

Curriculum

Agentic Machine Learning Engineering



Full-time: 14 weeks

English

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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Agentic Machine Learning Engineering

Why now is the ideal time for further training

1 AI Is Transforming the Tech Industry

Per Anthropic's 2026 Agentic Coding Trends Report, 95% of developers use AI tools weekly. A typical agentic session involves 47 tool calls and 20 autonomous actions before human input is needed – double the figure from six months prior. 27% of AI-assisted work wouldn't have been attempted without AI – it expands scope, not just speed. Companies that can build, evaluate, and safely deploy agentic AI systems are better positioned, and demand for qualified engineers far exceeds supply.

2 The AI/ML Engineering Market

AI and ML engineering are among the fastest-growing fields in the German job market. Companies across automotive, industry, finance, and technology urgently need specialists who can build, deploy, and optimize AI systems.

According to Glassdoor (June 2026), there are 827+ open positions for AI/ML Engineers – plus 631+ AI Engineer and 413+ Data Scientist roles. Demand for Agentic AI Engineers is growing rapidly.

According to Bitkom (2025), ~109,000 IT roles are unfilled in Germany. 42% of companies expect AI adoption to generate additional IT staff demand. Starting salaries for ML Engineers are ~€56,580 – growing quickly to €85,000+ for experienced profiles.

Roles on StepStone	Job DE	Average Salary
Data Scientist	413+	€49k–€88k
Machine Learning Engineer	554+	€50k–€75k
AI / ML Engineer	827+	€55k–€85k
AI Engineer (KI-Ingenieur)	631+	€55k–€100k+
LLM / Agentic AI Engineer	—	€65k–€110k+ (est.)
IT-Jobs DE gesamt (Bitkom 2025)	109.000	—



AI Competence

Key Skills: Generative AI, LLMs, prompt engineering, chatbot development, transformers, CNNs, and RAG techniques (connecting LLMs to external data).

Relevance: Knowledge of AI application is required in almost all professions today, even outside the tech industry.

💡 Boost your productivity with AI agents.

Data Competence

Essential skills include data-driven decision-making, performance metrics, data performance, automated data pipelines for AI models, and data architecture. These competencies are crucial because companies require experts for data-driven strategies who can define meaningful metrics and master the necessary data infrastructure.

Sources & References

- Glassdoor Job Search – AI/ML Engineer, Data Scientist, AI Engineer Germany, June 2026
- StepStone Gehaltsreport – Data Scientist & Machine Learning Engineer Deutschland 2026
- Bitkom Pressemitteilung – 109.000 unbesetzte IT-Stellen, August 2025
- Bitkom – Künstliche Intelligenz in Deutschland, Studienbericht Februar 2026
- Anthropic 2026 Agentic Coding Trends Report – resources.anthropic.com
- WBS Coding School / ERI SalaryExpert – AI Engineer Salary Germany 2026
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Curriculum

Agentic Machine Learning Engineering



Vollzeit: 14 Wochen

Englisch

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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Agentic Machine Learning Engineering

Warum jetzt der ideale Zeitpunkt für eine Weiterbildung ist

1 KI verändert die Tech-Branche

Laut Anthropics 2026 Agentic Coding Trends Report nutzen 95 % der Entwickler wöchentlich KI-Tools. Eine typische agentische Sitzung umfasst 47 Tool-Aufrufe und 20 autonome Aktionen, bevor menschlicher Input nötig ist – doppelt so viel wie vor sechs Monaten.

27 % der KI-unterstützten Arbeit wären ohne KI nicht angegangen worden – KI erweitert den Umfang, nicht nur die Geschwindigkeit.

Unternehmen, die agentische KI-Systeme sicher entwickeln, bewerten und einsetzen können, sind besser positioniert, und die Nachfrage nach qualifizierten Ingenieuren übersteigt das Angebot bei weitem.



KI-Kompetenz

Schlüsselkompetenzen: Generative KI, LLMs, Prompt Engineering, Chatbot-Entwicklung, Transformer, CNNs und RAG-Techniken (Verknüpfung von LLMs mit externen Daten).

Relevanz: Wissen über KI-Anwendung wird heute in fast allen Berufen benötigt, auch außerhalb der Tech-Branche.

💡 Steigere deine Produktivität mit KI-Agenten.

2 Der Markt für KI/ML Engineering

KI und ML Engineering zählen zu den am schnellsten wachsenden Bereichen im deutschen Arbeitsmarkt. Automobil, Industrie, Finanzwesen und Technologie benötigen dringend Spezialisten für KI-Systeme.

Laut Glassdoor (Juni 2026) gibt es 827+ offene Stellen für KI/ML Engineers, plus 631+ AI Engineer und 413+ Data-Scientist-Rollen. Die Nachfrage nach Agentic AI Engineers wächst rasant.

Laut Bitkom (2025) sind rund 109.000 IT-Stellen unbesetzt. 42 % der Unternehmen erwarten durch KI zusätzlichen IT-Personalbedarf. Einstiegsgehälter für ML Engineers liegen bei ca. 56.580 € – mit Anstieg auf 85.000+ € für Erfarene.

Daten-Kompetenz

Zu den wichtigsten Fähigkeiten zählen datengetriebene Entscheidungsfindung, Leistungskennzahlen, Datenperformance, automatisierte Datenpipelines für KI-Modelle und Datenarchitektur. Diese Kompetenzen sind entscheidend, da Unternehmen Experten für datengetriebene Strategien benötigen, die aussagekräftige Kennzahlen definieren und die nötige Dateninfrastruktur beherrschen.

Rolle	Offene Stellen DE	Durchschnitts-gehalt
Data Scientist	413+	€49k–€88k
Machine Learning Engineer	554+	€50k–€75k
AI / ML Engineer	827+	€55k–€85k
AI Engineer (KI-Ingenieur)	631+	€55k–€100k+
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