

Curriculum

Agentic Machine Learning Engineering



Full-time: 16 weeks / 4 months

German Remote

Artificial Intelligence is rapidly transforming the way software is built and how businesses operate. Beyond traditional machine learning, modern AI systems can reason, retrieve information, use tools, and autonomously solve complex tasks. As a result, professionals with expertise in machine learning, Large Language Models (LLMs), and agentic AI are among the most sought-after in today's technology landscape.

This hands-on course provides a practical journey from Python and data science fundamentals to classical machine learning, deep learning, NLP, Retrieval-Augmented Generation (RAG), and production-ready AI agents. Through real-world projects, participants will learn how to build, evaluate, and deploy intelligent AI systems while gaining the skills needed to succeed in one of the fastest-growing fields in technology.

Future jobs for you:

- > Data Scientist
- > Machine Learning Engineer
- > AI Engineer

Annual salary: €62,160 - €89,400

The curricula presented here are intended as an exemplary guide to course content. Adjustments to the content and schedule are possible from didactic and organizational perspectives reasons as well as to adapt to the state of the art and current requirements of the labor market expressly remain reserved, without thereby impairing the character of the course and the overall quality of its content.

Tech Stacks

Foundations

- Command Line & Version Control
- Python & Numerical Computing

Data Science Core

- Data Manipulation & Visualization
- Exploratory Data Analysis
- Project: Real Dataset Analysis

Classical Machine Learning

- Supervised Learning Concepts
- Logistic Regression & ML Workflow
- Classification Metrics & Debugging
- Feature Engineering & Hyperparameter Tuning
- Project: Classification
- Linear Regression & DateTime Data
- Feature Selection & Regularization
- Cross-Validation & Gradient Descent
- Project: Regression
- Decision Trees & Random Forests
- Bagging, Boosting & Gradient Boosting
- Ensemble Strategies & Class Imbalance
- Clustering & Dimensionality Reduction
- Project: Advanced Method on Business Data

Deep Learning

- Neural Networks & Backpropagation
- Training Strategies & Frameworks
- Convolutional Neural Networks
- Transfer Learning
- Project: Image Classification

NLP & Large Language Models

- Transformers & Modern LLMs
- LLM APIs & Prompt Engineering
- Retrieval-Augmented Generation (RAG)
- Fine-Tuning Concepts
- Project: LLM-Powered Tool

Agentic AI Systems

- Tool-Calling & Structured Outputs
- Agent Loop & ReAct
- Agent Frameworks
- State, Routing & Checkpointing
- Streaming & Interruption
- Human-in-the-Loop & Idempotency
- Embeddings, Vector Stores & Chunking

RAG as a Tool, Critique & Re-Query

- Adaptive RAG & Query Routing
- Memory Architectures
- Tool Protocols & Custom Tool Servers
- Hooks & Subagent Patterns

Multi-Agent Patterns

- Observability & Production Engineering

Observability & Tracing

- Type-Safe Production Agents
- Integration Patterns
- Cost-Latency Engineering
- Eval-Driven Development & LLM-as-Judge

Safety & Governance

- Safety in Production
- AI Governance & EU AI Act

Capstone Project

Soft Skills Development

Attention to Detail

Communication Ownership

Storytelling Resilience

Stakeholder Management

Research skills Curiosity

Time Management

Problem Solving Teamwork

Creativity Adaptability

Analytical Thinking

You'll get a

**CLAUDE PRO
SUBSCRIPTION**
during the course

Voucher for
certification

**NVIDIA NCA
Generative
AI LLMs
(NCA-GENL)**

Practical Project

Implementation of acquired knowledge in a real-life scenario.

Supported Job Search

Our career team of 4 coaches actively run the Career Compass program that train and support job searches, and we organize regularly masterclasses and events with industry experts.

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Curriculum Agentic Machine Learning Engineering



Vollzeit: 16 Wochen / 4 Monate

Deutsch Remote

Künstliche Intelligenz verändert die Art und Weise, wie Software entwickelt wird und Unternehmen arbeiten, grundlegend. Moderne KI-Systeme gehen heute weit über klassisches Machine Learning hinaus: Sie können schlussfolgern, Informationen abrufen, Werkzeuge nutzen und komplexe Aufgaben eigenständig lösen. Entsprechend gehören Fachkräfte mit Kenntnissen in Machine Learning, Large Language Models (LLMs) und agentlichen KI-Systemen zu den gefragtesten Experten auf dem Arbeitsmarkt.

Dieser praxisorientierte Kurs führt Sie von den Grundlagen in Python und Data Science über klassisches Machine Learning und Deep Learning bis hin zu Natural Language Processing (NLP), Retrieval-Augmented Generation (RAG) und produktionsreifen KI-Agenten. Anhand praxisnaher Projekte erwerben Sie das Wissen und die Fähigkeiten, moderne KI-Lösungen zu entwickeln, zu bewerten und erfolgreich in realen Anwendungen einzusetzen.

Zukunftsjobs für dich:

- Data Scientist
- Machine Learning Engineer
- AI Engineer

Jahresgehalt: €62.160 – €89.400

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Tech Stacks

Grundlagen

- Command Line & Version Control
- Python & Numerical Computing

Data Science – Kernkompetenzen

- Datenmanipulation & Visualisierung
- Exploratory Data Analysis
- Projekt: Analyse eines realen Datensatzes

Klassisches Machine Learning

- Konzepte des Supervised Learning
- Logistic Regression & ML Workflow
- Klassifikationsmetriken & Debugging
- Feature Engineering & Hyperparameter Tuning
- Projekt: Klassifikation
- Linear Regression & DateTime-Daten
- Feature Selection & Regularisierung
- Cross-Validation & Gradient Descent
- Projekt: Regression
- Decision Trees & Random Forests
- Bagging, Boosting & Gradient Boosting
- Ensemble-Strategien & Class Imbalance
- Clustering & Dimensionality Reduction
- Projekt: Fortgeschrittene Methoden auf Business-Daten

Deep Learning

- Neural Networks & Backpropagation
- Training Strategies & Frameworks
- Convolutional Neural Networks
- Transfer Learning
- Projekt: Bildklassifikation

NLP & Large Language Models

- Transformers & Modern LLMs
- LLM APIs & Prompt Engineering
- Retrieval-Augmented Generation (RAG)
- Fine-Tuning Concepts
- Projekt: LLM-gestütztes Tool

Agentische KI-Systeme

- Tool-Calling & Structured Outputs
- Agent Loop & ReAct
- Agent Frameworks
- State, Routing & Checkpointing
- Streaming & Interruption
- Human-in-the-Loop & Idempotency
- Embeddings, Vector Stores & Chunking

RAG als Tool: Critique & Re-Query

- Adaptive RAG & Query Routing
- Memory Architectures
- Tool Protocols & Custom Tool Servers
- Hooks & Subagent Patterns

Multi-Agent Patterns

- Observability & Production Engineering

Observability & Tracing

- Type-Safe Production Agents
- Integration Patterns
- Cost-Latency Engineering
- Eval-Driven Development & LLM-as-Judge

Sicherheit & Governance

- Safety in Production
- AI Governance & EU AI Act

Capstone-Projekt

Entwicklung von Soft Skills

Detailgenauigkeit Resilienz

Stakeholder-Management

Kommunikation Storytelling

Recherchefähigkeiten

Problemlösung Teamwork

Eigenverantwortung

Kreativität Anpassungsfähigkeit

Analytisches Denken

Zeitmanagement Neugier

Du bekommst einen
**CLAUDE PRO
ZUGANG**
während des Kurses

Gutschein für
Zertifizierung
**NVIDIA NCA
Generative
AI LLMs
(NCA-GENI)**

Praxisprojekt

Umsetzung des erworbenen Wissens in einem realen Szenario.

Unterstützte Jobsuche

Unser vierköpfiges Karriere-Team leitet aktiv das „Career-Compass“-Programm, das bei der Jobsuche schult und unterstützt; zudem organisieren wir regelmäßig Masterclasses und Veranstaltungen mit Branchenexperten.

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