UNIVERSITY
WARMIA AND MAZURY IN OLSZTYN

Faculty of Mathematics and Computer Science

Course title: **ELEMENTS OF INTELLIGENT ROBOTICS**

ECTS credit allocation (and other scores): **4.5**

Semester: autumn

Level of study: ISCED-7- long-cycle programmes (EQF-7)

Branch of science: Engineering and technology

Language: English /Polish

Number of hours per semester: 30 lectures + 30 classes = 60 hours

Course coordinator/ Department and e-mail: Piotr Artiemjew/ WMiI, erasmuswmii.uwm.edu.pl

Type of classes: classes and lectures

Substantive content

CLASSES:

1.History of the development of intelligent robotics. 2. - 8. Theoretical introduction to selected mobile robotics techniques, including localisation methods, path planning, motion path smoothing, state prediction with Kalman filtration, control with PID controller. 9. - 11. Discussion of selected robot programming environments, e.g. NXT++, Arduino IDE, ROS. Including in the case of remote work the Turtle environment. 12. - 15. Introduction to artificial intelligence techniques dedicated to application in decision making processes of mobile robots.

LECTURES:

1.History of the development of intelligent robotics. 2. - 8. Theoretical introduction to selected mobile robotics techniques, including localisation methods, path planning, motion path smoothing, state prediction with Kalman filtration, control with PID controller. 9. - 11. Discussion of selected robot programming environments, e.g. NXT++, Arduino IDE, ROS. Including in the case of remote work the Turtle environment. 12. - 15. Introduction to artificial intelligence techniques dedicated to application in decision making processes of mobile robots.

LEARNING PURPOSE

Introduction of theoretical foundations of intelligent robotics methods. Demonstration of practical applications of algorithmics.

On completion of the study programme the graduate will gain:

Knowledge:

Has elementary knowledge of the fundamentals of intelligent robotics - with a focus on applications in robot-human interaction systems.

Skills:

The student is able to apply the acquired algorithmic and technical knowledge to the programming of mobile robots

Social Competencies:

He is aware of the responsibility for his own work and is ready to follow the rules of teamwork and take responsibility for jointly implemented tasks

BASIC LITERATURE

1. Choset, H., *Principles of Robot Motion – Theory, Algorithms, and Implementations*, Wyd. MIT, R. 2005
2. Piotr Kulczycki, Józef Korbicz, Janusz Kacprzyk, *Automatyka, robotyka i przetwarzanie informacji(Miękka)*, Wyd. PWN, R. 2020

SUPPLEMENTARY LITERATURE

1. Bekey, G., A., *Autonomous Robots: From Biological Inspiration to Implementation and Control*, Wyd. MIT, R. 2005

The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 2,32 ECTS points,

Student's independent work: 2.18 ECTS points,