# Study plan

## Name of study plan: prg.ai/minor-tech

Faculty/Institute/Others:
Department:
Branch of study guaranteed by the department: Common courses
Garantor of the study branch:
Program of study: Welcome page
Type of study: unknown full-time
Required credits: 0
Elective courses credits: 0
Sum of credits in the plan: 0
Note on the plan:

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Name of the block: Elective courses
Minimal number of credits of the block: 0
The role of the block: V

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Code of the group: PRGAI_TECH
Name of the group: prg.ai/minor-tech
Requirement credits in the group:
Requirement courses in the group:
Credits in the group: 0
Note on the group:

| Code | Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors,* ***authors*** *and guarantors (gar.)* | Completion | Credits | Scope | Semester | Role |
|---|---|---|---|---|---|---|
| BE4M36UIR | **Artificial Intelligence in Robotics** *Stefan Edelkamp, Tomáš Kroupa, Jan Faigl* ***Jan Faigl*** *Jan Faigl (Gar.)* | Z,ZK | 6 | 2P+2C | Z | v |
| B3M33ARO | **Autonomous Robotics** | Z,ZK | 7 | 3P+2L | L | v |
| BE3M33ARO | **Autonomous Robotics** | Z,ZK | 7 | 3P+2L | L | v |
| BE4B36FUP | **Functional Programming** *Niklas Maximilian Heim* ***Rostislav Horčík*** *Michal Pěchouček (Gar.)* | Z,ZK | 6 | 2P+2C | L | v |
| B4B36FUP | **Functional Programming** *Rostislav Horčík* ***Michal Pěchouček*** *Michal Pěchouček (Gar.)* | Z,ZK | 6 | 2P+2C | L | v |
| BE5B33RPZ | **Pattern Recognition and Machine Learning** *Ondřej Drbohlav, Jiří Matas, Jan Šochman* ***Jiří Matas*** *Jiří Matas (Gar.)* | Z,ZK | 6 | 2P+2C | Z | v |
| B4B33RPZ | **Recognition and machine learning** *Ondřej Drbohlav, Jiří Matas, Jan Šochman* ***Ondřej Drbohlav*** *Jiří Matas (Gar.)* | Z,ZK | 6 | 2P+2C | Z | v |
| B4M36UIR | **Artificial Intelligence in Robotics** *Stefan Edelkamp, Tomáš Kroupa, Jan Faigl* ***Jan Faigl*** *Jan Faigl (Gar.)* | Z,ZK | 6 | 2P+2C | Z | v |
| B4B36ZUI | **Introduction to Artificial Intelligence** *Viliam Lisý, Branislav Bošanský* ***Branislav Bošanský*** *Michal Pěchouček (Gar.)* | Z,ZK | 6 | 2P+2C | L | v |

**Characteristics of the courses of this group of Study Plan: Code=PRGAI_TECH Name=prg.ai/minor-tech**

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|---|---|---|---|
| BE4M36UIR | Artificial Intelligence in Robotics | Z,ZK | 6 |

The course aims to acquaint students with the use of planning approaches and decision-making techniques of artificial intelligence for solving problems arising in autonomous robotic systems. Students in the course are employing knowledge of planning algorithms, game theory, and solving optimization problems in selected application scenarios of mobile robotics. Students first learn architectures of autonomous systems based on reactive and behavioral models of autonomous systems. The considered application scenarios and robotic problems include path planning, persistent environmental monitoring, robotic exploration of unknown environments, online real-time decision-making, deconfliction in autonomous systems, and solutions of antagonistic conflicts. In laboratory exercises, students practice their problem formulations of robotic challenges and practical solutions in a realistic robotic simulator or consumer mobile robots. This course is also part of the inter-university programme prg.ai Minor. It pools the best of AI education in Prague to provide students with a deeper and broader insight into the field of artificial intelligence. More information is available at https://prg.ai/minor.

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| B3M33ARO | Autonomous Robotics | Z,ZK | 7 |

The Autonomous robotics course will explain the principles needed to develop algorithms for intelligent mobile robots such as algorithms for: (1) Mapping and localization (SLAM) sensors calibration (lidar or camera). (2) Planning the path in the existing map or planning the exploration in a partially unknown map and performing the plan in the world. IMPORTANT: It is assumed that students of this course have a working knowledge of optimization (Gauss-Newton method, Levenberg Marquardt method, full Newton method), mathematical analysis (gradient, Jacobian, Hessian), linear algebra (least-squares method), probability theory (multivariate gaussian probability), statistics (maximum likelihood and maximum aposteriori estimate), python programming and machine learning algorithms.

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| BE4B36FUP | Functional Programming | Z,ZK | 6 |
| This course introduces students into the techniques of functional programming, the advantages and disadvantages of this programming paradigm, and its use in practice. This approach is declarative in the sense that the programmer symbolically describes the problem to be solved, rather than specifying the exact sequence of operations required to solve it. It allows focusing on the essence of the solved problem and implementing even more complex algorithms compactly. Functional programming has notable advantages for parallelization and automated verification of algorithms, and the most useful functional programming concepts are increasingly often introduced to standard programming languages. Because of the focus of functional programming on symbols, rather than numbers, functional programming has been heavily used in in artificial intelligence fields, such as agent systems or symbolic machine learning. This course is also part of the inter-university programme prg.ai Minor. It pools the best of AI education in Prague to provide students with a deeper and broader insight into the field of artificial intelligence. More information is available at https://prg.ai/minor. | | | |
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| BE5B33RPZ | Pattern Recognition and Machine Learning | Z,ZK | 6 |
| The basic formulations of the statistical decision problem are presented. The necessary knowledge about the (statistical) relationship between observations and classes of objects is acquired by learning on the raining set. The course covers both well-established and advanced classifier learning methods, as Perceptron, AdaBoost, Support Vector Machines, and Neural Nets. This course is also part of the inter-university programme prg.ai Minor. It pools the best of AI education in Prague to provide students with a deeper and broader insight into the field of artificial intelligence. More information is available at https://prg.ai/minor. | | | |
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| B4B36ZUI | Introduction to Artificial Intelligence | Z,ZK | 6 |
| The aim of the course is to cover the basics of symbolic artificial intelligence. We will focus on algorithms of informed and uninformed state space search, problem representation and solving, representation of knowledge using formal logic, methods of automated reasoning, and an introduction to Markov decision making, and to two-player games. This course is also part of the inter-university programme prg.ai Minor. It pools the best of AI education in Prague to provide students with a deeper and broader insight into the field of artificial intelligence. More information is available at https://prg.ai/minor. | | | |

## List of courses of this pass:

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For updated information see http://bilakniha.cvut.cz/en/FF.html
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