Program Catalog Page: Applied Machine Learning and Deep Learning (MLDL)

Program Overview

- **Program Main Code Name:** MLDL

- **Program Code:** MLDL

- **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

- Introductory understanding of statistics

- Successful NVIT Admissions Interview

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Program Description

The **Applied Machine Learning and Deep Learning (MLDL)** program prepares students to design, build, deploy, and scale real-world AI/ML solutions. Students gain practical hands-on **skills in:**

- Building predictive and classification models
- Designing and training deep learning neural networks
- Implementing generative AI techniques including GANs and VAEs
- Deploying scalable machine learning applications using DevOps and MLOps frameworks

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Course Description

This course prepares individuals for entry-level positions as:

- Machine Learning Engineers
- Deep Learning Engineers
- AI/ML Solutions Developers
- Applied AI Research Specialists

Students learn to:

- Design, build, and deploy machine learning and deep learning systems
- Apply advanced AI techniques including GANs, transfer learning, and scalable AI deployments
- Deploy AI models using industry-standard cloud and DevOps frameworks

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Occupations for Which Training Will Be Provided

- Machine Learning Engineer

- Deep Learning Engineer

- Computer Vision Engineer

- AI/ML Solutions Developer

- Applied AI Research Specialist

Work Settings for Program Graduates

- AI Technology Companies

- Cloud Computing Providers

- Data Science Consulting Firms

- Research and Development Labs

- Startups and Entrepreneurial Ventures

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Instructional Components

Instructional Component	Hours
Live Lectures + Live Proctored Exams	63 Hours
Labs & Projects	189 Hours
On-the-Job Training (OJT) + Capstone Project	84 Hours
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
MLDL 101	Machine Learning Foundations	6	18	0	24	1.0
MLDL 102	Supervised Learning Models	6	18	0	24	1.0
MLDL 103	Unsupervised Learning & Clustering	6	18	0	24	1.0

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Subject #	Subject Title	Lecture Hrs	Lab/Project Hrs	OJT + Capstone Hrs	Contact Hrs	Credit Hrs
MLDL 104	Introduction to Deep Learning	6	18	0	24	1.0
MLDL 105	Computer Vision with CNNs	6	18	0	24	1.0
MLDL 106	Sequence Models (RNN, LSTM, GRU)	6	18	0	24	1.0
MLDL 107	Transfer Learning and Fine-tuning	9	27	0	36	1.2
MLDL 108	Generative AI Systems	9	27	0	36	1.2
MLDL 109	Scalable AI Deployment	9	27	0	36	1.2
MLDL 110	Capstone Project and On-the-Job Training	0	0	84	84	3.6

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

Subject Descriptions

MLDL 101 – Machine Learning Foundations

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

Students will:

- Design supervised machine learning pipelines from raw datasets.
- Build and validate predictive models using cross-validation.
- Engineer features to optimize model performance and accuracy.
- Evaluate model outputs with metrics such as precision, recall, and ROC-AUC.
- Troubleshoot bias-variance tradeoff to improve generalization.

Prerequisite: Python programming basics, foundational statistics

Tools: Python, Scikit-learn

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MLDL 102 – Supervised Learning Models

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

Students will:

- Train linear and logistic regression models for classification and regression.

- Apply decision trees and random forest algorithms for real-world problems.

- Perform feature selection and hyperparameter tuning to optimize models.

- Deploy ensemble learning techniques to enhance prediction performance.

Prerequisite: MLDL 101 – Machine Learning Foundations

Tools: Scikit-learn, Pandas, Matplotlib

MLDL 103 – Unsupervised Learning & Clustering

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

Students will:

- Apply KMeans, DBSCAN, and hierarchical clustering to find hidden patterns.

- Perform dimensionality reduction using PCA, t-SNE, and UMAP.

- Analyze and interpret clusters for applications like customer segmentation.

Prerequisite: MLDL 102 – Supervised Learning Models

Tools: Scikit-learn, Seaborn

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MLDL 104 – Introduction to Deep Learning

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

Students will:

- Build deep neural networks from scratch using TensorFlow/Keras.
- Train models using backpropagation and advanced optimization techniques.
- Apply regularization methods such as dropout and batch normalization.

Prerequisite: MLDL 103 – Unsupervised Learning & Clustering

Tools: TensorFlow, Keras

MLDL 105 – Computer Vision with CNNs

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

Students will:

- Architect and train convolutional neural networks (CNNs) for image tasks.
- Implement pooling, padding, and feature extraction techniques.
- Apply data augmentation to improve model robustness and generalization.

Prerequisite: MLDL 104 – Introduction to Deep Learning

Tools: TensorFlow, OpenCV, Keras

MLDL 106 – Sequence Models (RNN, LSTM, GRU)

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

Students will:

- Build sequential models using RNN, LSTM, and GRU architectures.

- Design solutions for time-series forecasting and sequence classification.

- Handle challenges like vanishing gradients and overfitting in sequential data.

Prerequisite: MLDL 105 – Computer Vision with CNNs

Tools: TensorFlow, Hugging Face

MLDL 107 – Transfer Learning and Fine-Tuning

(Weeks 13–15 | Lecture 9 Hrs / Lab 27 Hrs / Ext 0 Hrs | 36 Total Contact Hrs | 1.2 Semester Credits)

Students will:

- Adapt pre-trained models like MobileNet, ResNet, and BERT to new domains.

- Fine-tune deep models for specific datasets without overfitting.

- Customize transformer models for specialized NLP tasks.

Prerequisite: MLDL 106 – Sequence Models (RNN, LSTM, GRU)

Tools: TensorFlow Hub, Hugging Face Transformers

MLDL 108 – Generative AI Systems

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(Weeks 16–18 | Lecture 9 Hrs / Lab 27 Hrs / Ext 0 Hrs | 36 Total Contact Hrs | 1.2 Semester Credits)

Students will:

- Develop Generative Adversarial Networks (GANs) for synthetic data creation.
- Build Variational Autoencoders (VAEs) for data generation tasks.
- Understand and apply the fundamentals of diffusion models and LLMs.

Prerequisite: MLDL 107 – Transfer Learning and Fine-Tuning

Tools: TensorFlow, Hugging Face, OpenAI API

MLDL 109 – Scalable AI Deployment

(Weeks 19–21 | Lecture 9 Hrs / Lab 27 Hrs / Ext 0 Hrs | 36 Total Contact Hrs | 1.2 Semester Credits)

Students will:

- Build and deploy ML model APIs using FastAPI.
- Containerize applications with Docker and orchestrate with Kubernetes.
- Implement cloud deployment pipelines using AWS, Azure, and GCP services.

Prerequisite: MLDL 108 – Generative AI Systems

Tools: FastAPI, Docker, AWS, Azure, GCP

MLDL 110 – Capstone Project and On-the-Job Training

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(Weeks 22–28 | Lecture 0 Hrs / Lab 0 Hrs / OJT + Capstone 84 Hrs | 84 Total Contact Hrs | 3.7 Semester Credits)

Students will:

- Complete a real-world AI/ML project from problem scoping to solution deployment.

- Deploy models in production environments with monitoring systems.

- Present final deliverables including technical documentation and business analysis.

Prerequisite: MLDL 109 – Scalable AI Deployment

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.

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Evening students will not have a meal break, but will have a 10-minute break each 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.**

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- 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
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:

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- **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 as follows:

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Subject Code	Subject Title	Contact Hours	In-Person Cost	Virtual Live Cost	Virtual Mentorship Cost
MLDL 101	Machine Learning Foundations	24	$878.64	$806.64	$949.92
MLDL 102	Supervised Learning Models	24	$878.64	$806.64	$949.92
MLDL 103	Unsupervised Learning & Clustering	24	$878.64	$806.64	$949.92
MLDL 104	Introduction to Deep Learning	24	$878.64	$806.64	$949.92
MLDL 105	Computer Vision with CNNs	24	$878.64	$806.64	$949.92
MLDL 106	Sequence Models (RNN, LSTM, GRU)	24	$878.64	$806.64	$949.92
MLDL 107	Transfer Learning and Fine-tuning	36	$1,317.96	$1,209.96	$1,424.88
MLDL 108	Generative AI Systems	36	$1,317.96	$1,209.96	$1,424.88
MLDL 109	Scalable AI Deployment	36	$1,317.96	$1,209.96	$1,424.88

Subject Code	Subject Title	Contact Hours	In-Person Cost	Virtual Live Cost	Virtual Mentorship Cost
MLDL 110	Capstone Project and On-the-Job Training	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 calculations but apply separately for students enrolling in individual subjects only.

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