CertNexus®

# Certified Artificial Intelligence Practitioner™ (AIP-210) Exam Blueprint

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CAIP

## Introduction to CertNexus

CertNexus is a vendor-neutral certification body, providing emerging technology certifications and micro-credentials for business, data, developer, IT, and security professionals. CertNexus' mission is to assist closing the emerging tech global skills gap while providing individuals with a path towards rewarding careers in Cybersecurity, Data Science, Data Ethics, Internet of Things, and Artificial Intelligence (AI)/ Machine Learning (ML).

We rely on our Subject Matters Experts (SMEs) to provide their industry expertise and help us develop these credentials by participating in a Job Task Analysis, Exam Item Development, and determining the Cut Score. We also depend upon practitioners in the field to participate in a survey of the Job Task Analysis and beta testing to ensure that our certifications validate knowledge and skills relevant to the industry.

## Acknowledgements

CertNexus was honored to have the following Subject Matter Experts contribute to the development of this exam blueprint.

| | | | |
|---|---|---|---|
| Gregory Herron | National Security Agency | https://www.nsa.gov/ | |
| Geoff Shaefer | Booz Allen Hamilton | https://www.boozallen.com/ | |
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# CertNexus Certified Artificial Intelligence Practitioner™ (CAIP) Exam AIP-210

## Exam Information

A *Certified Artificial Intelligence Practitioner™ (CAIP)* is a data professional that can implement the power of AI and machine learning to solve business challenges using various modeling techniques. CAIPs can utilize AI to automate processes, reduce costs, drive down completion times, and perform operational tasks that allow humans to perform higher level work. They have advanced knowledge of the engineering features of a dataset to prepare it for use in a machine learning model, the ability to select algorithms and perform model training and model handoff, and an understanding of the ethics and oversight required to create ethical outcomes with AI. Certified AI Practitioners enable organizations to enhance customer experiences and propel innovation to achieve their AI goals.

## Candidate Eligibility

The Certified Artificial Intelligence Practitioner exam requires no application fee, supporting documentation, or other eligibility verification measures for you to be eligible to take the exam. An exam voucher will come bundled with your training program or can be purchased separately here. Once purchased, you will receive more information about how to register for and schedule your exam through Pearson Vue. You can also purchase a voucher directly through Pearson Vue. Once you have obtained your voucher information, you can register for an exam time here. By registering, you agree to our Candidate Agreement included here.

## Exam Prerequisites

There should be no prerequisites for the examination. However, the following background knowledge is recommended:

- Applied mathematics
- Math theory
- Statistical modeling procedures (linear algebra, probability, statistics, multivariate calculus distributions like Poisson, normal, binomial, etc.)
- Programming abilities for ML and statistics (e.g., Python® and R)
- Ensemble learning
- Using algorithmic methods and frameworks (e.g., random forest or XGBoost)
- Proficiency with a querying language
- Strong communication skills
- Demonstrate responsibility based upon ethical implications when sharing data sources
- Familiarity with data visualization

You can obtain this level of skill and knowledge by taking the following courseware, which is available through training providers located around the world, or by attending an equivalent third-party training program:

- Introduction to Programming with Python®
- Python® Programming: Advanced
- Using Data Science Tools in Python®
- Data Wrangling with Python®

- Applied Data Science with Python® and Jupyter®
- Big Data Analysis with Python®
- Certified Ethical Emerging Technologist™ (CEET)
- CertNexus Certified Artificial Intelligence (AI) Practitioner™ (Exam CAIP-210)

## Exam Specifications

**Number of Items:** The exam should comprise 80 scored and 10 trial items with adequate time.

**Passing Score:** 60% or 59% depending on exam form. Forms have been statistically equated.

**Duration:** 120 minutes (**Note:** exam time includes 5 minutes for reading and signing the Candidate Agreement and 5 minutes for the Pearson VUE testing system tutorial.)

**Exam Options:** In person at Pearson VUE test centers or online with Pearson OnVUE online proctoring.

**Item Formats:** Multiple Choice / Multiple Response

The exam should comprise multiple-choice, single-response items as a default. Other item types may be used if content calls for it. For example, manipulating snippets of code, including SQL; reading data visualizations.

## Exam Description

**Target Candidate:**
This certification exam is designed for practitioners who are seeking to demonstrate a vendor-neutral, cross-industry skill set within AI and with a focus on ML that will enable them to design, implement, and hand off an AI solution or environment. Exposure in a professional environment: 1 to 3 years.

**Exam Objective Statement:**
This exam will certify that the candidate has the knowledge and skill set of AI concepts, technologies, and tools that will enable them to become capable AI practitioners in a wide variety of AI-related job functions.

To ensure exam candidates possess the aforementioned skills, the *Certified Artificial Intelligence Practitioner™ (CAIP)* exam will test them on the following domains with the following weightings:

| Domain | % of Examination |
|---|---|
| **1.0 Understanding the Artificial Intelligence Problem** | 26% |
| **2.0 Engineering Features for Machine Learning** | 20% |
| **3.0 Training and Tuning ML Systems and Models** | 24% |
| **4.0 Operationalizing ML Models** | 30% |
| **Total** | **100%** |

The information that follows is meant to help you prepare for your certification exam. This information does not represent an exhaustive list of all the concepts and skills that you may be tested on during your exam. The exam domains, identified previously and included in the objectives listing, represent the large content areas covered in the exam. The objectives within those domains represent the specific tasks associated with the job role(s) being tested. The information beyond the domains and objectives is meant to provide examples of the types of concepts, tools, skills, and abilities that relate to the corresponding domains and objectives. All of this information represents the industry-expert analysis of the job role(s) related to the certification and does not necessarily correlate one-to-one with the content covered in your training program or on your exam. We strongly recommend that you independently study to familiarize yourself with any concept identified here that was not explicitly covered in your training program or products.

## Objectives

### Domain 1.0 Understanding the Artificial Intelligence Problem (26%)

**Objective 1.1** Describe how artificial intelligence and machine learning are used to solve business (including commercial, government, public interest, and research) problems

**Objective 1.2** Analyze the use cases of ML algorithms to rank them by their success probability

**Objective 1.3** Research Learning Systems [Identify business case for image recognition; NLP; Speech recognition; Predictive & recommendation systems; Discovery & diagnostic systems; Robotics and autonomous systems]

**Objective 1.4** Analyze machine learning system use cases

**Objective 1.5** Communicate with stakeholders

**Objective 1.6** Identify potential ethical concerns

### Domain 2.0 Engineering Features for Machine Learning (20%)

**Objective 2.1** Recognize relative impact of data quality and size to algorithms

**Objective 2.2** Explain data collection/transformation process in ML workflow (transformations include standardization; normalization; log, square-root, and logit transformations)

**Objective 2.3** Work with textual, numerical, audio, or video data formats

**Objective 2.4** Transform numerical and categorical data

**Objective 2.5** Address business risks, ethical concerns, and related concepts in data exploration/feature engineering

### Domain 3.0 Training and Tuning ML Systems and Models (24%)

**Objective 3.1** Design machine and deep learning models [Differentiate types of ML algorithms; differentiate types of DL algorithms; design for pattern recognition in predictive models]

**Objective 3.2** Optimize the algorithm (e.g., structure, run time, tuning hyperparameters)

**Objective 3.3** Train, validate, and test data subsets

**Objective 3.4** Evaluate the model

**Objective 3.5** Address business risks, ethical concerns, and related concepts in training and tuning

## Domain 4.0 Operationalizing ML Models (30%)

**Objective 4.1** Deploy a model

**Objective 4.2** Secure a pipeline (includes maintenance)

**Objective 4.3** Maintain the model postproduction

**Objective 4.4** Address business risks, ethical concerns, and related concepts in operationalizing the model

## Recertification Requirements

The credential should be valid for three years. To maintain certification after three years, certificants may either retake the exam (using the form that is current at the time) or demonstrate completion of sixty hours of continuing education. CertNexus would approve bona fide continuing education programs that fall within the exam blueprint.

Alternatively, if CertNexus chooses to accept self-reported individual study time, the requirement is 144 hours, which assumes an hour a week.

## Certified Artificial Intelligence Practitioner (CAIP) Acronyms

| Acronym | Expanded Form |
|---|---|
| AI | artificial intelligence |
| ANN | artificial neural network |
| AUC | Area Under the Curve |
| CNN | convolutional neural network |
| DR | dimensionality reduction |
| ETL | exact, transform, and load |
| GAN | generative adversarial network |
| GDPR | General Data Protection Regulation |
| KNN | K-nearest neighbors |
| KPI | key performance indicator |
| LSTM | Long Short-Term Memory |
| ML | machine learning |
| NLP | natural language processing |
| NLTK | Natural Language Toolkit |

| | |
|---|---|
| NLU | natural language understanding |
| PCA | principal component analysis |
| PRC | Precision-Recall Curve |
| RBF | radial basis function kernel |
| ROC | Receiver Operating Characteristic |
| RNN | recurrent neural network |
| SVM | Support Vector Machine |

CertNexus offers  personnel certifications and micro credentials in a variety of emerging technology skills including Cybersecurity, Cyber Secure Coding, the Internet of Things (IoT), IoT Security, Data Science, Artificial Intelligence, and Data Ethics. For a complete list of our credentials visit **https://certnexus.com/certification/**.

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