

# CENGN Academy

## Machine Learning with Python



Machine Learning is a rapidly growing field that has captured the interest of the global community. Given all the buzz around, it can be difficult to understand what exactly it is. This course will help you grasp what machine learning is and what it is not, as well as understand the motivations and use cases related to machine learning. You will see why Python has become the tool of choice for machine learning, and then use it to solve multiple types of machine learning problems.



### Audience:

- Software developer/engineer/architect starting with machine learning
- Software team lead or manager overseeing machine learning teams
- Product manager overseeing a machine learning product



**Delivery Mode:** Learn on your own schedule with self-paced online training and labs



**Duration:** Learners will need approximately 20 - 25 hours to complete the course. Learners will have access to the online content and labs for 4 weeks.



**Hands-on Labs:** This course features hands-on labs hosted on CENGN's multi-vendor cloud, using the popular Jupyter Notebook web-based interactive development environment. The course culminates with an end-to-end exercise including data cleaning and visualization, problem specification, algorithm selection and results analysis



### Recommended Prerequisites:

- Moderate background in mathematics, especially statistics
- Basic understanding of standard programming constructs
- Introductory level experience with Python
- Intermediate level understanding of data analysis



**Learner Support:** The CENGN Academy team of subject matter experts will be available to support you while you take this course. We will answer your questions, confirm your labs, and check in with you after your course to assist with your badge exam preparations

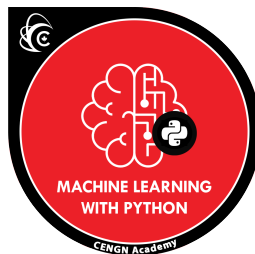
## Course Objectives

After completing this course, the learner will be able to:

- Recognize the key concepts, best practices, and applications of machine learning
- Discuss the main categories of machine learning algorithms, including Supervised and Unsupervised Learning
- Describe basic machine learning algorithms such as classification, regression, clustering, association learning, and dimensionality reduction
- Recall Python fundamentals, including basic syntax, variables, and types
- Build, train, and evaluate the performance of machine learning models using Python and its associated libraries
- Select the appropriate machine learning model for a given problem
- Perform exploratory data analysis on a dataset to detect anomalies and to summarize its main characteristics

## Exam and Digital Badge

Learners who complete this course are ready for the CENGN Machine Learning with Python exam. Those who successfully complete the exam will earn a CENGN Machine Learning digital badge



Developed in collaboration with LIGHTHOUSE LABS





## Course Content

### Module 1 – Introduction to Machine Learning

- Describe the motivations surrounding ML and types of problems that are of interest
- Identify the fundamental concepts that underlie ML
- Recognize the difference between supervised and unsupervised learning
- Recall key current use cases of ML
- Describe the strengths and limitations of ML

### Module 2 – Python for Machine Learning

- Recognize why Python is a popular language for ML
- Identify Python syntax commonly used in ML applications
- Define variables, sets, conditional statements and loops
- Create and manipulate Python lists
- Use popular functions and import packages

### Module 3 – Supervised Learning

- Identify use cases for supervised learning algorithms
- Explain common outcome prediction algorithms
- Solve selected prediction problems by building and training regression models using Python and its associated libraries
- Explain common data classification algorithms
- Solve selected classification problems by building and training data classification models using Python and its associated libraries
- Prepare a dataset for supervised learning by cleaning and formatting it
- Analyze a supervised learning dataset to summarize its main characteristics
- Evaluate a supervised learning model's performance visually and using various evaluation metrics

### Module 4 – Unsupervised Learning

- Identify use cases for unsupervised learning algorithms
- Explain common clustering algorithms
- Solve selected problems by building and training data clustering models using Python and its associated libraries
- Explain common data association algorithms
- Solve selected problems by building and training data association models using Python and its associated libraries
- Prepare a dataset for unsupervised learning by cleaning and formatting it
- Analyze an unsupervised learning dataset to summarize its main characteristics
- Evaluate an unsupervised learning model's performance visually and using various evaluation metrics

### Module 5 – Best Practices for ML

- Recognize best practices for applying ML
- Classify poorly defined problems under the best ML type
- Recognize additional topics relating to ML applications