

OVERALL COURSE OBJECTIVE:	Oracle Cloud Infrastructure AI Foundations
LEARNING OUTCOME:	<ul style="list-style-type: none"> • Gain a comprehensive understanding of fundamental AI concepts like machine learning and neural networks. • Grasp the capabilities of Oracle Cloud Infrastructure (OCI) for AI development and deployment. • Master common AI terminology including data science and deep learning. • Explore Generative AI concepts like Transformers, Large Language Models (LLMs), and Generative Adversarial Networks (GANs). • Learn best practices for designing, developing, and deploying robust AI solutions.
Training Duration	50 Hours

Module Description:

S.no	Unit	Module Description	Module Learning Outcome
1	1	Module 1 : Introduction to AI	<ul style="list-style-type: none"> • Grasp the foundational concepts of Artificial Intelligence (AI), including its history, goals, and applications. • Identify different AI problem-solving techniques and understand their strengths and weaknesses. • Explain the role of data in AI systems and explore basic data processing methods for AI applications. • Develop a critical perspective on the ethical considerations and potential impact of AI on society.

2		Module 2: AI - Tasks and Data	<ul style="list-style-type: none"> • Identify different categories of AI tasks, such as classification, regression, and natural language processing. • Understand the role of data in AI development and the various data types used for training AI models (text, images, audio, etc.). • Explain the importance of data quality and pre-processing techniques for effective AI performance. • Analyze the relationship between the amount and quality of data used in training and the resulting capabilities of an AI model.
3		Module 3: AI vs ML vs DL	<ul style="list-style-type: none"> • Differentiate Artificial Intelligence (AI) from Machine Learning (ML) and Deep Learning (DL) • Identify the strengths and limitations of AI, ML, and DL • Apply appropriate techniques from AI, ML, and DL to solve specific problems • Evaluate the ethical considerations surrounding AI, ML, and DL
4	2	Module 1: Introduction to Machine Learning	<ul style="list-style-type: none"> • Explain core machine learning concepts like supervised vs unsupervised learning. • Implement basic supervised learning algorithms for tasks like prediction and classification. • Prepare data for machine learning models through cleaning and feature engineering. • Evaluate and interpret the performance of machine learning models.
5		Module 2: Supervised	<ul style="list-style-type: none"> • Master linear regression for continuous value prediction.

		Learning - Regression	<ul style="list-style-type: none"> • Understand the applications and limitations of regression models. • Evaluate and interpret the results of regression analysis. • Prepare data for effective regression modeling.
6		Module 3: Supervised Learning-Classification	<ul style="list-style-type: none"> • Build classification models using algorithms like logistic regression and decision trees. • Assess model effectiveness with metrics like accuracy and precision. • Address imbalanced data issues in classification problems. • Translate classification results into actionable insights.
7		Module 4: Unsupervised Learning	<ul style="list-style-type: none"> • Uncover hidden patterns in data using unsupervised learning techniques. • Implement algorithms like k-means clustering and dimensionality reduction. • Evaluate and visualize unsupervised learning results. • Apply unsupervised learning for real-world tasks like customer segmentation.
8		Module 5: Reinforcement Learning	<ul style="list-style-type: none"> • Master core concepts of Reinforcement Learning (learning through rewards). • Implement basic RL algorithms for agent training. • Evaluate and optimize RL models for optimal performance. • Explore real-world applications of Reinforcement Learning
9	3	Module 1: Introduction to Deep Learning	<ul style="list-style-type: none"> • Understand core Deep Learning concepts like neural networks and backpropagation. • Identify key architectures like CNNs and RNNs.

			<ul style="list-style-type: none"> • Build and train basic Deep Learning models using frameworks like TensorFlow. • Evaluate and interpret Deep Learning model performance and outputs
10		Module 2: Deep Learning Models-Sequence Models	<ul style="list-style-type: none"> • Master sequence data processing with Deep Learning models. • Implement RNNs like LSTMs and GRUs for sequence tasks. • Evaluate and interpret results of sequence models. • Explore advanced techniques like attention and transformers.
11		Module 3: Deep Learning Models-CNN	<ul style="list-style-type: none"> • Grasp CNN architecture: convolutional layers, pooling, and activation functions. • Apply CNNs for image tasks: classification, object detection, feature extraction. • Train and fine-tune pre-trained CNN models (VGG, ResNet). • Explore advanced CNN architectures and applications.
12		Module 4: Introduction to Generative AI	<ul style="list-style-type: none"> • Grasp core concepts of Generative AI: data creation and model types. • Explore Generative AI models like VAEs and GANs. • Generate creative content using tools and prompts. • Evaluate potential and limitations of Generative AI (ethics, security, applications).

13		Module 5: LLM and Transformer Model	<ul style="list-style-type: none"> • Demystify Transformer models: understand their architecture and self-attention. • Explore the capabilities of Large Language Models (LLMs) powered by Transformers. • Utilize LLMs through tools and APIs for text generation and manipulation.
			<ul style="list-style-type: none"> • Analyze limitations and potential biases in LLM models, promoting responsible use.
14		Module 6: Prompt Engineering	<ul style="list-style-type: none"> • Master Prompt Engineering: how prompts influence LLM and generative AI outputs. • Craft informative prompts: structure, context, and styles for desired outcomes. • Evaluate and refine prompts for optimal LLM performance. • Explore advanced techniques like few-shot learning and chain-of-thought prompting.
15		Module 7: LLM Fine Tuning	<ul style="list-style-type: none"> • Grasp the concept of LLM Fine Tuning • Apply fine-tuning techniques for improved LLM performance • Evaluate the benefits and limitations of LLM Fine Tuning • Explore advanced fine-tuning techniques and considerations
16	4	Module 1: AI Infrastructure and services	<ul style="list-style-type: none"> • Grasp the role of AI infrastructure (cloud services) for building and deploying AI. • Identify key AI services offered by cloud platform (data, training, inference). • Deploy AI models using platform tools and APIs for real-world use. • Manage and monitor cloud-based AI deployments for performance, fairness, and explainability

17		Module 2: ML Services	<ul style="list-style-type: none"> • Leverage cloud-based ML services for tasks like data prep, training, and deployment. • Utilize managed workflows to streamline ML development on the cloud. • Optimize ML workloads for efficient resource use within the cloud environment.
			<ul style="list-style-type: none"> • Monitor and manage cloud-based ML models for performance, drift, and bias.
18		Module 3: GPU and superclusters in OCI	<ul style="list-style-type: none"> • Leverage GPUs for faster AI/ML workloads (training, inference). • Choose optimal GPU instances on OCI for your AI development needs. • Explore OCI Superclusters for deploying large-scale AI on thousands of GPUs. • Optimize AI workloads on OCI for cost-efficiency using features like spot instances
19		Module 4: Responsible AI	<ul style="list-style-type: none"> • Understand ethical considerations in AI • Identify and mitigate potential biases in AI systems. • Ensure explainability and interpretability of AI models for trust and understanding. • Implement responsible AI practices throughout development, deployment, and monitoring.

20		Module 5: OCI Generative AI	<ul style="list-style-type: none"> • Master OCI Generative AI functionalities: access pre-trained models and fine-tune them. • Generate creative text formats, translate languages, and write content using OCI Generative AI. • Fine-tune pre-trained models on OCI for specific tasks and desired outputs. • Integrate OCI Generative AI with applications using APIs for deployment and access
21		Module 6: OCI Generative AI Agents	<ul style="list-style-type: none"> • Understand OCI Generative AI Agents: LLMs, RAG, and enterprise data for user queries. • Build OCI Generative AI Agents: creating agents, connecting data sources, configuring responses.
			<ul style="list-style-type: none"> • Apply OCI Generative AI Agents for tasks like chatbots, legal research assistants, or knowledge bases. • Evaluate and improve OCI Generative AI Agents for optimal user experience and accuracy.
22		Module 1: OCI AI Services- Language	<ul style="list-style-type: none"> • Extract key information from text with OCI Text Analysis (sentiment, entities, topics). • Translate languages in real-time or batches using OCI Language Translation. • Build chatbots with OCI Conversational AI for natural language interaction. • Convert speech to text and analyze sentiment with OCI Speech Services.

23	5	Module 2: OCI AI Services- Speech	<ul style="list-style-type: none"> • Convert speech to text accurately with OCI Speech Recognition (real-time & batch). • Analyze emotions and sentiment within spoken language using OCI Speech Services. • Customize speech recognition for your industry jargon with OCI Speech. • Integrate OCI Speech functionalities like recognition and analysis into your applications
24		Module 3: OCI AI Services- Document Understanding	<ul style="list-style-type: none"> • Extract key data (text, tables, classifications) from documents using OCI Document Understanding. • Automate document processing tasks like classification, data extraction, and integration. • Customize OCI Document Understanding for specific document types and needs.
			<ul style="list-style-type: none"> • Optimize OCI Document Understanding for accuracy and efficiency
25		Module 4: OCI AI Services- Vision	<ul style="list-style-type: none"> • Analyze images/videos using OCI Vision: object detection, classification, content moderation. • Automate visual inspections (defect, anomaly, object detection) with OCI Vision. • Gain insights from visuals: scene understanding, object attributes, brand recognition using OCI Vision. • Integrate OCI Vision for real-world applications (product ID, security, content moderation)

26	Module 5: OCI AI Services- Anomaly detection	<ul style="list-style-type: none">• Detect unusual data patterns in time series or sensor data using OCI Anomaly Detection.• Optimize anomaly detection models for your specific data (seasonality, trends).• Integrate anomaly detection with monitoring systems for real-time awareness.• Evaluate and improve anomaly detection performance (reduce false positives/negatives)
27	Module 6: Oracle AI Decision services	<ul style="list-style-type: none">• Understand Oracle AI Decision Services: automate decision-making with ML and business rules.• Build decision models: leverage ML, rules, and data sources for intelligent decisions.• Deploy and manage decision models in production for real-world use.• Monitor and optimize decision model performance for better outcomes.

Use Cases :

S.No	Use cases	Modules
1	Building a Chatbot for Customer Service using OCI Conversational AI	1) Setup and Configuration 2) Natural Language Understanding (NLU) Development 3) Dialog Flow Design and Implementation 4) Integration and Deployment
2	Sentiment Analysis of Social Media Data with OCI Text Analysis	1) Data Collection and Preprocessing 2) Sentiment Analysis Model Development 3) Evaluation and Fine-tuning 4) Deployment and Integration
3	Automatic Document Summarization using OCI Text Analysis	1) Text Preprocessing and Parsing 2) Summarization Algorithm Development 3) Evaluation and Optimization 4) Deployment and Integration
4	Multilingual News Translation Engine with OCI Language Translation	1) Data Collection and Preprocessing 2) Translation Model Development 3) Quality Assessment and Improvement 4) Deployment and Integration
5	Building a Question-Answering System for a Specific Domain using OCI Language	1) Domain-specific Data Collection and Annotation 2) Question-Answering Model Development 3) Evaluation and Fine-

		tuning 4) Deployment and Integration
6	Anomaly Detection in Manufacturing with OCI Vision	1) Data Acquisition and Preprocessing 2) Anomaly Detection Model Development 3) Model Evaluation and Fine-tuning 4) Deployment and Integration
7	Image Classification for Product Categorization in E-commerce with OCI Vision	1) Data Collection and Preparation 2) Model Training for Image Classification 3) Evaluation and Fine-tuning 4) Integration and Deployment
8	Content Moderation System for User-Generated Content with OCI Vision	1) Data Collection and Labeling 2) Model Training for Content Moderation 3) Validation and Optimization 4) Deployment and Integration
9	Automated Visual Inspection for Quality Control using OCI Vision	1) Data Collection and Preprocessing 2) Model Development for Automated Visual Inspection 3) Performance Evaluation and Optimization 4) Deployment and Integration
10	Object Detection for Traffic Monitoring and Analysis with OCI Vision	1) Data Collection and Annotation 2) Object Detection Model Development 3) Evaluation and Optimization

		4) Deployment and Integration
11	Predicting Customer Churn with OCI Machine Learning	1) Data Collection and Preparation 2) Feature Engineering and Model Development 3) Model Evaluation and Hyperparameter Tuning 4) Deployment and Integration
12	Stock Price Prediction using OCI Machine Learning Services	1) Data Collection and Preprocessing 2) Feature Engineering and Model Development 3) Model Evaluation and Fine-tuning 4) Deployment and Integration
13	Building a Recommendation Engine for E-commerce with OCI Machine Learning	1) Data Collection and Preprocessing 2) Recommendation Model Development 3) Evaluation and Optimization 4) Deployment and Integration
14	Fraud Detection System using Machine Learning on OCI	1) Data Collection and Preprocessing 2) Fraud Detection Model Development 3) Model Evaluation and Fine-tuning 4) Deployment and Integration
15	Time Series Forecasting for Sales or Resource Management with OCI Machine Learning	1) Data Collection and Preprocessing 2) Time Series Forecasting Model Development 3) Model Evaluation

		and Tuning 4) Deployment and Integration
16	Generating Creative Text Formats (e.g., poems, scripts) with OCI Generative AI	1) Data Collection and Preprocessing 2) Generative Model Development for Creative Text Formats 3) Evaluation and Fine-tuning 4) Deployment and Integration
17	Building an Interactive Chat Interface for a Specific Use Case with OCI Conversational AI	1) Use Case Definition and Requirements Gathering 2) Conversation Design and Flow Mapping 3) Bot Development and Training 4) Integration with OCI Conversational AI Platform
18	Exploring Text-to-Speech and Sentiment Analysis with OCI Speech Services	1) Data Collection and Preprocessing 2) Text-to-Speech Model Development 3) Sentiment Analysis Model Development 4) Evaluation and Integration with OCI Speech Services
19	Developing a Knowledge Base Assistant for Employees using OCI Generative AI Agents	1) Knowledge Base Compilation and Organization 2) Generative AI Agent Development 3) Training and Fine-tuning 4) Integration and Deployment with OCI Services

20	Building a Legal Research Assistant with OCI Generative AI Agents	<ol style="list-style-type: none">1) Legal Data Compilation and Organization2) Generative AI Agent Development for Legal Research3) Training and Fine-tuning for Legal Terminology4) Integration and Deployment with OCI Services
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