Program Catalog Page: Applied MLOps & LLMOps: Managing the AI Lifecycle (MLOps)

Program Overview

- **Program Main Code Name:** MLOps

- **Program Code:** MLOps

- **Program Length:** 28 Weeks (7 Months)

- **Total Contact Hours:** 336 Hours

- **Total Credit Hours:** 13.3 Credits

- **Delivery Method:** In-person Live Instructor-Led, Virtual Live Instructor-Led, or 1-on-1 Personalized Mentorship

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Admissions Requirements

- High school diploma or GED

- Minimum age of 18 years (Applicants under 18 require parental consent)

- Basic Python programming proficiency

- Familiarity with cloud computing and machine learning basics

- Successful NVIT Admissions Interview and Readiness Assessment

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Program Description

The **Applied MLOps & LLMOps: Managing the AI Lifecycle (MLOps)** program prepares students to automate, deploy, monitor, and optimize ML and LLM models at production scale. Students will gain expertise in:

- Building ML pipelines using TFX, MLflow, and Kubeflow
- Deploying LLMs and AI agents using LangChain and Hugging Face
- Automating CI/CD workflows for AI systems
- Implementing model monitoring, feedback loops, and retraining
- Applying responsible AI, compliance, and security in AI workflows
- Managing deployments on cloud, hybrid, and edge platforms

Course Description

This course prepares individuals for professional roles as:

- MLOps Engineer
- AI Infrastructure Engineer
- LLMOps Specialist
- AI Deployment Engineer
- AI Reliability Engineer

Students will:

- Design, automate, and monitor ML/LLM deployments

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- Manage the full AI lifecycle from experimentation to production

- Integrate DevOps best practices into AI workflows

- Apply AI-specific monitoring and compliance frameworks

Occupations for Which Training Will Be Provided

- MLOps Engineer

- LLMOps Engineer

- AI Infrastructure Engineer

- Platform Engineer (AI Focus)

- AI Systems Engineer

Work Settings for Program Graduates

- Technology Companies and Cloud Providers

- AI and ML Startups

- Research Labs and Enterprise AI Teams

- Consulting Firms and DevOps Platforms

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Instructional Components

Instructional Component	Hours
Live Lectures + Live Proctored Exams	63
Labs & Projects	189
On-the-Job Training (OJT) + Capstone Project	84

- **Total Contact Hours:** 336 Hours
- **Total Credit Hours:** 13.3 Credits

Course Outline

Subject #	Subject Title	Lecture Hrs	Lab/Project Hrs	OJT + Capstone Hrs	Contact Hrs	Credit Hrs
MLOps 101	ML Engineering Foundations	6	18	0	24	1.0
MLOps 102	Production-Ready ML Pipelines	6	18	0	24	1.0
MLOps 103	Containerization & Model Serving	6	18	0	24	1.0

Subject #	Subject Title	Lecture Hrs	Lab/Project Hrs	OJT + Capstone Hrs	Contact Hrs	Credit Hrs
MLOps 104	CI/CD for AI Pipelines	6	18	0	24	1.0
MLOps 105	Monitoring, Drift & Feedback Loops	6	18	0	24	1.0
MLOps 106	Scaling AI Workloads	6	18	0	24	1.0
MLOps 107	LLMOps & GenAI Deployment	9	27	0	36	1.2
MLOps 108	Observability & Compliance	9	27	0	36	1.2
MLOps 109	Advanced Orchestration	9	27	0	36	1.2
MLOps 110	Capstone AI Lifecycle Project	2	2	80	84	3.6

Total Contact Hours = 336, **Total Credits = 13.3**

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Subject Descriptions

MLOps 101 – ML Engineering Foundations

(Weeks 1–2 | Lec 6 Hrs / Lab 18 Hrs / Ext 0 Hrs | 24 Total Hrs | 1.0 Credit Hrs)

Students will:

- Understand ML system design and architecture
- Refactor ML code for production readiness
- Implement data validation and feature engineering pipelines
- Apply reproducibility and version control practices

Prerequisite: Python programming, basic machine learning familiarity

Tools: TensorFlow Extended (TFX), MLflow, Git

MLOps 102 – Production-Ready ML Pipelines

(Weeks 3–4 | Lec 6 Hrs / Lab 18 Hrs / Ext 0 Hrs | 24 Total Hrs | 1.0 Credit Hrs)

Students will:

- Automate end-to-end ML workflows
- Build training, validation, and deployment pipelines
- Handle data drift and schema evolution

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- Manage experiments systematically

Prerequisite: MLOps 101 – ML Engineering Foundations

Tools: Kubeflow Pipelines, MLflow, Metaflow

MLOps 103 – Containerization & Model Serving

(Weeks 5–6 | Lec 6 Hrs / Lab 18 Hrs / Ext 0 Hrs | 24 Total Hrs | 1.0 Credit Hrs)

Students will:

- Containerize ML models using Docker
- Deploy models to production with FastAPI and TensorFlow Serving
- Design scalable model serving architectures
- Integrate model endpoints with APIs

Prerequisite: MLOps 102 – Production-Ready ML Pipelines

Tools: Docker, Kubernetes, TensorFlow Serving

MLOps 104 – CI/CD for AI Pipelines

(Weeks 7–8 | Lec 6 Hrs / Lab 18 Hrs / Ext 0 Hrs | 24 Total Hrs | 1.0 Credit Hrs)

Students will:

- Build CI/CD pipelines for ML systems
- Automate model retraining and redeployment
- Integrate GitHub Actions and GitLab CI for MLOps
- Apply canary deployments and blue-green rollout strategies

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Prerequisite: MLOps 103 – Containerization & Model Serving

Tools: GitHub Actions, Jenkins, MLflow

MLOps 105 – Monitoring, Drift & Feedback Loops

(Weeks 9–10 | Lec 6 Hrs / Lab 18 Hrs / Ext 0 Hrs | 24 Total Hrs | 1.0 Credit Hrs)

Students will:

- Implement monitoring of model performance in production
- Detect data drift and concept drift
- Set up feedback loops for retraining
- Design alerting systems for AI anomalies

Prerequisite: MLOps 104 – CI/CD for AI Pipelines

Tools: Evidently AI, Prometheus, Grafana

MLOps 106 – Scaling AI Workloads

(Weeks 11–12 | Lec 6 Hrs / Lab 18 Hrs / Ext 0 Hrs | 24 Total Hrs | 1.0 Credit Hrs)

Students will:

- Scale training and inference across cloud and edge
- Optimize compute, memory, and network resources
- Implement batch and streaming pipelines
- Manage cost-efficient scaling strategies

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Prerequisite: MLOps 105 – Monitoring, Drift & Feedback Loops

Tools: AWS SageMaker, Azure ML, Google Vertex AI

MLOps 107 – LLMOps & GenAI Deployment

(Weeks 13–15 | Lec 9 Hrs / Lab 27 Hrs / Ext 0 Hrs | 36 Total Hrs | 1.2 Credit Hrs)

Students will:

- Deploy large language models (LLMs) at scale
- Implement retrieval-augmented generation (RAG) pipelines
- Fine-tune and deploy custom LLMs
- Optimize GenAI solutions for latency and reliability

Prerequisite: MLOps 106 – Scaling AI Workloads

Tools: LangChain, Hugging Face, OpenAI API

MLOps 108 – Observability & Compliance

(Weeks 16–18 | Lec 9 Hrs / Lab 27 Hrs / Ext 0 Hrs | 36 Total Hrs | 1.2 Credit Hrs)

Students will:

- Apply observability techniques across ML systems
- Build explainability (XAI) modules for models
- Implement AI model compliance frameworks
- Address fairness, bias, privacy, and security in AI deployments

Prerequisite: MLOps 107 – LLMOps & GenAI Deployment

Tools: WhyLabs, Weights & Biases, TensorBoard

MLOps 109 – Advanced Orchestration

(Weeks 19–21 | Lec 9 Hrs / Lab 27 Hrs / Ext 0 Hrs | 36 Total Hrs | 1.2 Credit Hrs)

Students will:

- Design orchestrated ML workflows across distributed systems

- Optimize DAGs for ML workloads

- Implement advanced scheduling with Airflow, Prefect, and Argo Workflows

- Automate cross-platform AI deployments

Prerequisite: MLOps 108 – Observability & Compliance

Tools: Apache Airflow, Prefect, Argo Workflows

MLOps 110 – Capstone AI Lifecycle Project

(Weeks 22–28 | Lec 2 Hrs / Lab 2 Hrs / OJT + Capstone 80 Hrs | 84 Total Hrs | 3.6 Credit Hrs)

Students will:

- Complete a real-world AI lifecycle project

- Build end-to-end pipelines from ingestion to deployment and monitoring

- Produce production-ready documentation, dashboards, and presentations

- Defend and present the solution to a panel of experts

Prerequisite: MLOps 109 – Advanced Orchestration

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Class Schedule

- **Day Students:** Monday to Wednesday, 9:30 AM – 12:30 PM

- **Afternoon Students:** Monday to Wednesday, 1:30 PM – 4:30 PM

- **Evening Students:** Monday to Wednesday, 6:00 PM – 9:00 PM

- **Weekend Students:** Thursday to Saturday, available in Morning, Afternoon, and Evening shifts.

- **Virtual Mentorship Students:** 12–24 flexible hours per week

Day students will attend class Monday through Wednesday.

Weekend students will attend class Thursday through Saturday.

A **10-minute break** will be taken every instructional hour for all in-person students.

Lunch break for day students is from 12:30 PM to 1:30 PM.

Evening students will not have a meal break but will have a 10-minute break every instructional hour.

Dates School Will Be Closed

- New Year's Day

- Martin Luther King Day

- Presidents' Day

- Good Friday

- Memorial Day

- Independence Day

- LBJ's Birthday

- Labor Day

- Veteran's Day

- Thanksgiving Day

- Day After Thanksgiving

- Christmas Eve

- Christmas Day

- Day After Christmas

Class Start Dates

- Classes for all students (Day, Afternoon, Evening, Weekend) begin **May 26, 2025**.

- New classes start approximately **every eight weeks** for in-person students.

- Virtual Mentorship students have **rolling admissions** with flexible start dates.

Tuition and Fees

Fee Type	Cost
Registration Fee	$50.00
Books and Supplies (estimated)	$600.00

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Fee Type	Cost
Background Check (if applicable)	$150.00
Tuition (In-person Live Instruction)	$11,499.00
Tuition (Virtual Live Instruction)	$10,499.00
Tuition (1-on-1 Virtual Mentorship)	$12,499.00

Total Program Cost:

- **In-person:** $12,299.00

- **Virtual Live:** $11,299.00

- **Virtual Mentorship:** $13,299.00

Cost per Single Subject

Each single subject cost is calculated based on the tuition per contact hour multiplied by the number of contact hours for each subject.

Hourly Tuition Rate (Based on Total Program Cost Divided by 336 Contact Hours):

- **In-Person Live Instruction:** $36.61 per hour

- **Virtual Live Instruction:** $33.61 per hour

- **1-on-1 Virtual Mentorship:** $39.58 per hour

The individual subject costs are:

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Subject Code	Subject Title	Contact Hours	In-Person Cost	Virtual Live Cost	Virtual Mentorship Cost
MLOps 101	ML Engineering Foundations	24	$878.64	$806.64	$949.92
MLOps 102	Production-Ready ML Pipelines	24	$878.64	$806.64	$949.92
MLOps 103	Containerization & Model Serving	24	$878.64	$806.64	$949.92
MLOps 104	CI/CD for AI Pipelines	24	$878.64	$806.64	$949.92
MLOps 105	Monitoring, Drift & Feedback Loops	24	$878.64	$806.64	$949.92
MLOps 106	Scaling AI Workloads	24	$878.64	$806.64	$949.92
MLOps 107	LLMOps & GenAI Deployment	36	$1,317.96	$1,209.96	$1,424.88
MLOps 108	Observability & Compliance	36	$1,317.96	$1,209.96	$1,424.88

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Subject Code	Subject Title	Contact Hours	In-Person Cost	Virtual Live Cost	Virtual Mentorship Cost
MLOps 109	Advanced Orchestration	36	$1,317.96	$1,209.96	$1,424.88
MLOps 110	Capstone AI Lifecycle Project	84	$3,076.92	$2,822.52	$3,325.92

Note

- Registration Fee, Books and Supplies, and Background Check are **already included** in the total program cost for full program students.
- They **apply separately** for students enrolling only in individual subjects.