



## Production-Ready Machine Learning: Designing Scalable, Reliable, and Real-World AI Systems



**AGILE LEADERS**  
Training Center

# Production-Ready Machine Learning: Designing Scalable, Reliable, and Real-World AI Systems

## Course Overview:

In today's fast-paced digital landscape, deploying scalable and reliable machine learning systems is no longer optional – it is essential. Production-Ready Machine Learning: Designing Scalable, Reliable, and Real-World AI is an intensive, practical training program grounded in the best practices from the authoritative book *Designing Machine Learning Systems*. This course demystifies the challenges of transforming ML prototypes into robust, real-world AI systems. Participants will explore the entire lifecycle of production-ready ML – from system design and feature engineering techniques to ML model deployment, continuous training, model versioning, and monitoring.

## Target Audience:

- Machine Learning Engineers
- AI System Architects
- Data Scientists
- DevOps Engineers
- Software Engineers in ML Ops
- AI/ML Product Managers
- Cloud Infrastructure Engineers

## Targeted Organisational Departments:

- AI/ML Engineering
- Data Science & Advanced Analytics
- IT Operations & Infrastructure
- Digital Transformation
- Product Development & Innovation
- Quality Assurance & Monitoring
- Cloud & DevOps Teams

## Targeted Industries:

- Technology & SaaS •
- Healthcare & Biotech •
- Finance & FinTech •
- E-commerce & Retail •
- Telecommunications •
- Manufacturing & IoT •
- Automotive Self-driving Systems •
- Logistics & Smart Supply Chain •

## Course Offerings:

By the end of this course, participants will be able to:

- Design and implement scalable machine learning system architectures. •
- Build production-ready ML pipelines and deploy models to cloud and edge environments. •
- Apply data-centric AI principles to optimize feature engineering and data pipelines. •
- Monitor, debug, and maintain ML systems using observability tools. •
- Implement iterative ML development and continuous training practices. •
- Manage model versioning and lifecycle with real-time deployment strategies. •
- Ensure robust performance, fairness, and low-latency operation of AI systems in production. •

## Training Methodology:

This course integrates real-world machine learning case studies, interactive labs, and group-based projects that simulate production machine learning environments. Trainees will engage in iterative machine learning development cycles, explore debugging techniques for machine learning systems, and assess model performance using live monitoring methods. Each module blends conceptual discussions, hands-on exercises, and feedback driven refinement of deployed artificial intelligence systems.

## Course Toolbox:

- Course ebook & Slides •
- Jupyter Notebooks with example ML pipelines •
- Code templates for real-time ML systems •
- Tools: MLflow, TensorFlow Serving, Streamlit, Airflow, Docker, Prometheus/Grafana •
- Access to curated reading materials, case studies & GitHub repos •
- Model evaluation checklists & deployment templates •
- Monitoring dashboards for ML performance •
- Troubleshooting & debugging flowcharts •
- Production ML best practices cheat sheets •

## Course Agenda:

## Day 1: Foundations of Production-Ready ML Systems

- Introduction to Machine Learning Systems in Production Topic 1: •
- Designing Reliable and Scalable ML Systems Topic 2: •
- Differences Between Traditional Software and ML Engineering Topic 3: •
- ML System Requirements: Reliability, Scalability, Maintainability, Adaptability Topic 4: •
- Overview of Real-World ML Use Cases and Business Impact Topic 5: •
- Introduction to Iterative ML Development and Deployment Topic 6: •
- Assessing readiness for real-world ML system design Reflection & Review: •

## Day 2: Data-Centric AI and Feature Engineering

- The Critical Role of Data in ML System Performance Topic 1: •
- Creating and Validating High-Quality Datasets for Production Topic 2: •
- Feature Engineering Techniques and Data Preprocessing Best Practices Topic 3: •
- Data Versioning and Validation in ML Pipelines Topic 4: •
- Understanding Train-Serving Skew and Data Distribution Shifts Topic 5: •
- Managing ML Data Infrastructure at Scale Topic 6: •
- Data-centric challenges in scalable machine learning Reflection & Review: •

## Day 3: Model Development, Evaluation, and Deployment

- Building Robust ML Models for Real-World Applications Topic 1: •
- Model Selection, Training Strategies, and Evaluation Metrics Topic 2: •
- Deployment Strategies: Online vs Batch Prediction Topic 3: •
- Infrastructure for ML Model Deployment and Integration Topic 4: •
- Model Versioning Tools and Continuous Deployment Pipelines Topic 5: •
- Debugging ML Systems and Handling Edge Cases Topic 6: •
- Strengthening ML model deployment pipelines Reflection & Review: •

## Day 4: Monitoring, Retraining, and Observability

- ML Model Monitoring in Production Environments Topic 1: •
- Detecting and Responding to Concept Drift and Data Shifts Topic 2: •
- Continual Learning and Retraining Cycles Topic 3: •
- Observability Tools and Logging for ML Systems Topic 4: •
- ML Reliability Engineering: Failures, Alerts, and Mitigations Topic 5: •
- Real-Time ML Pipelines and Streaming Data Considerations Topic 6: •
- ML lifecycle management and observability Reflection & Review: •

## Day 5: Scaling, Fairness, and Business Alignment

- Scaling AI Systems: From Prototypes to Global Infrastructure Topic 1: •
- Ethical AI: Fairness, Bias, and Interpretability in Production Topic 2: •
- Performance Optimization in Low-Latency AI Systems Topic 3: •
- Business Metrics Alignment and Post-Deployment Analytics Topic 4: •
- Case Studies of Real-World ML System Failures and Recoveries Topic 5: •
- Best Practices in Production ML: End-to-End Workflows Topic 6: •
- Final synthesis of scalable, production-ready ML systems Reflection & Review: •

## FAQ:

What specific qualifications or prerequisites are needed for participants before enrolling in the course?

Basic understanding of machine learning concepts and experience with Python programming is recommended. Prior experience with ML model development or deployment is helpful but not mandatory.

How long is each day's session, and is there a total number of hours required for the entire course?

Each day's session is generally structured to last around 4-5 hours, with breaks and interactive activities included. The total course duration spans five days, approximately 20-25 hours of instruction.

What's the difference between deploying a model and making it production-ready?

Deploying a model means making it technically accessible. But making it production-ready involves designing scalable, low-latency pipelines, building monitoring and alerting systems, ensuring fairness, and preparing for continuous retraining, as emphasised in this course.

## How This Course is Different from Other Production ML Courses:

is structured around real-world Production-Ready Machine LearningUnlike general-purpose ML bootcamps, requirements for reliability, scalability, and adaptability, drawn directly from the acclaimed reference "Designing Machine Learning Systems." It encompasses not only model development but also critical infrastructure design, continuous deployment, monitoring, and feedback loops. The curriculum is rich in use cases and practical challenges faced by companies like Netflix, Uber, and Google. Trainees gain hands-on experience with ML observability tools, iterative workflows, and scalable ML model deployment pipelines. Additionally, the course includes production ML best practices for debugging, data versioning, fairness checks, and retraining strategies ensuring you are equipped for real-world success, not just academic exercises.



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دورات إدارة الجودة وتطوير العمليات



الدورات التدريبية في مجال البيئة والاستدامة



دورات التسويق وإدارة علاقات العملاء وإدارة  
المبيعات



دورات التدريب القانوني والمشتريات  
والتعاقدات



دورات الاتصال الجماهيري و السياسات  
والعلاقات العامة



دورات الذهن السيبراني ودورات تقنية  
المعلومات



دورات الصيانة ودورات المجالات الهندسية  
المختلفة



دورات الصحة والسلامة والذهن المهني



دورات السكرتارية و إدارة المكاتب



دورات الحوكمة وإدارة المخاطر والامتثال



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دورات في مجالات القيادة والإدارة



دورات المهارات الشخصية وتطوير الذات



دورات الحاسبة و التمويل و دورات الإدارة  
المالية



دورات مكتب إدارة المشاريع وإدارة المشاريع  
الرشيقة



دورات معتمدة من قبل هيئات دولية

## مدن التدريب



اسطنبول - تركيا



أهستردام - هولندا



أكرا - غانا



أثينا - اليونان



الرياض - المملكة العربية السعودية



الدوحة - قطر



الدار البيضاء - المغرب



الجبيل - المملكة العربية السعودية



باريس - فرنسا



المنامة - مملكة البحرين



الكويت - الكويت



القاهرة - مصر



براغ - جمهورية التشيك



بانكوك - تايلاند



بالي - جمهورية إندونيسيا



باكو - أذربيجان

## مدن التدريب



جاكرتا - جمهورية إندونيسيا



تبليسي - جورجيا



بوكيت - تايلاند



برشلونة - إسبانيا



روما - إيطاليا



دبي - الإمارات العربية المتحدة



جوهانسبرغ - جنوب إفريقيا



جنيف - سويسرا



شرم الشيخ - مصر



سيول - كوريا الجنوبية



سان دييغو - الولايات المتحدة الأمريكية



زنجبار - تنزانيا



طوكيو - اليابان



طشقند - أوزبكستان



طرابزون - تركيا



شيكاغو - الولايات المتحدة الأمريكية

## مدن التدريب



كوالالمبور - ماليزيا



فيينا - النمسا



عن بعد - منصة زووم



عمان - المملكة الأردنية الهاشمية



ماربيا - اسبانيا



لندن - المملكة المتحدة



لانكاوي - ماليزيا



كيب تاون - جنوب إفريقيا



ميلان - إيطاليا



مونترنو - سويسرا



مسقط - سلطنة عمان



مدريد - إسبانيا



نيس - فرنسا



نairobi - كينيا



ميونخ - ألمانيا

# WHO WE ARE

Agile Leaders is a renowned training center with a team of experienced experts in vocational training and development. With 20 years of industry experience, we are committed to helping executives and managers replace traditional practices with more effective and agile approaches.

## OUR VISION

We aspire to be the top choice training provider for organizations seeking to embrace agile business practices. As we progress towards our vision, our focus becomes increasingly customer-centric and agile.

## OUR MISSION

We are dedicated to developing value-adding, customer-centric agile training courses that deliver a clear return on investment. Guided by our core agile values, we ensure our training is actionable and impactful.

## WHAT DO WE OFFER

At Agile Leaders, we offer agile, bite-sized training courses that provide a real-life return on investment. Our courses focus on enhancing knowledge, improving skills, and changing attitudes. We achieve this through engaging and interactive training techniques, including Q&As, live discussions, games, and puzzles.



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