

## PCAC2008 MACHINE LEARNING TECHNIQUES AND APPLICATIONS 3-0-0

**OVERALL COURSE OBJECTIVES:** Acquire and apply knowledge of machine learning models to solve complex problems across various fields, manage machine learning projects effectively using data science processes, and make informed decisions on technology choices in machine learning system designs.

**LEARNING OUTCOMES:** On successful completion of the course the students shall be able to:

1. Gain foundational knowledge of various machine learning models such as logistic regression, multilayer perceptrons, and convolutional neural networks.
2. Apply machine learning models to address complex problems in different fields such as medical diagnostics, image recognition, and text prediction.
3. Perform hands-on tasks using PyTorch and other open-source libraries to implement machine-learning algorithms.
4. Identify potential opportunities for implementing machine learning to resolve user problems.
5. Use the data science process to effectively manage and organize machine learning projects.
6. Evaluate and decide on key technology choices in machine learning system design.

### COURSE CONTENT:

#### Module 1: [Introduction to Machine Learning](#) [25 Hours]

This course will provide you a foundational understanding of machine learning models (logistic regression, multilayer perceptrons, convolutional neural networks, natural language processing, etc.) as well as demonstrate how these models can solve complex problems in a variety of industries, from medical diagnostics to image recognition to text prediction. In addition, we have designed practice exercises that will give you hands-on experience implementing these data science models on data sets. These practice exercises will teach you how to implement machine learning algorithms with PyTorch, open source libraries used by leading tech companies in the machine learning field (e.g., Google, NVIDIA, CocaCola, eBay, Snapchat, Uber and many more).

##### Sub-Topic

Simple Introduction to Machine Learning  
Basics of Model Learning  
Image Analysis with Convolutional Neural Networks  
Recurrent Neural Networks for Natural Language Processing  
The Transformer Network for Natural Language Processing  
Introduction to Reinforcement Learning

##### Formative Assessments:

4 quizzes and 11 ungraded lab assignments.

#### Module 2: [Managing Machine Learning Projects](#) [18 Hours]

This practical course, part of the AI Product Management Specialization by Duke University's Pratt School of Engineering, provides detailed insights into managing machine learning projects. Walking through each stage of an ML project - right from identifying valid opportunities for ML, to data

collection, model building, deployment, and maintenance of production systems - it imparts knowledge of the data science process and its ML applications, and the vital decisions made in ML system design. By the end of the course, participants will be adept at recognising ML application opportunities, applying the data science process to organize ML projects, evaluating crucial technology decisions in ML system design, and leading ML projects from ideation through to production.

**Sub-Topic**

Identifying Opportunities for Machine Learning

Organizing ML Projects

Data Considerations

ML System Design & Technology Selection

Model Lifecycle Management

**Formative Assessments:**

5 quizzes and 1 peer-review assignment.

**ASSESSMENT:**

**For summative assessments, Coursera will provide question banks for which exams can be conducted on the Coursera platform or the faculty will create their own assessments.**

*Note: If a Course or Specialization becomes unavailable prior to the end of the Term, Coursera may replace such Course or Specialization with a reasonable alternative Course or Specialization.*