JÖNKÖPING UNIVERSITY
School of Engineering

COURSE SYLLABUS

Python Programming for AI, 7.5 credits

Pythonprogrammering för AI, 7.5 högskolepoäng

Course Code:	T2PFAF	Education Cycle:	Second-cycle level
Confirmed:	Sep 01, 2025	Disciplinary domain:	Technology
Valid From:	Aug 31, 2026	Subject group:	Computer Technology
		Specialised in:	A1N Second cycle, has only first-cycle course/s as entry requirements
		Main field of study:	Computer Science

Intended Learning Outcomes (ILO)

On completion of the course the student shall:

Knowledge and understanding

- display knowledge of fundamental concepts in machine learning and data science using Python.
- show familiarity with fundamental libraries such as Scikit-Learn, Pandas, NumPy, Matplotlib, and Hugging Face.
- demonstrate comprehension of key techniques in preprocessing, modelling, and evaluation.
- display knowledge of key machine learning algorithms, including their main advantages and drawbacks
- display knowledge of Python programming principles and established coding conventions, including effective and responsible use of AI-assisted programming tools such as GitHub Copilot.

Skills and abilities

- demonstrate the ability to implement Python pipelines for data science tasks including data wrangling, visualization, and feature engineering.
- demonstrate the ability to work with pre-trained large language models.

Judgement and approach

- demonstrate the ability to evaluate the strengths and limitations of different AI approaches for various problems.

Content

The course provides an introduction to Python programming in the context of AI, focusing on classical machine learning and data science applications. Theory is combined with practical programming exercises to develop a strong foundation in AI development.

The course includes the following elements:

- Python programming: implementing and documenting Python solutions following good programming practice and ethical use of AI-assisted coding tools.
- Python for AI: Overview of Python libraries relevant to AI, including NumPy, Pandas, and Matplotlib.
- Machine Learning with Scikit-Learn: Predictive modelling using supervised learning, model evaluation, hyperparameter tuning.
- Large language models and Transformers: Using tools and resources for working with pre-trained language models.
- Ethical AI: Considerations for responsible AI including fairness and interpretability.

Type of instruction

The teaching in the course consists mainly of lectures, assignments, and tutoring.

Language of instruction is English.

Entry requirements

The applicant must hold a minimum of a bachelor's degree (i.e. the equivalent of 180 ECTS credits at an accredited university) with at least 90 credits in the main field of computer engineering, computer science, informatics, information systems, information technology, or equivalent. The bachelor's degree should comprise a minimum of 15 credits in mathematics and at least 30 credits in programming/software development. Alternatively the applicant must have passed courses at least 150 credits from the programme Computer Science and Engineering. Proof of English proficiency is required.

Examination and grades

The course is graded 5, 4, 3 or U.

Registration of examination:

Name of the Test	Value	Grading
Examination [1]	4 credits	5/4/3/U
Assignment	3.5 credits	G/U

[1]Determines the final grade of the course, which is issued only when all course units have been passed.

Course literature

Please note that changes may be made to the reading list up until eight weeks before the start of the course.

Aurélien Géron:Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow, 3rd ed. Publisher: O'Reilly Media ISBN: 978-1098125974