

**Systems of artificial intelligence for building the innovative potential of higher education**

Instructors:

Yurii Romasevych

Mykola Korobko



**Course Handbook**

TREATY - Nurturing deep tech talents for clean and sustainable energy transition

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## Course Information

Title: Mechatronics for building innovative potential of higher education

Instructor(s): Yurii Romasevych, Mykola Korobko

ECTS: 3

|  |  |
| --- | --- |
| Course structure: | 90 hours |
| Lecture classes | 15 hours |
| Laboratory classes | 15 hours |
| Personal Activities | 60 hours |

Mode of delivery: *[ hybrid]*

### Course Summary

*The aim of the course ”Systems of artificial intelligence for building the innovative potential of higher education” is connected with providing students with theoretical knowledge and practical skills regarding the development and use of artificial intelligence systems in technical systems and strengthening the innovative potential of higher education.*

*The course students will obtain the knowledge and practical skills for the design, production and operation of artificial intelligence systems in various fields (agricultural production, automation, robotics, and many others).*

### Learning Outcomes

Upon completion of the course, students will be able to know about:

1. *The basic principles and concepts of artificial intelligence systems: students will familiarize themselves with the principles of functioning of artificial intelligence systems, in particular, the technologies of artificial neural networks and fuzzy systems;*
2. *The development of artificial intelligence systems: students study methods of analysis, design and modeling of artificial intelligence systems, including methods and approaches to training artificial neural networks and developing rule bases for fuzzy systems;*
3. *Modern technologies and trends in artificial intelligence systems: students explore modern achievements in the field of artificial intelligence and evaluate trends in this field.*

### Assessment

In order for each participant to complete successfully the course and be awarded the corresponding ECTS credits, they must pass the course assessment. The outcome of the assessment can be either Pass or Fail.

**Assessment methods**

* Exam

|  |  |
| --- | --- |
| **Learning outcomes** | **Assessment examples** |
| * *Designing of artificial neural networks structure, activation functions of neurons, etc.* | Oral presentation, quiz, laboratory research |
| * *Training of artificial neural networks in reinforcement and with teacher paradigms.* | Oral presentation, quiz, laboratory research |
| * *Evaluating the quality of artificial neural networks training.* | Oral presentation, quiz, laboratory research |

### Bibliography

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2. Нейронні мережі : теорія та практика / С.О. Субботін. – Житомир : Вид. О. О. Євенок, 2020. – 184 с.
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6. Штучні нейронні мережі: базові положення / І. А. Терейковський, Д. А. Бушуєв, Л. О. Терейковська. Електронне мережне навчальне видання. Навчальний посібник. 123 с. <https://ela.kpi.ua/bitstream/123456789/50135/1/ANN.pdf>
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8. <https://uk.wikipedia.org/wiki/%D0%A8%D1%82%D1%83%D1%87%D0%BD%D0%B8%D0%B9_%D1%96%D0%BD%D1%82%D0%B5%D0%BB%D0%B5%D0%BA%D1%82>
9. <https://uk.wikipedia.org/wiki/%D0%A8%D1%82%D1%83%D1%87%D0%BD%D0%B0_%D0%BD%D0%B5%D0%B9%D1%80%D0%BE%D0%BD%D0%BD%D0%B0_%D0%BC%D0%B5%D1%80%D0%B5%D0%B6%D0%B0>
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14. Субботін С. О., Олійник А.О., Субботін С.О. Нейронні мережі: навч. посібн. – Запоріжжя. ЗНТУ, 2014. – 132 с.

### Course Timetable

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| --- | --- | --- | --- |
| **Lecture** | **Date and Time** | **Instructor** | **Venue** |
| 1st and 2nd | 25.04.2024,  13:30 – 14:50  15:10 – 16:30 | Prof. Yurii ROMASEVYCH | NUBiP, building 11,  classroom 202 |
| 3rd and 4th | 02.05.2024,  13:30 – 14:50  15:10 – 16:30 | Prof. Yurii ROMASEVYCH | <https://us04web.zoom.us/j/4977259668?pwd=NndjcTlWWklqQ2NzaC9aSTNONGlUdz09> |
| 5th and 6th | 09.05.2024,  13:30 – 14:50  15:10 – 16:30 | Prof. Yurii ROMASEVYCH | NUBiP, building 11,  classroom 202 |
| 7th and 8th | 16.05.2024,  15:10 – 16:30 | Prof. Yurii ROMASEVYCH | <https://us04web.zoom.us/j/4977259668?pwd=NndjcTlWWklqQ2NzaC9aSTNONGlUdz09> |
| **Summarizing. Presentation of certificates to graduates.** | 21.06.2024  11:50 – 13:10 | Prof. Yurii ROMASEVYCH  Prof. Viacheslav BRATISHKO  Assoc. Prof. Zinovii RUZHILO | building 11,  library reading room |

**The 1-st group**

|  |  |  |  |
| --- | --- | --- | --- |
| **Seminars** | **Date and Time** | **Instructor** | **Venue** |
| 1st and 2nd | 26.04.2024,  08:30 – 09:50  10:10 – 11:30 | Assoc. Prof.  Mykola KOROBKO | NUBiP, building 11,  classroom 357 |
| 3rd and 4th | 03.05.2024,  08:30 – 09:50  10:10 – 11:30 | Assoc. Prof.  Mykola KOROBKO | NUBiP, building 11,  classroom 357 |
| 5th and 6th | 10.05.2024,  08:30 – 09:50  10:10 – 11:30 | Assoc. Prof.  Mykola KOROBKO | NUBiP, building 11,  classroom 357 |
| 7th and 8th | 17.05.2024,  08:30 – 09:50  10:10 – 11:30 | Assoc. Prof.  Mykola KOROBKO | NUBiP, building 11,  classroom 357 |

**The 2-nd group**

|  |  |  |  |
| --- | --- | --- | --- |
| **Seminars** | **Date and Time** | **Instructor** | **Venue** |
| 1st and 2nd | 26.04.2024,  11:50 – 13:10  13:30 – 14:50 | Assoc. Prof.  Mykola KOROBKO | NUBiP, building 11,  classroom 357 |
| 3rd and 4th | 03.05.2024,  11:50 – 13:10  13:30 – 14:50 | Assoc. Prof.  Mykola KOROBKO | NUBiP, building 11,  classroom 357 |
| 5th and 6th | 10.05.2024,  11:50 – 13:10  13:30 – 14:50 | Assoc. Prof.  Mykola KOROBKO | NUBiP, building 11,  classroom 357 |
| 7th and 8th | 17.05.2024,  11:50 – 13:10  13:30 – 14:50 | Assoc. Prof.  Mykola KOROBKO | NUBiP, building 11,  classroom 357 |

### Contact Details of Instructor(s)

|  |  |  |
| --- | --- | --- |
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