



Module	Advanced Deep Learning
Code	MSLS_V5_9
Degree Program	Master of Science in Life Sciences (MSLS)
ECTS Credits	3
Workload	90h: 30h Lecture (2 Lessons/W), 30h Exercises (2 Lessons/W), 30h Self-study
Module Coordinators	<p> Name Dr. Claus Horn Phone +41 (0)58 934 51 47 Email claus.horn@zhaw.ch </p> <p> Name Dr. Martin Schüle Phone +41 (0)58 934 55 74 Email martin.schuele@zhaw.ch </p> <p> Address ZHAW Zürcher Hochschule für Angewandte Wissenschaften Life Sciences and Facility Management Schloss 1 CH-8820 Wädenswil </p>
Lecturers	<ul style="list-style-type: none"> • Dr. Claus Horn • Dr. Martin Schüle
Entry Requirements	Attending the modules “Neural Networks and Deep Learning” and “Machine Learning and Pattern Recognition” is mandatory.
Learning Outcomes and Competences	<p>Familiarity with basic programming in Python is required. Familiarity with Keras/Tensorflow is an advantage. Most exercises will be in PyTorch/Keras/Tensorflow.</p> <p>After completing the module, students will be able to:</p> <ul style="list-style-type: none"> • use and implement deep learning models in PyTorch/ Keras/Tensorflow • display an advanced understanding of deep learning theory • apply deep sequence models to text and time series data • understand the advantages of generative models • understand and develop models in probabilistic deep learning • recognize possible application areas of reinforcement learning • reflect the usage and impact of advanced deep learning in a context of applications in computational life sciences

Module Content	<p>The module covers the following topics:</p> <ol style="list-style-type: none"> 1. General Introduction to Advanced Deep Learning 2. Introduction to PyTorch/ Keras/Tensorflow 3. Advanced sequence modeling 4. Generative models 5. Probabilistic deep learning 6. Advanced NLP 7. Reinforcement learning 8. Data challenge: industry challenges
Teaching / Learning Methods	The module will consist of lectures and practical exercises. In addition to lectures, students will be required to self-study selected topics. Students will work in groups on a data challenge and present their results to the class at the end of the course.
Assessment of Learning Outcome	<ul style="list-style-type: none"> • Preparatory Exercises: 10% • Exercises during the course: 40% • Data challenge: 50%
Bibliography	Pointers to literature will be provided on our online learning platform.
Language	English
Comments	–
Last Update	24.02.2023