Subject sheet

1. **data about the program**

|  |  |
| --- | --- |
| Higher education institution | Babeș-Bolyai University Cluj- Napoca |
| 1.2 Faculty | Faculty of Mathematics and Computer Science |
| 1.3 Department | Department of Informatics |
| 1.4 Field of study | Computer science |
| 1.5 Study cycle | License |
| 1.6 Study Program / Qualification | Computer science |

1. **data about discipline**

|  |  |
| --- | --- |
| 2.1 Name of the discipline | Intelligent Robots |
| 2.2 holder activity of course | Mureșan Horea- Bogdan |
| 2.3 holder activity seminar​ | Mureșan Horea- Bogdan |
| 2.4 Year of study | 3 | 2.5 Semester | 2 | 2.6. Type of ASSESSMENT | C | 2.7 Discipline regime | A |
| 2.8 Code of Discipline | MLE5154 |  |

1. **time total estimated** (hours) on semester teaching activities )

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 3.1 Number of hours per week | 5 | Of which: 3.2 course | 2 | 3.3 seminar/laboratory | 1 lab + 2 projects |
| 3.4 Total hours  | 70 | Of which: 3.5 course | 28 | 3.6 seminar/laboratory | 42 |
| Distribution of time: | hours |
| Study according to the textbook, course material, bibliography and notes | 12 |
| Additional documentation in the library, on specialized electronic platforms and in the field | 2 |
| Preparation of seminars/laboratories, assignments, papers, portfolios and essays | 8 |
| tutorial | 2 |
| EXAMINATION | 4 |

|  |  |
| --- | --- |
| Other activities: exhibition with public | 2 |
| 3.7 Total hours study individual | 30 |  |
| 3.8 Total hours on semester | 100 |
| 3.9 Number of credits | 4 |

1. **PREREQUISITES** (there where is case)

|  |  |
| --- | --- |
| 4.1 curriculum | ● |
| 4.2 competencies | * Intermediate to advanced knowledge of programming and artificial intelligence
 |

1. **Conditions** (where applicable)

|  |  |
| --- | --- |
| 5.1 From course development | ● |
| 5.2 Conducting the seminar/laboratory | * Laboratory equipped with specific equipment
 |

1. **Specific skills acquired**

|  |  |
| --- | --- |
| **Professional skills** | * Learning uses, sensors, motors and other equipment/hardware.
 |
| **Transversal skills** | * improving organizational skills
 |

1. **Discipline objectives** (based on the grid of acquired competencies)

|  |  |
| --- | --- |
| 7.1 The objective generic of discipline | Teaching students to work with hardware other than computers. Provides Basic algorithms for Artificial intelligence . |
| 7.2 Specific objectives | Learning how to use sensors, engines and other hardware. |

1. **content**

|  |  |  |
| --- | --- | --- |
| 8.1 Course | Teaching methods | Observations |

|  |  |  |
| --- | --- | --- |
| 1. Administrative | Exposure |  |
| 2. Presentation of available robots. | Exposure |  |
| 3. Introduction to robotics and electronics. | Exposure |  |
| 4-5. Engines, Wheeled/Tracked Locomotion | Exposure |  |
| 6. Engines, Locomotion by legs | Exposure |  |
| 7-8. Sensors, Receiving information from the environment | Exposure |  |
| 9. Industrial robots | Exposure |  |
| 10. Audio/video processing | Exposure |  |
| 11-12. integration clever artificially | Exposure |  |
| Bibliography1. Sebastian Thrun, Tungsten Burgard, Dieter Fox, [*probabilistic Robotics*](https://ieeexplore.ieee.org/document/6792214)
2. Christopher Bishop, [*Pattern recognition and machine learning*](https://www.cs.uoi.gr/~arly/courses/ml/tmp/Bishop_book.pdf)
3. Stuart Russell, Peter Norvig, [*Artificial intelligence. A modern approach*](https://archive.org/details/artificial-intelligence-modern-approach-3rd-ed.-russell-norvig)
4. Patrick Goebel, [*gnawed by Example INDIGO – book 1*](https://github.com/edward-wq/books/blob/master/ros/ros%20by%20example%20vol%201%20indigo.pdf)
5. [Choreographer](http://doc.aldebaran.com/1-14/software/choregraphe/choregraphe_overview.html)
6. [https://www.ros.org/](https://www.hiwonder.com/products/puppypi?variant=39776033144919)
7. [Puppy Pi](https://www.hiwonder.com/products/puppypi?variant=39776033144919)
8. [Arm Pi](https://www.hiwonder.com/products/armpi-pro?variant=40308380958807)
9. [NAO V6](https://www.robotlab.com/higher-ed-robots/store/nao-power-v6-standard-edition)
10. [https://www.universal-robots.com/products/collaborative-robots-cobots-benefits](https://www.universal-robots.com/products/collaborative-robots-cobots-benefits/)
11. Bodur, Mehmet (2006), [Computational Principles of Robotics, course Notes](http://cmpe.emu.edu.tr/mbodur/COUR/CMPE528/CPR528C1.pdf) , Department of Computer Engineering, Eastern Mediterranean University, pp. 2
12. W. Hey, Mr. them and C. IT. P. Chen, "The survey of human-centered intelligent robots: issues and challenges," in *IEEE/CAA Journal of Automatica Sinica* , vol. 4, no. 4, pp. 602-609, 2017, [https://doi.org/10.1109/JAS.2017.751060](https://doi.org/10.1109/JAS.2017.7510604) /
13. D. Nitzan, "Development of intelligent robots: Achievements and issues," in *IEEE Journal on Robotics and Automation* , vol. 1, no. 1, pp. 3-13, March 1985, <https://doi.org/10.1109/JRA.1985.1086994>
14. Lai. R., Lin, W., Wu, Y. (2018). Review of Research on the Key Technologies, Application Fields and Development Trends of Intelligent Robots. In: Chen, Z., Mendes, A., Yan, Y., Chen, S. (eds) Intelligent Robotics and Applications. ICIRA 2018. Lecture Notes in Computer Science(), vol 10985. Springer, Cham. <https://doi.org/10.1007/978-3-319-97589-4_38>
15. Matthias Wahde, Introduction to Autonomous Robots, 2016, <https://www.me.chalmers.se/~mwahde/courses/aa/2016/FFR125_LectureNotes.pdf>
16. Michel Albonico, Militia Djordjevic, Angel Hammer, Ivano Malavolta, *Software engineering research on the Robot Operating System: A systematic mapping study* , Journal of Systems and Software, Volume 197, 2023, <https://doi.org/10.1016/j.jss.2022.111574>
 |

|  |  |  |
| --- | --- | --- |
| 8.2 Seminar/ laboratory | Teaching methods | Observations |
| 1. Administrative; establishing teams, objectives. | didactic demonstration |  |
| 2. Presentation of robots; small examples. | didactic demonstration |  |
| 3. Connecting by bluetooth, wireless or cable to various types of robots. | didactic demonstration |  |
| 4. Basic principles in electronics. Using sensors. Examples. | didactic demonstration |  |
| 5. Use sensor and other devices for information collection. | didactic demonstration |  |
| 6. Implementation of a tracking algorithms (for tracking an object). | didactic demonstration |  |

1. **Corroborating content of the course with waiting representatives community epistemic organizations, professional associations and representative employers in the field related to the program**
2. **ASSESSMENT**

|  |  |  |  |
| --- | --- | --- | --- |
| Type activity | 10.1 Evaluation criteria | 10.2 evaluation methods | 10.3 Weight FROM final grade |
| 10.4 Course |  | - | 0 |
|  |  |  |
| 10.5 Seminar/laboratory | Application quality/complexity | practical | 100% |
|  |  |  |
| 10.6 Standard minimum performance |

|  |  |  |
| --- | --- | --- |
| Date of completion | Holder course​ | Holder of seminar |
| 29.04.2024 | Dr. Muresan Horea- Bogdan | Dr. Muresan Horea- Bogdan |

Date of approval in the department Head of Department

................................... Conf. Dr. Sterca Adrian