

Ebook



Start Your AI Learning Journey

Master Python and machine learning essentials for free.



Master the Basics

Build Future-Ready Skills

In today's rapidly evolving digital landscape, proficiency in AI has become a fundamental skill set for professionals across industries. Developing AI skills not only enhances individual career prospects, but also empowers professionals to contribute meaningfully to their organizations' growth and competitiveness.

This ebook is designed for curious minds who are eager to explore the leading-edge fields of artificial intelligence (AI) and deep learning (DL). Whether you're a student, a professional, or an enthusiast, this learning path will introduce you to the foundational concepts that underpin modern AI technologies. Starting with the basics of Python programming, we'll gradually build up to core machine learning principles.

This journey is ideal for those with little to no prior experience in programming or data science. Upon completion, you'll have a solid grasp of Python and the fundamental concepts of machine learning, preparing you for more advanced studies.

Here's what's included

- > **Key concepts:** Get started with a review of basic AI and deep learning concepts.
- > **AI skills pre-check:** Assess your current knowledge level to tailor your learning experience.
- > **Recommended training:** We've identified three curriculums to choose from. Each contains a rich collection of learning materials, including lectures, hands-on exercises, and interactive modules designed to reinforce key concepts. Pick the curriculum that best matches your learning style. All learning content is available at no charge.
- > **Additional resources:** Explore a curated list of resources to supplement your learning and deepen your understanding of AI and deep learning topics.

As you progress, you will:

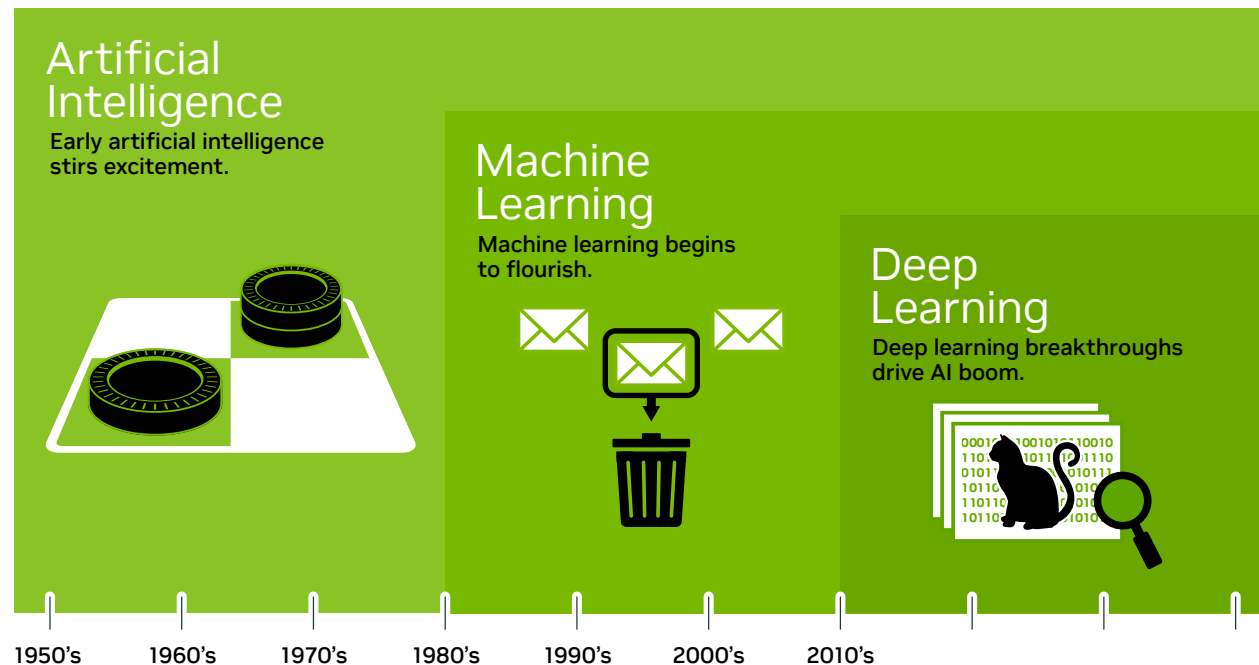
- > Master the basics of programming concepts in Python 3.
- > Get familiar with crucial data structures and machine learning libraries (i.e., Pandas, NumPy, and Scikit-Learn).
- > Build a solid understanding of introductory statistics, including how to compute a regression line.

Here's what to expect:

- > **Experience level:** We assume no prior experience with Python, and start with the very basics.
- > **Time commitment:** Expect to spend between 40 to 80 hours learning, depending on the path chosen and your existing skill set.
- > **Resource accessibility:** All necessary materials/ resources listed on page 12. A standard computer or mobile device with internet connection should be sufficient to access all learning materials.

Start Learning for Free

Step 1: Familiarize Yourself With Key Concepts



Since an early flush of optimism in the 1950s, smaller subsets of artificial intelligence – first machine learning, then deep learning, a subset of machine learning – have created ever larger disruptions.

What is Artificial Intelligence?

Artificial Intelligence is a set of technologies that enable machines to perform advanced functions by simulating human learning, comprehension, problem solving, and decision-making. AI systems simulate these cognitive processes by analyzing vast amounts of data and identifying patterns and relationships, which can then be used to automate the execution of complex tasks. AI's key advantage is its ability to learn from experiences and patterns, continuously adapting and improving as new data is introduced.

NVIDIA's commitment to AI is driving the future of innovation. We provide the tools and technologies that empower researchers, developers, and businesses to push the boundaries of what's possible, transforming industries and improving lives worldwide.

What is Machine Learning?

Machine learning (ML) is a subset of AI that lets machines automatically learn from data and past experiences to identify patterns and make predictions with minimal human intervention.

Machine learning methods let computers operate autonomously without explicit programming, and ML applications can independently learn, grow, develop, and adapt as they are fed with new data.

Today, companies are increasingly data-driven, and are using analytics and machine learning to recognize complex patterns, detect changes, and make predictions that directly impact the bottom line.

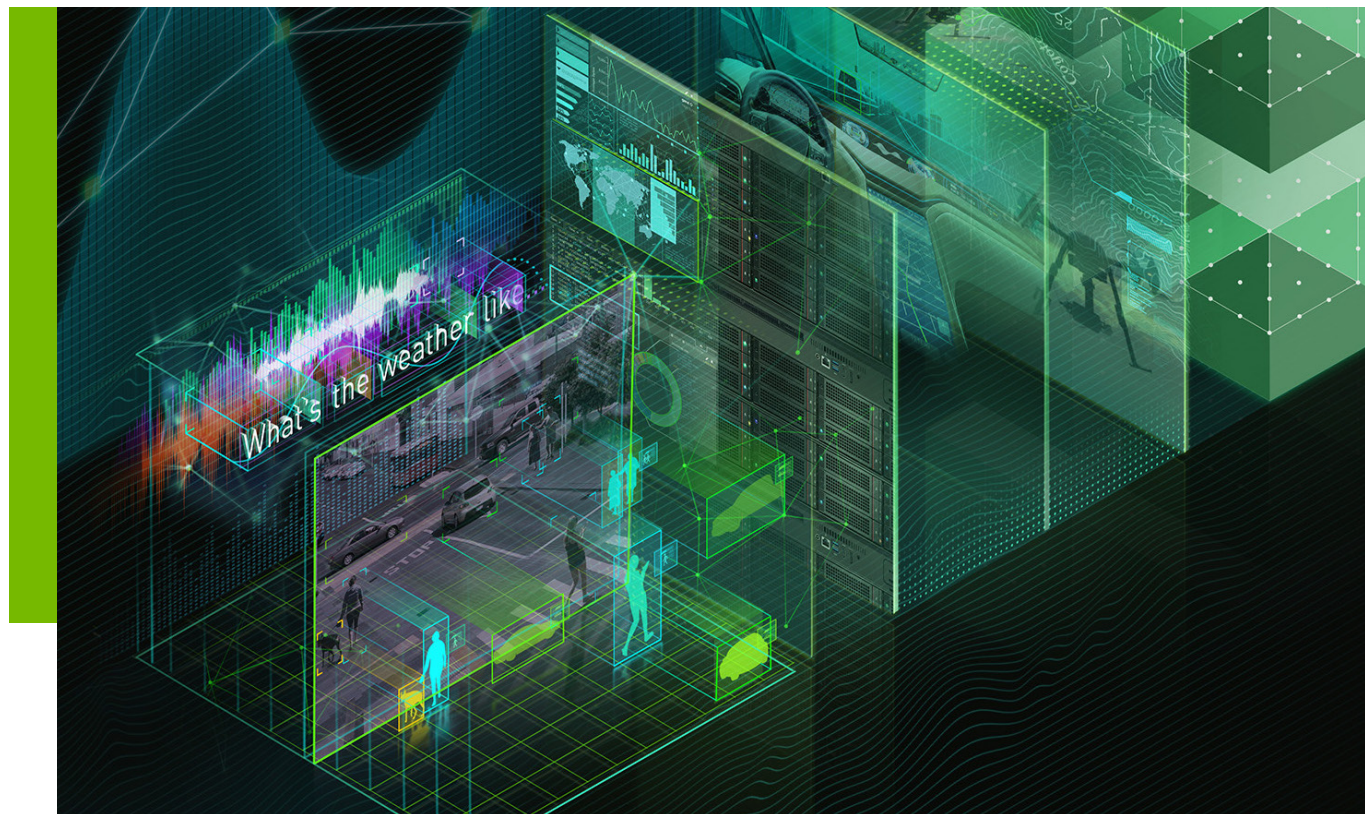
What is Deep Learning?

Deep learning is a subset of AI and ML that uses artificial neural networks to mimic how the human brain processes information using layers of interconnected nodes called neurons. These neurons work together to process and learn from input data, enabling computers to autonomously discover patterns and make decisions from vast amounts of unstructured data.

Today, deep learning AI has become one of the most popular and visible areas of machine learning. This is due to its success in a variety of applications, such as computer vision, natural language processing, and reinforcement learning.

At NVIDIA, we believe that deep learning is the key to unlocking the full potential of AI. We're committed to providing the technology and support that will drive the next wave of AI breakthroughs, transforming industries and improving lives on a global scale.

To learn more about the differences between artificial intelligence, machine learning, and deep learning, refer to [this NVIDIA AI Tech Blog Post](#).



Step 2: Create Your Learning Account

Register for the NVIDIA Developer Program* for free access to practical training, technical blogs, expert forums, and the company's software library. It's the best way to join a community of like-minded developers and stay up-to-date on the latest NVIDIA content.

[Register for the NVIDIA Developer Program >](#)

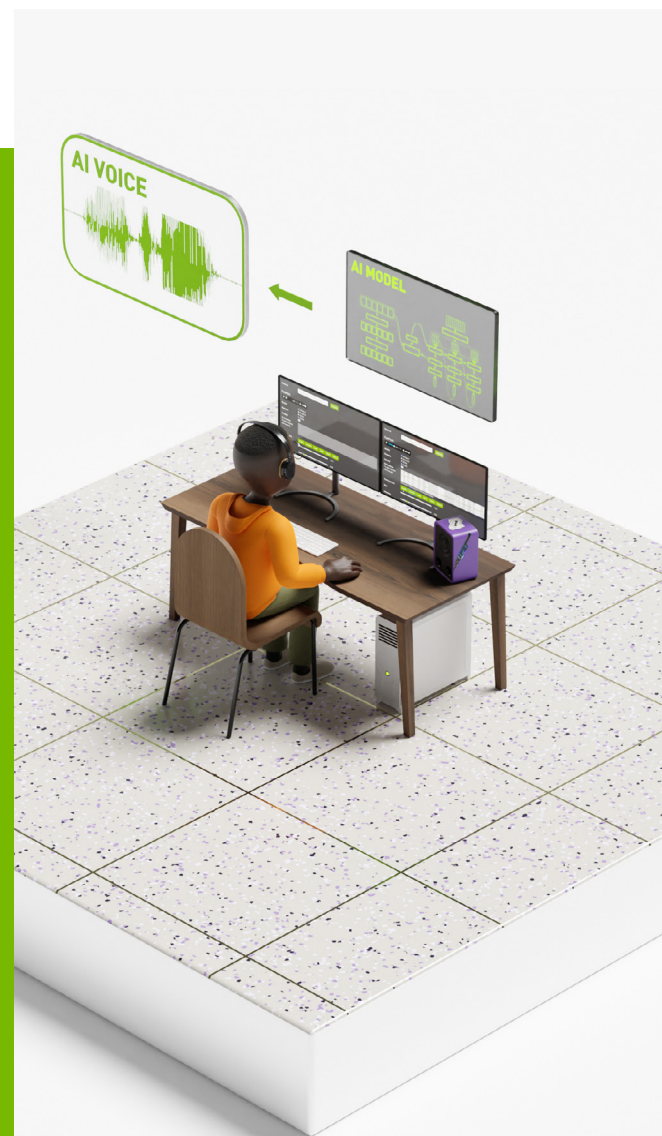
Step 3: Assess Your Skills

Once registered, you'll have access to NVIDIA Deep Learning Institute (DLI) content. We've created a quick pre-check for you to assess your current Python and machine learning skills. Follow the instructions below to understand which course you should use to begin your learning. Students with the skills to pass the pre-check should be able to finish the materials in two hours or less with little difficulty.

Instructions:

1. Access the pre-check
 - a. Visit the NVIDIA Learning Platform at <https://learn.nvidia.com/dli-event>.
 - b. Enter the event code: **PRECHECK_DLI_0724**
2. Complete the assessment
 - a. Take the short quiz to evaluate your Python and machine learning knowledge.
3. Choose your course
 - a. Based on your quiz results, select the most suitable course by identifying which topics in our learning path align with your current knowledge and learning goals.

After completing the pre-check, you'll have a clearer picture of your current position in the learning path. If you are a beginner, start with the first recommended course. If you encountered difficulties with a specific topic during the pre-check, locate the topic in the learning path and proceed from there.



*Note: When you register for the NVIDIA Developer Program, you'll receive a [complimentary self-paced course](#).

Step 4: Choose a Path and Start Learning

Choose from three comprehensive paths to build your AI and machine learning skills:

- 1. MIT OpenCourseWare: Rigorous academic approach
- 2. Harvard's edX: Structured online learning experience
- 3. FreeCodeCamp: Hands-on learning

Things to consider:

- > Learning style preference
- > Time availability
- > Prior programming experience
- > Certification needs

If you aren't sure which path to take, we recommend Path C: FreeCodeCamp.

Regardless of the path you choose, you will:

- > Implement a basic machine learning algorithm.
- > Complete a data analysis project.
- > Build an AI-powered application.

Path A: MIT OpenCourseWare	Path B: Harvard edX	Path C: FreeCodeCamp
>Self-paced, academic-style courses	>Structured courses with set schedules	>Completely free, project-focused learning
>Comprehensive lecture notes and assignments	>Interactive elements and peer collaboration	>Learning by doing, with coding challenges
>No certification, but in-depth understanding	>Optional paid certification	>Free certificates upon completion
Recommended Course Path (in-depth description below)		
Course 1: Introduction to Computer Science and Programming in Python	Course 1: CS50's Introduction to Computer Science	Course 1: Scientific Computing With Python
Course 2: Introduction to Computational Thinking	Course 2: Data Science: Machine Learning	Course 2: Data Analysis With Python
Course 3: Machine Learning With Python	Course 3: Artificial Intelligence With Python	Course 3: Machine Learning With Python

MIT OpenCourseWare

This is an online publication of materials from over 2,500 MIT courses, freely sharing knowledge with learners and educators around the world. The training is estimated to take about 45 hours to complete.

Course 1: A Gentle Introduction to Programming Using Python

Topics: Variables, Types, Functions, Basic Recursion, Branching, Control Flow, Strings, Lists, Modules, Debugging, Dictionaries, Functions, List Comprehension

Skill level: Beginner

Abstract: This course introduces you to the basics of programming through project-oriented learning, with several exercises and projects in place to reinforce Python application in creative ways.

[Syllabus >](#)

[Lecture notes >](#)

[Course material >](#)

[Assignments >](#)

Course 2: Introduction to Computer Science and Programming in Python

Topics: Computation, Branching, Iteration, String Manipulation, Decomposition, Tuples, Lists, Recursion, Object Oriented Programming, Classes, Inheritance, Testing, Dictionaries

Skill level: Beginner

Abstract: This course lays a solid foundation for programming in Python and prepares students for more advanced topics. It focuses on practical skills and includes numerous exercises to reinforce learning.

[Syllabus >](#)

[Lecture videos >](#)

[Course material >](#)

[Assignments >](#)

Course 3: Introduction to Machine Learning (MIT Open Learning Library)

Topics: Linear classifiers, Features, Logistic Regression, Linear Regression, Neural Networks, Convolutional Neural Networks, Reinforcement Learning, Recurrent Neural Networks, Decision Trees, Nearest Neighbors

Skill level: Intermediate

Abstract: This course lays a solid foundation for programming in Python and prepares students for more advanced topics. It focuses on practical skills and includes numerous exercises to reinforce learning.

[Course \(including videos and hands-on practice\) >](#)

HarvardX

Harvard and MIT's edX offers thousands of job-relevant programs designed to give every ambitious learner a path to achievement. This set of training is estimated to take about 80 hours to complete.

Course 1: CS50's Introduction to Programming With Python

Topics: Functions, Variables, Conditionals, Loops, Exceptions, Libraries, Unit Tests, File I/O, RegEx, Object Oriented Programming, etc.

Skill level: Beginner

Abstract: This course lays a solid foundation for programming in Python and prepares students for more advanced topics.

[Syllabus >](#)

[Course material >](#)

and simple linear models to more intermediate techniques. By the end, you'll be prepared to move into more advanced courses, or maybe even a junior position in the data science industry.

[Syllabus >](#)

[Course material >](#)

(Optional) Course 3: PH125.8's Data Science: Machine Learning

Topics: Machine Learning basics, Smoothing, Prediction, Cross-Validation, KNN, Caret Package, Model Fitting, Recommendation Systems

Skill level: Intermediate

Abstract: This course is part of HarvardX's Professional Certificate in DS. It will teach you popular machine learning algorithms, and how to teach and train them to predict future outcomes.

[Syllabus >](#)

[Course material >](#)

Course 2: CS109's Introduction to Data Science With Python

Topics: Linear Regression, Multiple and Polynomial Regression, Model Selection and Cross-Validation, Bias, Variance, and Hyperparameters, Classification and Logistic Regression, Multi-logistic Regression, Confidence Intervals, Hypothesis Testing

Skill level: Intermediate

Abstract: This course teaches you the basics of data modeling, from nearest neighbor approaches



FreeCodeCamp

FreeCodeCamp is a non-profit community of people from all around the world who are learning to code together. Certifications are project-based and require no previous experience. This set of training is estimated to take about 42 hours to complete.

Course 1: Python for Everybody (Legacy Course)

Topics: Variables, Expressions, Statements, Conditionals, Functions, Loops and Iterations, Strings, Files, Lists, Dictionaries, Tuples, RegEx, Network Programming, Using Web Services, Object Oriented Programming, Databases, Data Visualization

Skill level: Beginner

Abstract: This course lays a solid foundation for programming in Python and prepares students for more advanced topics.

[Course material >](#)

[Official PY4E website >](#)

Course 2: Data Analysis With Python Certification

Topics: Data Analysis, Numpy, Pandas, SciKitLearn

Skill level: Beginner

Abstract: This course teaches the fundamentals of data analysis with Python. By the end of this certification, you'll know how to use libraries like

Numpy, Pandas, Matplotlib, and Seaborn to visualize data. FreeCodeCamp also has additional statistics, plus scikit-learn material to prepare you for machine learning.

[Course material >](#)

[Statistics handbook >](#)

[Scikit-learn guide >](#)

Course 3: Machine Learning With Python Certification

Topics: Algorithms, Training/Testing Dat, Building the Model, Clustering, Classification, Probabilities, Predictions, Neural Networks, CNN, NLP, RNN, Reinforcement Learning

Skill level: Intermediate

Abstract: This course lays a solid foundation for programming in Python and prepares students for more advanced topics.

[Course material >](#)

[\(Optional\) PyTorch learning guide >](#)



Step 5: Share Your Success

Congratulations on completing one of these learning paths. You've mastered essential skills in programming, data analysis, and machine learning, giving you a solid foundation to tackle real-world problems. Your dedication and hard work have paid off, and this achievement sets you up for exciting opportunities ahead. Be sure to share your accomplishment on social media.

Continue Learning With NVIDIA



The world of AI is a vast landscape of possibilities, each path offering unique challenges and rewards. Will you harness deep learning to revolutionize natural language processing? Will you develop computer vision systems for autonomous vehicles? Or will you push the boundaries of what's possible in generative AI? The options are unlimited, and the choice is yours.

Your journey could lead you to revolutionize industries, enhance human capabilities, or unlock new frontiers of knowledge. As you navigate this rapidly evolving domain, remember that your decisions today could influence tomorrow's technological landscape.

[Explore NVIDIA learning paths for developers >](#)

Specializations include:

- > [Accelerated Computing](#)
- > [Computer Vision and Video Analytics](#)
- > [Cybersecurity and Fraud Detection](#)
- > [Data Science](#)
- > [Deep Learning](#)
- > [Edge Computing](#)
- > [Generative AI and Large Language Models](#)
- > [Simulation, Data Modeling, and Design](#)
- > [Industry-Related Training](#)

Claim Your Complimentary Course from NVIDIA

When you join the NVIDIA Developer Program, you'll receive a complimentary self-paced course, valued up to \$90. Courses are available on the hottest topics in tech, including accelerated computing, data science, deep learning, generative AI and large language models, graphics, and simulation.

[Join NVIDIA Developer Program >](#)

Here are several self-paced courses we recommend to get you started:

> Introductory Courses (free, under 2 hours)

- [Generative AI Explained](#)
- [Introduction to Learning "Deep Learning"](#)
- [An Even Easier Introduction to CUDA](#)
- [Building a Brain in 10 Minutes](#)
- [Accelerate Data Science Workflows With Zero Code Changes](#)
- [Getting Started With AI on Jetson Nano](#)

> Foundational Courses Across Learning Paths (paid, typically 6-8 hours)

- [Getting Started With Deep Learning](#) (most popular)
- [Fundamentals of Accelerated Computing With CUDA Python](#)
- [Accelerating End-to-End Data Science Workflows](#)
- [Accelerating Data Engineering Pipelines](#)
- [Introduction to Robotic Simulations in Isaac Sim](#)



Dive Into the World of Generative AI and Large Language Models:

As a driving force behind the AI revolution, NVIDIA offers unique opportunities to learn about generative AI and large language models (LLMs) from industry experts. This knowledge positions you at the forefront of the AI revolution.

> Start with these resources:

- [What Is Natural Language Processing?](#) (blog)
- [What Are Large Language Models?](#) (blog)
- [What Is Retrieval-Augmented Generation, aka RAG?](#) (blog)
- [Generative AI Explained](#) (course, 2 hours)

> Then take these self-paced foundational courses:

- [Getting Started With Deep Learning](#) (most popular)
- [Accelerating End-to-End Data Science Workflows](#) (optional, required for certification training)

> Continue with [Generative AI and Large Language Models](#) learning path (training/certification)

> (Additional resources)

- [The Fast Path to Developing With LLMs](#)
- [Running Your Own LLM](#)
- [Trustworthy AI](#)

Try Your Hand at Data Science

Data science is a foundational skill in the development and application of AI, serving as the bridge between raw information and intelligent systems. As AI continues to evolve and permeate various industries, the role of data science becomes increasingly vital in transforming complex data into actionable intelligence, driving innovation, and helping AI tackle real-world challenges.

> Start with these resources:

- [Data Science Study Pack](#) (apply for the NVIDIA Student Network*)
- [Exploratory Data Analysis](#) (blog)
- [Data Visualization](#) (blog)
- [Time Series Analytics](#) (blog)
- [Basics of Machine Learning](#) (blog)
- [Build and Deploy an ML Model](#) (blog)

> Then take these self-paced foundational courses:

- [Fundamentals of Accelerated Data Science](#)
- [Accelerated Data Engineering Pipelines](#)

> Continue with the [Data Science](#) Learning Path (training/certification)

Uncover the Potential of Computer Vision and Video Analytics

By mastering these skills, you'll be at the forefront of creating AI systems that can see and understand the world. Whether you're interested in developing autonomous systems, enhancing security applications, or pushing the boundaries of medical imaging, this learning path will equip you with the tools to turn visual data into actionable insights.

> Start with these resources:

- [What Is Computer Vision?](#) (blog)
- [Computer Vision Use Cases](#) (site)
- [What Is a Convolutional Neural Network?](#) (blog)
- [What Is a Recurrent Neural Network?](#) (blog)
- [Generative AI Explained](#) (course, 2 hours)
- [Computer Vision Study Pack](#) (apply for the NVIDIA Student Network*)

> Then take these self-paced foundational courses:

- [Getting Started With Deep Learning](#) (most popular)
- [Getting Started With AI on Jetson Nano](#) (free, optional)

> Continue with the [Computer Vision and Video Analytics](#) learning path (training/certification)

> (Additional resources)

- [Advanced Computer Vision Playlist](#)
- [Deep Learning Software](#)

* The NVIDIA Student Network is aimed at student-run organizations and requires an application to access resources.

Continue Your Learning Journey



As AI technologies become increasingly integral to business operations and technological innovation, the demand for skilled professionals in this field will remain high. Committing to an AI learning journey is more than just gaining knowledge. It's embracing lifelong learning as a future-ready skill set that will empower you to adapt, grow, and unlock exciting career opportunities for years to come.

Ready to Learn More?

Visit nvidia.com/en-us/training/

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