Topics for the Computer Science Bachelor Graduation Examination
June and September 2026
Artificial Intelligence Specialisation

Part 1. Algorithms and Programming (1/3 of the evaluation)

Courses: Programming fundamentals, Object oriented programming, Data structures and algorithms

The courses and topics required for this subject are exactly the same as the courses and topics required for the ***Part 1. Algorithms and Programming*** subject in the bachelor graduation examination for the Computer Science Specialisation.

Part 2. Artificial Intelligence (2/3 of the evaluation)

Courses: Fundamentals of Machine Learning, Metaheuristics, Graph algorithms

1. Machine Learning
    a. Data processing and representation
    b. Supervised, unsupervised, semi-supervised, self-supervised algorithms
    c. Evaluation (performance metrics)
2. Metaheuristics and optimization
    a. Search and optimization algorithms
    b. Data structures and solution representation
    c. Metaheuristic algorithms
3. AI applications in search, optimization, regression, classification and clustering

Note
Algorithms and Programming and Artificial Intelligence exam items can be theoretical items, problem solving, multiple choice questions with/without justifications.

Bibliographic recommendations:

1. Goodfellow, Y. Bengio, A. Courville, Deep Learning, MIT Press, 2016 https://www.deeplearningbook.org/
2. Francois Chollet, Deep Learning with Python, https://github.com/fchollet/deep-learning-with-python-notebooks
3. Geron, Hands-On Machine Learning with Scikit-Learn and TensorFlow, https://github.com/ageron/handson-ml
4. Sean Luke, 2013, Essentials of Metaheuristics, Lulu, second edition, available at http://cs.gmu.edu/~sean/book/metaheuristics/
5. Z. Michalewicz, D. B. Fogel, How to solve it: Modern Heuristics, 2nd edition, Springer, 2004.
6. E.G. Talbi, Metaheuristics: From Design to Implementation, Wiley, 2009.
7. J. Erickson, Algorithms, independently published, 2019. https://jeffe.cs.illinois.edu/teaching/algorithms/