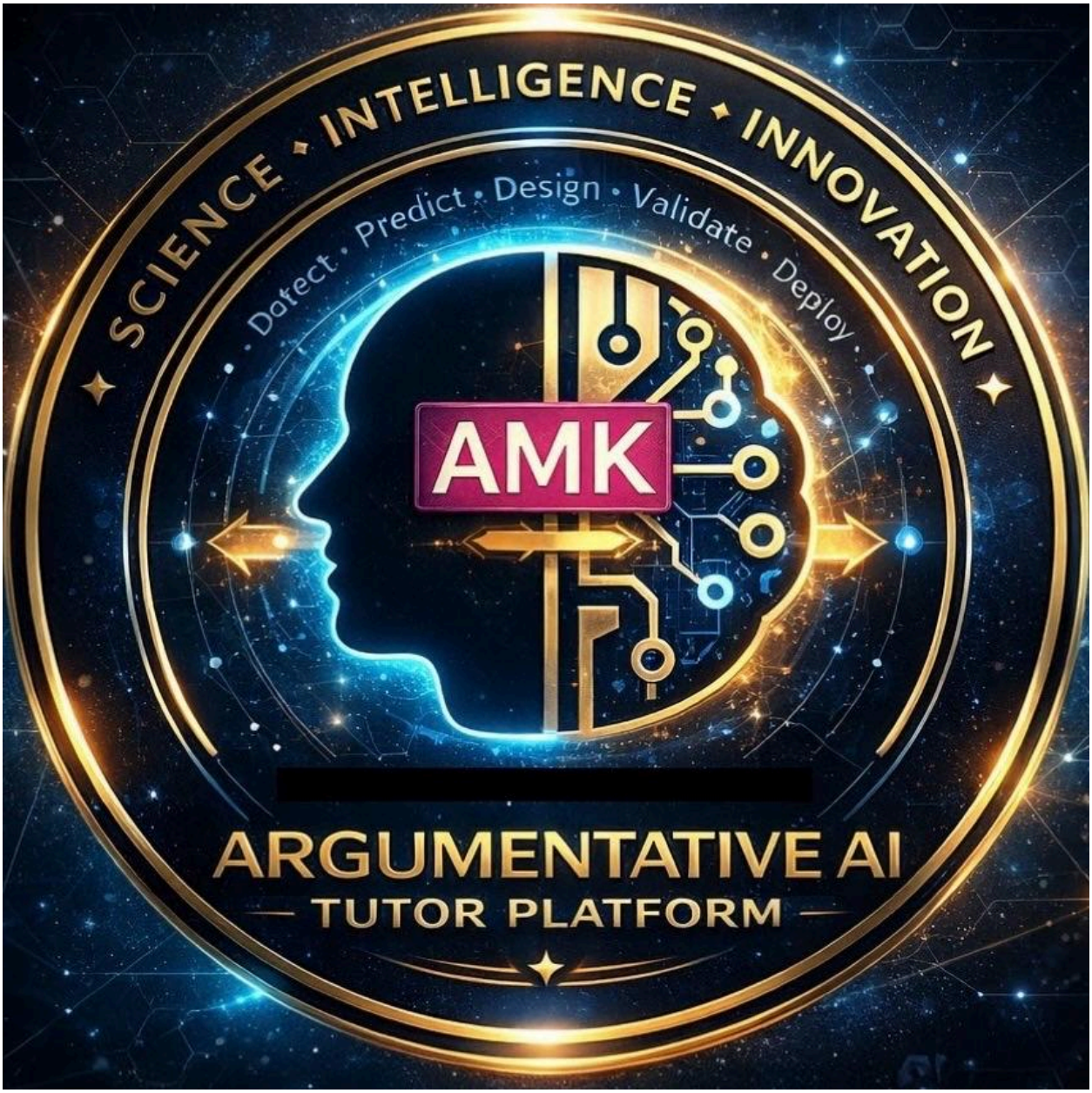
AMK RESEARCH LAB

Science • Intelligence • Innovation



12-WEEK BENCHMARK SYLLABUS AND CURRICULUM

Artificial Intelligence • AI for Cybersecurity • AI for Project Management

Artificial Intelligence Engineering Certification

Institution AMK Research Lab Platform

Delivery Online • Self-Paced • Lecture + Lab + Capstone

Duration 12 Weeks

Prepared for internationally benchmarked AI learning, practical labs, governance literacy, and industry-ready capstone development.

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12-WEEK BENCHMARK SYLLABUS AND CURRICULUM

Artificial Intelligence

• AI for Cybersecurity

• AI for Project Management

Program Duration	12 Weeks
Delivery Mode	Online and Self-Paced
Learning Format	Lecture + Lab + Workshop + Capstone
Certification Pathways	AI Engineering • AI for Cybersecurity • AI for Project Management

Prepared for the AMK RESEARCH LAB platform

1. Program Overview

This handbook presents a 12-week benchmark curriculum for AMK Research Lab's upcoming lecture series. It keeps the Artificial Intelligence Engineering Certification structure while extending it into two applied pathways: AI for Cybersecurity and AI for Project Management. The curriculum is designed as one coherent academy. Learners complete shared technical foundations, then move into applied use cases, deployment discipline, and governance-by-design before a final capstone showcase. Primary toolchain: Python, Jupyter/Colab, NumPy, pandas, scikit-learn, TensorFlow, PyTorch, FastAPI, Docker, and visualization libraries.

Figure 1. Recommended structure of the 12-week program.

2. Benchmark Logic and Design Principles

- Teach technical foundations before specialization.
- Build implementation fluency through weekly labs and mini-projects.
- Connect AI to real deployment contexts in security, operations, and project delivery.
- Introduce ethics, explainability, safety, and human oversight from the first week.
- Use capstone work as portfolio evidence of competence.

3. Intended Audience and Exit Profile

This program is suitable for computer science students, software engineers, analysts, cybersecurity practitioners, technical project managers, and researchers who need a structured path from AI theory to implementation and responsible deployment.

By the end of the 12 weeks, learners should be able to frame an AI problem, prepare data, train and evaluate machine-learning and deep-learning models, explain deployment choices, apply AI to cybersecurity and project-management use cases, and document controls, limitations, and human-review checkpoints.

4. Program Learning Outcomes

1. Explain the fundamental concepts of artificial intelligence and intelligent systems.
2. Develop machine-learning models in Python using standard workflows and evaluation metrics.
3. Implement neural-network and deep-learning methods for practical pattern-recognition tasks.
4. Apply AI to cybersecurity use cases such as anomaly detection, alert triage, and secure operations.
5. Apply AI to project-management use cases such as schedule forecasting, risk analysis, and automated reporting.
6. Deploy AI models into operational environments through APIs, dashboards, or notebooks.
7. Evaluate governance, ethics, fairness, safety, and security implications of AI systems.

5. Assessment Structure

The assessment model prioritizes practical execution and portfolio-ready outputs.

Figure 2. Assessment weighting across quizzes, labs, assignments, and capstone.

Component	Weight	Purpose
Module quizzes	20%	Checks conceptual understanding without dominating the skill profile.
Laboratory exercises	30%	Builds coding fluency and reproducible engineering habits.
Assignments	20%	Requires written interpretation, trade-off analysis, and reflection.
Capstone project	30%	Creates employer-visible evidence of competence and integration.

6. Weekly Curriculum Map

Weeks 1–4 build shared foundations. Weeks 5–10 emphasize applied modeling and pathway examples. Weeks 11–12 cover deployment, governance, and capstone integration.

Week	Theme	Topics	Lab	Expected Outcome
1	AI Era & Responsible Foundations	AI definitions, agents, uses, ethics	Rule-based assistant	Explain AI and responsible use
2	Python for AI	Syntax, functions, data structures, NumPy, pandas	Notebook data summary	Write basic AI workflows
3	Algorithms & Research Methods	Dictionaries, search, graphs, clustering	Keyword-tagging dictionary	Use computational thinking
4	Data Science Foundations	Cleaning, visualization, features, leakage	Risk-data charts	Prepare modeling datasets
5	Machine Learning	Classification, regression, clustering, metrics	Baseline classifier	Select and evaluate models
6	Deep Learning	Neural nets, backprop, activations, regularization	Neural-network demo	Understand gradient learning
7	NLP & Knowledge Systems	TF-IDF, prompting, guardrails, RAG	Q&A or knowledge bot	Apply grounded NLP
8	AI for Cybersecurity	Anomaly detection, intrusion, phishing, SOC use	Intrusion/anomaly workflow	Support secure operations
9	AI for Project Management	Forecasting, risk analytics, meeting intelligence	Project-risk dashboard	Improve delivery decisions
10	Vision & Edge AI	CNNs, detection, drone/camera uses	Image or object demo	Apply real-time monitoring
11	Deployment, MLOps, LLMOps	APIs, Docker, monitoring, logging	Deploy a model API	Move models to operations
12	Governance & Capstone	Explainability, bias, oversight, model cards	Model card + capstone	Integrate governance thinking

7. Pathway Integration Across the Same 12 Weeks

Pathway	Primary Focus	Typical Labs	Capstone Direction
AI Engineering	Model building, evaluation, deployment, governance	Classification, regression, NLP, computer vision, API deployment	Fraud detection, healthcare prediction, student performance, tutor
AI for Cybersecurity	Threat detection, anomaly analysis, SOC automation, secure AI use	Log analytics, intrusion detection, phishing detection, alert triage	Intrusion detection, phishing classifier, cyber dashboard
AI for Project Management	Forecasting, risk management, automated reporting, decision support	Schedule analytics, meeting intelligence, resource forecasting	Risk predictor, action tracker, PM dashboard

8. Weekly Lecture-to-Lab Pattern

Element	Recommended Pattern
Pre-class	One short reading or benchmark video
Lecture	Concept explanation, worked examples, and misconceptions
Lab	Build, debug, test, and interpret outputs
Reflection	Connect technical decisions to ethics, governance, and business impact

9. Capstone Project Options

AI Engineering: Fraud detection, healthcare prediction, student performance, citation-aware tutor.

AI for Cybersecurity: Intrusion detection, phishing classifier, cyber risk dashboard.

AI for Project Management: Project-risk predictor, schedule/cost forecasting, meeting action tracker.

AMK Advanced Applied Track: Drone aquaculture monitoring, governed AI employee system, knowledge assistant.

10. Software and Platform Requirements

Tool	Purpose	Required	Notes
Python	Language for all labs	Yes	Current stable 3.x
Jupyter / JupyterLab	Interactive notebooks	Yes	Primary teaching environment
Google Colab	Cloud option	Recommended	Zero-setup labs
scikit-learn	Classical ML	Yes	Baseline modeling
TensorFlow / PyTorch	Deep learning	Yes	Choose one primary
FastAPI	Model serving	Yes	Week 11 deployment
Docker	Portable runtime	Recommended	Deployment discipline

11. Public Lecture Series

- Artificial Intelligence Engineering Certification
- AI for Cybersecurity and Secure Operations
- AI for Project Management and Delivery Intelligence
- Responsible AI, Deployment, and Governance
- AMK Research Lab Applied AI Lecture Series

12. Certificate and Completion Format

Certificate title: AMK Professional Certificate in Artificial Intelligence Engineering, with optional pathway badges for AI for Cybersecurity, AI for Project Management, and AI Deployment and Governance.

Each certificate includes student name, completion date, certificate ID, course hours, pathway, and authorized signatures. A verification register is maintained for credibility and fraud reduction.

13. Syllabus Statement for Promotion Pages

> *This 12-week online and self-paced certification equips learners with practical skills in artificial intelligence, machine learning, deep learning, deployment, cybersecurity applications, project-management intelligence, and responsible AI governance through lectures, laboratories, assignments, and a capstone project.*

14. Benchmark Alignment Summary

This curriculum is aligned to the benchmark logic already established in the AMK International Benchmark Lecture Notes handbook: shared AI foundations, Python-based implementation, practical labs, deployment readiness, and governance-by-design across the lifecycle. It also preserves the recommended practical balance of quizzes, labs, assignments, and capstone work while extending the program into cybersecurity and project-management applications.

Instructors can use this handbook as a program syllabus, website curriculum page, faculty guide, or student orientation booklet.

References

- AMK Research Lab International Benchmark Lecture Notes: Artificial Intelligence Engineering Certification Program (April 2026).
- AMK benchmark stack: Python, Jupyter, NumPy, pandas, scikit-learn, TensorFlow, and PyTorch.
- AMK assessment guidance: 20% quizzes, 30% labs, 20% assignments, and 30% capstone.