



Program Catalog Page: Applied Data Science & Engineering (DSEng)

Program Overview

- **Program Main Code Name:** DSEng
- **Program Code:** DSEng
- **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

Admissions Requirements

- High school diploma or GED
- Minimum age of 18 years (Applicants under 18 require parental consent)
- Strong interest in Data Science, AI, and Analytics
- Basic computer literacy
- Successful NVIT Admissions Interview and Readiness Assessment

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Program Description

The **Applied Data Science & Engineering (DSEng)** program prepares students for real-world roles in data science, AI, and data engineering. Students will:

- Build data pipelines, automate ETL workflows, and manage big data
- Perform data exploration, statistical modeling, and predictive analytics
- Develop machine learning and deep learning models
- Implement scalable AI deployments with MLOps frameworks
- Work with NLP and large language models for text-based AI solutions

Course Description

This course prepares individuals for entry-level and mid-level roles as:

- Data Scientists
- Data Engineers
- AI/ML Engineers
- Analytics Engineers
- AI Solutions Developers

Students will learn to:

- Design and deploy machine learning and AI pipelines
- Engineer scalable data systems and automate workflows
- Deploy real-world cloud-based AI solutions

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- Apply advanced AI modeling techniques with generative AI

Occupations for Which Training Will Be Provided

- Data Scientist
- Data Engineer
- AI/ML Engineer
- Business Intelligence Developer
- Analytics Engineer

Work Settings for Program Graduates

- Technology Companies and AI Startups
- Healthcare and Financial Analytics
- Cloud Computing Providers
- Data Science Consulting Firms
- Research and Development Labs

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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
DSEng 101	Python for Data Science & Pandas	6	18	0	24	1.0
DSEng 102	SQL, Databases & APIs	6	18	0	24	1.0
DSEng 103	Statistics & Exploratory Data Analysis (EDA)	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
DSEng 104	Data Visualization & Storytelling	6	18	0	24	1.0
DSEng 105	Machine Learning Foundations	6	18	0	24	1.0
DSEng 106	Deep Learning & Generative AI	6	18	0	24	1.0
DSEng 107	Data Engineering & Pipelines	9	27	0	36	1.2
DSEng 108	NLP & Large Language Models	9	27	0	36	1.2
DSEng 109	AI Deployment & MLOps	9	27	0	36	1.2
DSEng 110	Capstone Project and On-the-Job Training	0	0	84	84	3.7

Total Contact Hours = 336, Total Credits = 13.3

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Subject Descriptions

DSEng 101 – Python for Data Science & Pandas

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

Students will:

- Develop proficiency in Python programming for data analysis
- Load, clean, and manipulate datasets using Pandas
- Automate repetitive data wrangling tasks
- Prepare structured and unstructured datasets for analytics workflows

Prerequisite: None

Tools: Python, Pandas, Jupyter Notebook

DSEng 102 – SQL, Databases & APIs

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

Students will:

- Write efficient SQL queries to retrieve and manage data
- Design and normalize relational databases
- Connect to external data sources using APIs
- Build simple ETL pipelines integrating SQL and API data ingestion

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Prerequisite: DSEng 101 – Python for Data Science & Pandas

Tools: MySQL, PostgreSQL, REST APIs, SQLAlchemy

DSEng 103 – Statistics & Exploratory Data Analysis (EDA)

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

Students will:

- Apply descriptive and inferential statistics to datasets
- Conduct hypothesis testing and regression analysis
- Perform exploratory data analysis (EDA) to identify patterns
- Prepare data for predictive modeling

Prerequisite: DSEng 102 – SQL, Databases & APIs

Tools: NumPy, SciPy, StatsModels

DSEng 104 – Data Visualization & Storytelling

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

Students will:

- Build professional visualizations and dashboards
- Apply storytelling frameworks to communicate findings
- Create interactive reports for business users
- Integrate insights from multiple data sources

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Prerequisite: DSEng 103 – Statistics & EDA

Tools: Power BI, Matplotlib, Seaborn

DSEng 105 – Machine Learning Foundations

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

Students will:

- Build supervised learning models (regression, classification)
- Implement model evaluation metrics (precision, recall, F1-score)
- Perform feature engineering and model selection
- Use scikit-learn pipelines for ML workflows

Prerequisite: DSEng 104 – Data Visualization & Storytelling

Tools: Scikit-learn, Pandas, Matplotlib

DSEng 106 – Deep Learning & Generative AI

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

Students will:

- Construct neural networks for deep learning tasks
- Train CNN models for image classification
- Understand principles of generative AI (GANs, VAEs)
- Apply transfer learning techniques using pre-trained models

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Prerequisite: DSEng 105 – Machine Learning Foundations

Tools: TensorFlow, Keras

DSEng 107 – Data Engineering & Pipelines

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

Students will:

- Build ETL and ELT pipelines using modern frameworks
- Automate data workflows with Apache Airflow and Prefect
- Manage large datasets using Spark and Databricks
- Design robust and scalable data systems

Prerequisite: DSEng 106 – Deep Learning & Generative AI

Tools: Apache Airflow, Apache Spark, Databricks

DSEng 108 – NLP & Large Language Models

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

Students will:

- Preprocess, clean, and analyze text datasets
- Implement NLP pipelines (tokenization, classification, sentiment analysis)
- Fine-tune transformer models for business applications
- Apply LLMs for advanced text generation and summarization

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Prerequisite: DSEng 107 – Data Engineering & Pipelines

Tools: Hugging Face Transformers, OpenAI API

DSEng 109 – AI Deployment & MLOps

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

Students will:

- Build and deploy ML models using FastAPI and Docker
- Automate deployment pipelines (CI/CD) for AI solutions
- Monitor model performance and automate retraining
- Utilize AWS, Azure, and GCP platforms for deployment

Prerequisite: DSEng 108 – NLP & Large Language Models

Tools: FastAPI, Docker, GitHub Actions, AWS, Azure, GCP

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

(Weeks 22–28 | Lec 0 Hrs / Lab 0 Hrs / OJT + Capstone 84 Hrs | 84 Total Hrs | 3.7 Credit Hrs)

Students will:

- Complete a real-world data science or AI engineering project
- Apply full-stack development: data ingestion, ML modeling, deployment
- Produce a portfolio-ready solution aligned with industry needs
- Deliver project documentation and a professional presentation

Prerequisite: DSEng 109 – AI Deployment & MLOps

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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 (Morning, Afternoon, and Evening shifts available)
- **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: 12:30 PM – 1:30 PM for day students.

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

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- 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
Background Check (if applicable)	\$150.00

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Fee Type	Cost
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 calculated as follows:

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Subject Code	Subject Title	Contact Hours	In-Person Cost	Virtual Live Cost	Virtual Mentorship Cost
DSEng 101	Python for Data Science & Pandas	24	\$878.64	\$806.64	\$949.92
DSEng 102	SQL, Databases & APIs	24	\$878.64	\$806.64	\$949.92
DSEng 103	Statistics & Exploratory Data Analysis (EDA)	24	\$878.64	\$806.64	\$949.92
DSEng 104	Data Visualization & Storytelling	24	\$878.64	\$806.64	\$949.92
DSEng 105	Machine Learning Foundations	24	\$878.64	\$806.64	\$949.92
DSEng 106	Deep Learning & Generative AI	24	\$878.64	\$806.64	\$949.92
DSEng 107	Data Engineering & Pipelines	36	\$1,317.96	\$1,209.96	\$1,424.88
DSEng 108	NLP & Large Language Models	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
DSEng 109	AI Deployment & MLOps	36	\$1,317.96	\$1,209.96	\$1,424.88
DSEng 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** for full program students, but **apply separately** for students enrolling in individual subjects only.

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