

**Mechatronics for building the innovative potential of higher education**

Instructor:

Yurii Romasevych



**Course Handbook**

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

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## Course Information

Title: MECHATRONICS FOR DEVELOPING THE INNOVATIVE POTENTIAL OF HIGHER EDUCATION

Instructor(s): Yurii Romasevych

ECTS: 3

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

Mode of delivery: *[ hybrid]*

### Course Summary

### *The purpose of studying the discipline "Mechatronics for the development of innovative potential of higher education is to provide students with theoretical knowledge and practical skills in the integration of mechanical, electronic, and software components to create complex and functional mechatronic systems for the development of innovative potential higher education.*

### *The main task of studying the discipline is to acquire the necessary knowledge and skills for the design, production, and operation of complex mechatronic systems in various fields, such as the automation of agro-industrial production, robotics in the agricultural sector, and many others.*

### Learning Outcomes

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

1. *Bases of mechanics, electronics, and control;*
2. *Theoretical knowledge and skills in the development of mechatronic systems: methods of analysis, design, and modeling of mechatronic systems, including the selection and integration of components, development of control algorithms and software;*
3. *Modern technologies and trends in mechatronics: students are able to research modern achievements in the field of mechatronics, such as robotics, autonomous systems, artificial intelligence, and other innovative developments;*
4. *Practical skills and ability to implement mechatronic systems: students get practical experience in designing, assembling, debugging, and testing mechatronic devices and systems. They determine the processes of production and optimization of mechatronic systems, and also apply methods of maintenance and repair;*
5. *They are able to analyze problems, look for innovative solutions and use a creative approach to the design of mechatronic systems. Technical and technological analysis of the functioning of technological systems of engineering management.*

### 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

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| **Learning outcomes** | **Assessment examples** |
| * *Bases of mechanics, electronics, and control;* | Oral presentation, quiz, laboratory research |
| * *Theoretical knowledge and skills in the development of mechatronic systems: methods of analysis, design, and modeling of mechatronic systems, including the selection and integration of components, development of control algorithms and software;* | Oral presentation, quiz, laboratory research |
| * *Modern technologies and trends in mechatronics: students are able to research modern achievements in the field of mechatronics, such as robotics, autonomous systems, artificial intelligence, and other innovative developments;* | Oral presentation, quiz, laboratory research |
| * *Practical skills and ability to implement mechatronic systems: students get practical experience in designing, assembling, debugging, and testing mechatronic devices and systems. They determine the processes of production and optimization of mechatronic systems, and also apply methods of maintenance and repair;* | Oral presentation, quiz, laboratory research |
| * *They are able to analyze problems, look for innovative solutions, and use a creative approach to the design of mechatronic systems. Technical and technological analysis of the functioning of technological systems of engineering management.* | Oral presentation, quiz, laboratory research |

### Bibliography

1. Ромасевич Ю. О. Електронний курс "Мехатроніка" Навчально-інформаційний портал НУБІП України [Електронний ресурс] /   
   Ю. О. Ромасевич, В. В. Крушельницький – Режим доступу до ресурсу: <https://elearn.nubip.edu.ua/course/view.php?id=5274>.
2. Мехатроніка: підручник / В.С. Ловейкін, Ю.О. Ромасевич, В.В. Крушельницький. – К.: ЦП „Компрінт”, 2020. – 404 с.
3. Мехатроніка [Електронний ресурс] – Режим доступу до ресурсу: https://uk.wikipedia.org/wiki/Мехатроніка.
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8. Osama Rahil Shaltami. Introduction to Engineering Management. Lecture Notes. 2020. https://www.researchgate.net/publication/340579033\_Introduction\_to\_Engineering\_ Management.
9. Nyambane Osano. Engineering Management. Lecture Notes. 2022. https://civil.uonbi.ac.ke/sites/default/files/cae/engineering/civil/FCE%20372%20- %20Engineering%20Management%20NOTES.pdf.
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11. Ricardo Garcia. Agricultural Machinery Management. Lecture Notes. 2023. https://www.scribd.com/document/416320315/Agricultural-Machinery-Management-ASAE-497-4-pd

### Course Timetable

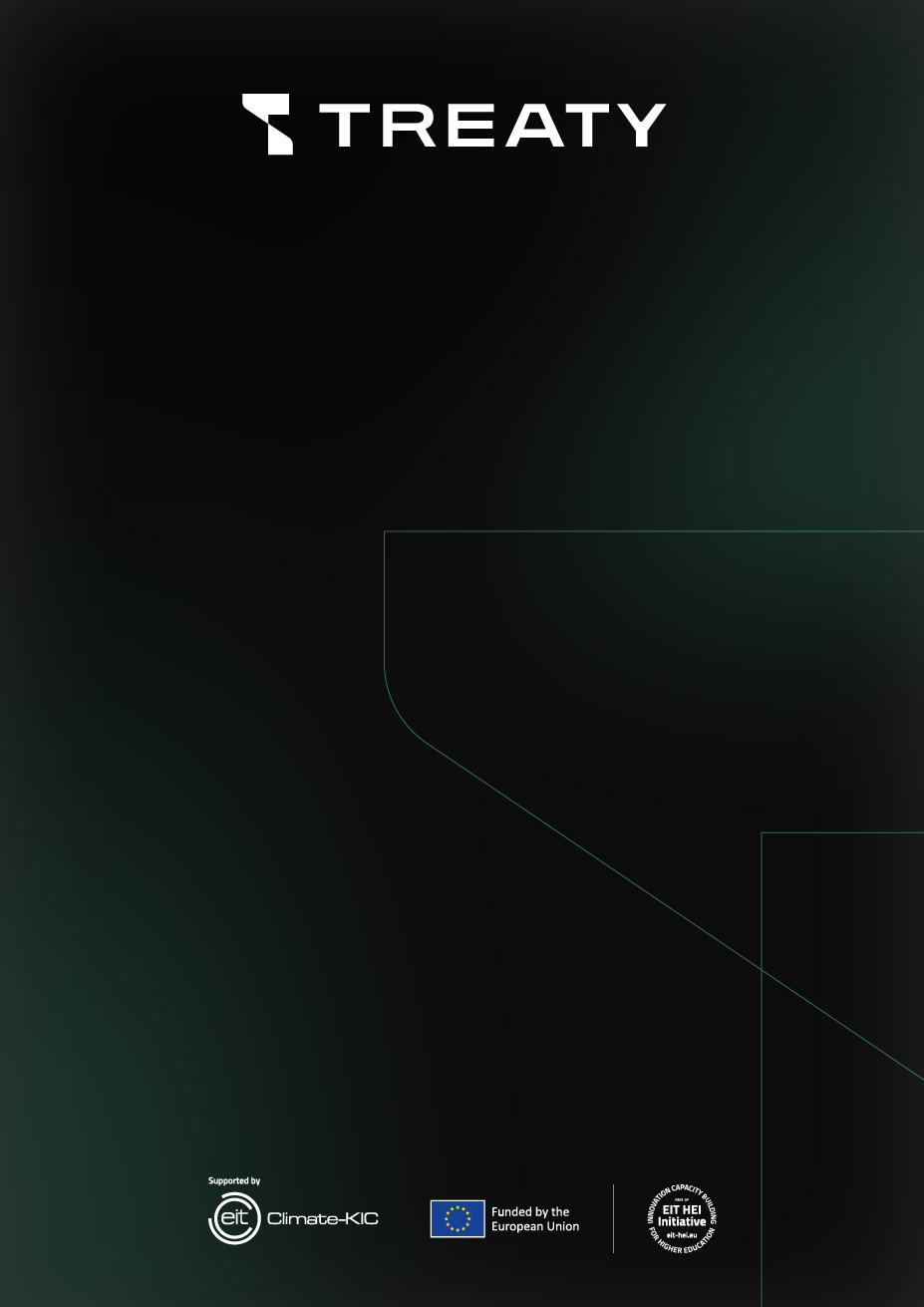
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| --- | --- | --- | --- |
| **Lecture** | **Date and Time** | **Instructor** | **Venue** |
| 1st | 01.11.2023,  16:50 – 18:10 | Prof. Yurii Romasevych | <https://us04web.zoom.us/j/71870653786?pwd=dXU1Y3haNmZibXF1TEJnR2ZyUGF0QT09> |
| 2nd | 01.11.2023,  18:30 –19:50 | Prof. Yurii Romasevych | <https://us04web.zoom.us/j/71870653786?pwd=dXU1Y3haNmZibXF1TEJnR2ZyUGF0QT09> |
| 3rd | 11.11.2023,  8:30 – 9:50 | Prof. Yurii Romasevych | <https://us04web.zoom.us/j/71870653786?pwd=dXU1Y3haNmZibXF1TEJnR2ZyUGF0QT09> |
| 4th | 11.11.2023,  10:10 – 11:30 | Prof. Yurii Romasevych | <https://us04web.zoom.us/j/71870653786?pwd=dXU1Y3haNmZibXF1TEJnR2ZyUGF0QT09> |
| 5th | 18.11.2023,  8:30 – 9:50 | Prof. Yurii Romasevych | NUBiP, building 11,  classroom 105 |
| 6th | 18.11.2023,  10:10 – 11:30 | Prof. Yurii Romasevych | NUBiP, building 11,  classroom 105 |
| 7th | 25.11.2023,  8:30 – 9:50 | Prof. Yurii Romasevych | <https://us04web.zoom.us/j/71870653786?pwd=dXU1Y3haNmZibXF1TEJnR2ZyUGF0QT09> |
| **Summarizing. Presentation of certificates to graduates.** | 06.12.2023  15:10 – 16:30 | Prof. Gennadii GOLUB  Prof. Viacheslav BRATISHKO  Assoc. Prof. Zinovii RUZHILO | building 11,  library reading room |

**The 1-st group**

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| **Seminars** | **Date and Time** | **Instructor** | **Venue** |
| 1st | 04.11.2023,  8:30 – 09:50 | Prof. Yurii Romasevych | NUBiP, building 11,  classroom 105 |
| 2nd | 04.11.2023,  10:10 – 11:30 | Prof. Yurii Romasevych | NUBiP, building 11,  classroom 105 |
| 3rd | 11.11.2023,  11:50 – 13:10 | Prof. Yurii Romasevych | <https://us04web.zoom.us/j/71870653786?pwd=dXU1Y3haNmZibXF1TEJnR2ZyUGF0QT09> |
| 4th | 11.11.2023,  13:30 – 14:50 | Prof. Yurii Romasevych | <https://us04web.zoom.us/j/71870653786?pwd=dXU1Y3haNmZibXF1TEJnR2ZyUGF0QT09> |
| 5th | 18.11.2023,  11:50 – 13:10 | Prof. Yurii Romasevych | NUBiP, building 11,  classroom 105 |
| 6th | 18.11.2023,  13:30 – 14:50 | Prof. Yurii Romasevych | NUBiP, building 11,  classroom 105 |
| 7th | 25.11.2023,  10:10 – 11:30 | Prof. Yurii Romasevych | <https://us04web.zoom.us/j/71870653786?pwd=dXU1Y3haNmZibXF1TEJnR2ZyUGF0QT09> |

### Contact Details of Instructor

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