

Master in Life Sciences

A cooperation between
BFH, FHNW, HES-SO, ZHAW

Module title	Optimisation and Bio-Inspired Algorithms
Code	CO3
Degree Programme	Master of Science in Life Sciences
Group	Computation
Workload	3 ECTS (90 student working hours: 42 lessons contact = 32 h; 58 h self-study)
Module Coordinator	Name: Thomas Ott Phone: +41 (0)58 934 56 84 Email: thomas.ott@zhaw.ch Address: ZHAW Life Sciences und Facility Management, Schloss 1, 8820 Wädenswil
Lecturers	• Thomas Ott, ZHAW • Ahmad Aghaebrahimian, ZHAW
Entry requirements	Bachelor level of analysis (differential calculus), linear algebra, statistics; basic python programming skills Vibe coding skills are not enough. There is an online tutorial available for students without python skills
Learning outcomes and competences	After completing the module, students will be able to: • understand and analyze different optimization problems • understand, explain and validate a variety of linear, nonlinear, deterministic and stochastic optimization methods (a special focus will be on nature-and bio-inspired methods such as simulated annealing, genetic algorithms or swarm intelligence) • apply the algorithms to problems in their field • use AI tools to efficiently implement optimization algorithms
Module contents	The major topics covered in the module are: • identification of problems solvable with optimization methods • abstraction and modelling of task description • coding of optimization tasks • bio-inspired algorithms • implementation of examples from various fields with python
Teaching / learning methods	lecture, exercises, seminar-style, project work, self-study, python programming
Assessment of learning outcome	1. individual project work including a short presentation (60%) 2. written exam (closed book) (40%)
Format	7-weeks
Timing of the module	Spring semester, CW 8-15
Venue	Blended learning format. Presence sequences take place in Olten
Bibliography	-
Language	English
Links to other modules	Coordinated with the module Machine Learning and Pattern Recognition
Comments	-
Last Update	08.09.2026