knowledge of the subject</li></ul> |