

ISTQB® Certified Tester AI Testing (CT-AI) v2.0

Duration: 3 Days

Exam Code: CT-AI v 2.0

Prerequisite Certification: CTFL

Prerequisites: Knowledge of AI And Machine Learning, Basic Python Programming

Day 1 – Introduction to AI, Quality Characteristics & Machine Learning Fundamentals

Topics

Introduction to Artificial Intelligence

- AI-Based and Conventional Systems
- Narrow AI, General AI, and Super AI
- Different Types of AI Technologies
- Generative AI
- Hardware for Machine Learning Systems
- Development and Hosting of AI Models
- Machine Learning Development Frameworks
- Regulations and Standards for AI

Quality Characteristics for AI-Based Systems

- AI-Specific Quality Characteristics
- AI and Safety
- Acceptance Criteria for AI-Based Systems

Introduction to Machine Learning

- Different Forms of Machine Learning
- Machine Learning Workflow
- Pretrained Models
- Fine-Tuning
- Retrieval-Augmented Generation

Data for Machine Learning

- Activities in Data Preparation

Labs

- **Lab 1:** Create a Machine Learning Model
 - **Lab 2:** Data Preparation in Support of the Creation of a Machine Learning Model
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Day 2 – Machine Learning Evaluation & Testing AI-Based Systems

Topics

ML Functional Performance Metrics for Classification

- Calculation of Machine Learning Functional Performance Metrics

Neural Networks

- Structure and Working of a Deep Neural Network
- Coverage Measures for Neural Networks

Testing AI-Based Systems

- Locked and Adaptive AI-Based Systems
- Rationale for a Statistical Approach to Testing AI-Based Systems
- Test Oracles for AI-Based Systems

Testing Generative AI and Large Language Models

- Testing Generative AI
- Red Teaming

Test Levels and Machine Learning Systems

- Test Levels for Machine Learning Systems
- Risk-Based Testing of Machine Learning Systems

Labs

- **Lab 3:** Evaluate a Machine Learning Model using Selected ML Functional Performance Metrics
- **Lab 4:** Show the Impact of Different Machine Learning Models and Dataset Combinations
- **Lab 5:** Experience the Implementation of a Perceptron
- **Lab 6:** Exploratory Testing of a Large Language Model

Day 3 – Input Data Testing, Model Testing & ML Development Testing

Topics

Input Data Testing for Machine Learning Systems

- Input Data Risks and Mitigations
- Testing for Bias
- Data Pipeline Testing
- Testing for Data Representativeness
- Dataset Constraint Testing
- Label Correctness Testing

Model Testing for Machine Learning Systems

- Machine Learning Model Risks and Mitigations
- Machine Learning Model Documentation and Review

- ML Functional Performance Testing of Probabilistic Machine Learning Systems
- Adversarial Testing of Machine Learning Systems
- Metamorphic Testing
- Drift Testing
- Testing for Overfitting and Underfitting
- A/B Testing
- Back-to-Back Testing

Machine Learning Development Testing

- Machine Learning Development Risks and Mitigations
- Machine Learning System Deployment Testing

Labs

- **Lab 7:** Input Data Testing
- **Lab 8:** Apply Metamorphic Testing