



Zaporizhzhia Polytechnic National University
DESCRIPTION / Syllabus of discipline / module

| | |
|--|--|
| Short name of the university / department date (month / year) | NU «Zaporizhzhia Polytechnic» 08/2020 |
| Module name / Course name | Machine learning and artificial intelligence |
| Code: | PPN 02 |

| | |
|---------------------------------------|--|
| Teacher(s) | Department |
| Morshchavka Sergii Subbotin Sergey | Radioengineering and Telecommunication |

| | | |
|--------------------|----------------------------|---------------------------|
| Study cycle | Level of the module | Type of the module |
| MSc | 1 | mandatory |

| | | |
|--|-------------------------------|--------------------|
| Form of delivery | Duration | Language(s) |
| Lectures/Hands-on Lab session | 15 weeks | Ukrainian |
| Connection with other disciplines | | |
| Previous: | Related (if required): | |
| | | |

| | | | |
|------------------------------|-------------------------------|----------------------|------------------------------|
| Credits of the module | Total student workload | Contact hours | Individual work hours |
| 5 | 150 | 60 | 90 |

Aim of the module (course unit): competences foreseen by the study programme

Providing a clear understanding of the models, methods and software tools for intelligent problem solving and for intelligent system building for biomedical field.

| | | |
|--|---|--|
| Learning outcomes of module (course unit) | Teaching/learning methods | Assessment methods |
| <ul style="list-style-type: none"> - be fluent in the state language and communicate foreign language; - be able to reasonably choose and effectively apply mathematical methods computer simulation technology as well also methods optimization telecommunications and radio engineering telemedicine and biomedical systems and devices; - demonstrate an understanding of the subject area and understanding of professional activity, apply knowledge in practice situations, evaluate and provide | <ul style="list-style-type: none"> - using during lectures listening and preparing to practical work and labs. - theoretical knowledge received during lectures and consultations | <ul style="list-style-type: none"> - without separate assessment ; - evaluate by the report on laboratory works; |



| | | |
|---|---|--|
| <p>quality performed works;</p> <ul style="list-style-type: none"> - be able to use and improve of the modern software, hardware of telecommunications and radio engineering devices and biomedical systems; - use informational and communication technologies for to search, processing and analysis of information from various sources; be capable of the abstract thinking, analysis and synthesis, work both autonomously and in the team; - be able to think abstractly, analyze and synthesize, work both independently and in a team. | <p>- independent and under supervising preparation and implementation practical work.</p> | <p>- assessment during laboratory work and exam.</p> |
|---|---|--|

| Themes | Contact work hours | | | | | | Time and tasks for individual work | |
|--|--------------------|--------------|----------|----------------|-----------------|--------------------|------------------------------------|--|
| | Lectures | Consultation | Seminars | Practical work | Laboratory work | Total contact work | Individual work | Tasks |
| Theme 1. Main definitions of artificial intelligence. | 4 | - | - | - | 4 | 8 | 12 | Study of problems and methods of artificial intelligence usage |
| Theme 2. Pattern recognition | 4 | - | - | - | 4 | 8 | 12 | Study of basic techniques of pattern recognition |
| Theme 3. Crisp cluster analysis | 4 | - | - | - | 4 | 8 | 12 | Study of clustering methods usage |
| Theme 4. Neuro-fuzzy systmes | 4 | - | - | - | 4 | 8 | 12 | Introduction to neuro-fuzzy systmes |
| Theme 5. Knowledge based systems. | 3 | - | - | - | | 3 | 14 | Learning of a tructure and main types of knowledge based systems |



| | | | | | | | | |
|--|-----------|----------|----------|----------|-----------|-----------|-----------|---|
| Theme 6. Inference | 3 | - | - | - | 4 | 7 | 10 | Statistical data processing using neurofuzzy technologies |
| Theme 7. Applied tasks. | 4 | - | - | - | 10 | 14 | 4 | Consideration of the real application examples of studied methods |
| Theme 8. Knowledge extraction form the data | 4 | - | - | - | - | 4 | 14 | Study of methods for knowledge extraction from the data |
| Total | 30 | - | - | - | 30 | 60 | 90 | |

| Assessment strategy | Weight in % | Deadlines | Assessment criteria |
|--------------------------|-------------|--------------------------------|---|
| current assessment | 50 | during the semester | theoretical report on each topic |
| laboratory work defense | 12,5 | | defense of laboratory work №1 |
| | 12,5 | | defense of laboratory work №2 |
| | 12,5 | | defense of laboratory work №3 |
| | 12,5 | | defense of laboratory work №4 |
| passing the written exam | 90-100 | after the module | excellent |
| | 75-89 | | good |
| | 60-74 | | enough |
| | 35-59 | during the examination session | unsatisfactorily with mandatory re-study of the discipline |
| | 0-34 | | unsatisfactorily with obligatory re-study of the discipline |

| Author | Year of issue | Title | Information about the publication | Place of printing. Printing house or internet link |
|------------------------------|---------------|---|-----------------------------------|--|
| Compulsory literature | | | | |
| Subbotin S, | 2008 | Knowledge representation and processing in artificial intelligence and decision support systems | textbook | Zaporizhzhia, ZNTU, 2008. – 341 p. |
| Oliynyk A. | 2011 | Intellectual data analysis | textbook | Zaporizhzhia, ZNTU, 2011. - 271 p |



| | | | | |
|------------------------------|------|---|------|---------------------------------------|
| | | | | |
| Additional literature | | | | |
| S. Subbotin et al, | 2005 | Intelligent information technologies for designing automated diagnostic systems and monograph | book | Kharkiv: SMIT Company, 2012. - 318 p. |
| Luger G. | 2005 | Artificial intelligence: strategies and methods for solving complex problems | book | Moscow , Williams, 2005. - 864 p. |
| Russell S. | 2006 | Artificial intelligence: modern approach | book | Moscow , Williams, 2006. - 1408 p, |

Prepared in framework of ERASMUS+ project «Innovation Multidisciplinary Training Program for BA and MSc Trainings for Implants for Biological Engineering» 586114-EPP-1-2017-1-ES-EPPKA2-CBHE-JP

Disclaimer: The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.