



THE SCHOOL OF ARTIFICIAL INTELLIGENCE

AI Engineer using Microsoft Azure



NANODEGREE SYLLABUS

Overview

IN COLLABORATION WITH



The AI Engineer using Microsoft Azure Nanodegree program will equip students with the skills required to become an Azure AI engineer or an AI engineer with expertise in Azure AI and machine learning services. This program will teach students how to implement machine learning models, design and build an end-to-end AI solution with Azure Cognitive Services, and how to deploy, monitor, and manage continuous improvement of an Azure AI solution. Students seeking certification who successfully complete this program are ideal candidates for Microsoft certification AI-102.

Educational Objectives

By the end of this program a student will be able to:

- Design and build an end-to-end AI solution with Azure Cognitive Services/Azure Cognitive APIs.
- Design a security strategy that aligns with organizational policies and compliance frameworks.
- Deploy, monitor, and manage continuous improvement of an Azure AI solution

*The length of this program is an estimation of total hours the average student may take to complete all required coursework, including lecture and project time. If you spend about 5-10 hours per week working through the program, you should finish within the time provided. Actual hours may vary.

Program Information



TIME

3 months
Study 5-10 hours/week



LEVEL

Advanced



SOFTWARE/HARDWARE AND VERSION REQUIREMENTS

Azure Portal (Browser based)
VS Code
Microsoft Bot Framework Emulator
Node.js V16
Python 3.6 and above
Various Azure cognitive Services SDK (Python)



PREREQUISITES

Python programming skills:

- Understand the basics of object-oriented programming.
- Read basic Python syntax, including using white space in Python.
- Distinguish between object types like integers and strings in scripts.
- Use Python to build basic algorithms for simple programs and scripts that automate common tasks (i.e. renaming files).
- Write and run basic programming scripts in a terminal that includes function definitions and loops.

Other required skills:

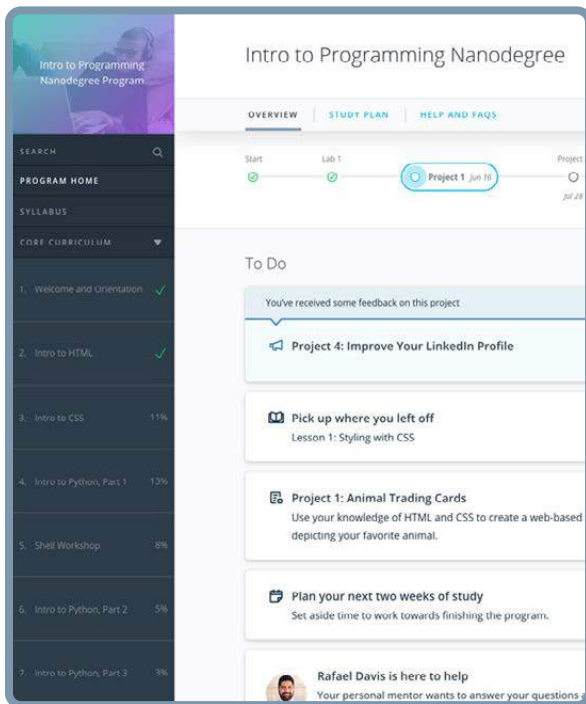
- Demonstrate knowledge of Microsoft Azure and the ability to navigate the Azure portal.
- Familiarity with a variety of Azure data sources such as Azure Data Lake and Azure SQL.
- Demonstrate knowledge of JSON and REST programming semantics and the ability to use APIs in application development.



LEARN MORE ABOUT THIS NANODEGREE

Contact us at enterpriseNDs@udacity.com.

Our classroom experience



REAL-WORLD PROJECTS

Learners build new skills through industry-relevant projects and receive personalized feedback from our network of 900+ project reviewers. Our simple user interface makes it easy to submit projects as often as needed and receive unlimited feedback.

KNOWLEDGE

Answers to most questions can be found with Knowledge, our proprietary wiki. Learners can search questions asked by others and discover in real time how to solve challenges.

LEARNER HUB

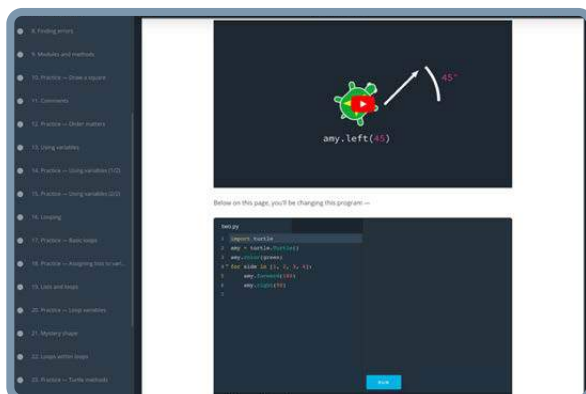
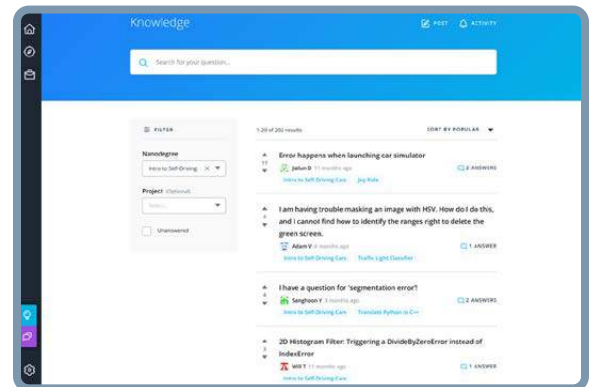
Learners leverage the power of community through a simple yet powerful chat interface built within the classroom. Learner Hub connects learners with their technical mentor and fellow learners.

WORKSPACES

Learners can check the output and quality of their code by testing it on interactive workspaces that are integrated into the classroom.

QUIZZES

Understanding concepts learned during lessons is made simple with auto-graded quizzes. Learners can easily go back and brush up on concepts at any time during the course.



CUSTOM STUDY PLANS

Mentors create a custom study plan tailored to learners' needs. This plan keeps track of progress toward learner goals.

PROGRESS TRACKER

Personalized milestone reminders help learners stay on track and focused as they work to complete their Nanodegree program.

Learn with the best



Avkash Chauhan

FOUNDER AND PRINCIPAL AT UN-BLOCKER.AI

Avkash Chauhan has over 20 years of software development experience including the last 10 years building AI and ML platforms and solutions for enterprise customers. His previous work experience includes Microsoft, H2O.ai, Macnica, RoamBee and his own startups Big Data Perspective and UnBlocker.ai.



Valerie Scarlata

CURRICULUM MANAGER, UDACITY

Valerie is a curriculum manager at Udacity who has developed and taught a broad range of computing curriculum for several colleges and universities. She was a professor and software engineer for over 10 years specializing in web, mobile, voice assistant, and social full-stack application development.



Matt Swaffer

SOLUTIONS ARCHITECT

Matt Swaffer is a software and solutions architect focusing on data science and analytics for Managed Business Solutions. In addition, Matt is an adjunct lecturer, teaching courses in the Computer Information Systems department at the University of Northern Colorado where he received his PhD in Educational Psychology.

Nanodegree Program Overview

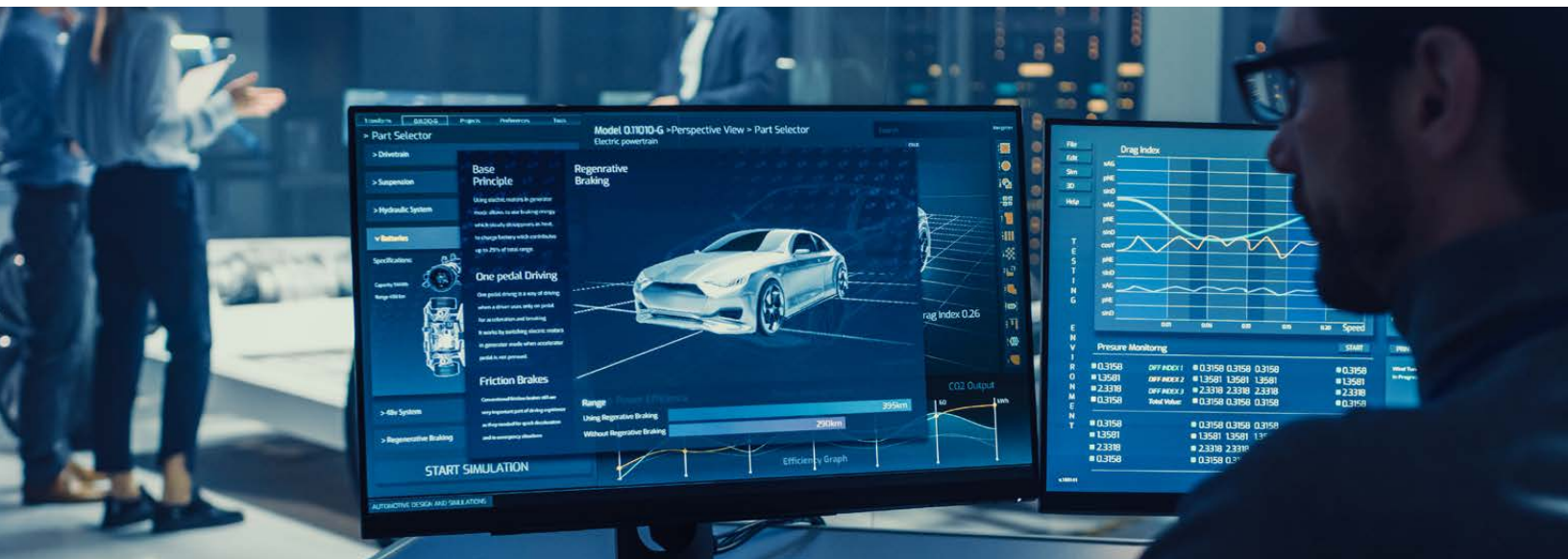
Course 1: Building Computer Vision Solutions with Azure

This course is designed for anyone who would like to use computer vision technology in their application to solve a business problem. You will begin by learning what computer vision is and ç through real-life business use cases. You will then learn to create solutions using different types of vision-based Azure Cognitive Services, including Azure Form Recognizer for text extraction, Azure Face and Video Analyzer for facial detection and recognition, and Azure Computer Vision and Custom Vision for image classification and object detection. Finally, you will learn and apply the deployment and monitoring tools to ensure that your solution is complete and runs smoothly.

Project

Automated Passenger Boarding Kiosk

In this project, you will build an automated passenger boarding kiosk. The kiosk will collect passenger and flight information through the passenger's face image, digital ID, boarding pass, etc. Your objective will be to perform various validation processes and confirm if a given passenger can board the plane or not. You will use various Azure Cognitive Services and supporting services for this project, including Azure Computer Vision, Face, Form Recognizer, Video Analyzer, Azure Blob storage. The run-time environment will be Python while you interact with these Azure services.



Nanodegree Program Overview



LESSON TITLE

LEARNING OUTCOMES

DESIGN COMPUTER VISION APPLICATIONS

- Identify business and technical considerations for creating computer vision applications
- Identify data considerations and sources for Azure computer vision solutions
- Identify various Azure computer vision services for a given business scenario
- Identify various programming models to use with Azure Cognitive Services

EXTRACTING TEXT FROM DIGITAL CONTENT

- Apply the prebuilt layout recognizer and create a custom layout recognizer model to extract the layout of a digital document
- Apply the prebuilt Azure Form Recognizer service to read the text from images and documents
- Create a custom form recognizer model to collect text data from a digital document

FACIAL DETECTION AND RECOGNITION

- Understand the terms involved in face detection and recognition
- Identify face(s) in an image or a collection of images
- Create a custom face recognition model to identify a person's face
- Process faces in a video using Azure Video Analyzer service

IMAGE CLASSIFICATION AND OBJECT DETECTION

- Apply image classification and object detection concepts
- Create a custom image classification model to classify your own images
- Create a custom object detection model to identify a specific object
- Understand the basics of spatial analysis

SOLUTIONS DEPLOYMENT & MONITORING

- Understand and apply computer vision solution deployment, accessibility, and security
- Understand and apply application monitoring with extended logging and enhanced diagnostics
- Export and delete data and models with cost management

Nanodegree Program Overview

COURSE 2: Building NLP and Conversational AI Solutions with Azure

In this course you'll learn how to build conversational AI and NLP solutions on Azure. You'll begin by exploring use cases for NLP and conversational AI, including chatbots and assistant solutions. Then you'll create solution diagrams, model dialogs, and learn about responsible AI principles and practice creating requirements for conversational applications. You'll create and configure bot applications on the Azure platform using the Microsoft Bot Framework and integrate Azure QnA Knowledge Bases and LUIS Models. In the last part of the course you'll implement Azure Text and Speech Cognitive Services in applications.

Project

Dental Office Virtual Assistant

Students will create a customer support chatbot for a dentist website. They will create a bot on the Azure platform and a Node.js bot application, create, train, and publish a LUIS Model and QnA Knowledge Base. The bot will use the Azure QnA Knowledge Base and LUIS to answer patient questions and help them schedule appointments. They will deploy the bot application and resources to Azure and implement the assistant on a website.



Nanodegree Program Overview



LESSON TITLE

LEARNING OUTCOMES

DESIGNING NLP AND CONVERSATIONAL AI SOLUTIONS

- Create requirements for NLP and conversational AI solutions including creating user stories and dialog modeling
- Create architecture diagrams based on the components of Azure NLP and Cognitive services
- Implement responsible AI use of Azure Text Analytics, QnA Maker, and Speech Services

BUILDING BOTS WITH THE BOT FRAMEWORK

- Create and configure Bot resources for chatbot and assistant applications on Azure
- Create Node.js Bot applications using the Microsoft Bot Framework SDK and templates
- Identify the components of a Bot Framework application including context, dialog, and adapters
- Test Microsoft Bot Framework applications using the Bot Framework Emulator
- Configure and deploy bot applications on Azure using Github continuous integration and deployment

NLP COGNITIVE SERVICES

- Use Azure Language Understanding Service (LUIS) to identify intents and entities in the context of conversational AI solutions
- Define and train language understanding models with Azure LUIS service
- Use Azure QnA to identify intent in the context of conversational AI solutions
- Create QnA Knowledge Bases
- Implement Language Understanding Services (LUIS) and QnA Knowledge Bases in conversational AI applications

TEXT ANALYTICS AND SPEECH SERVICES

- Identify and extract entities and key phrases from text using Azure text analytics
- Extract phrases and run sentiments analysis on text using Azure text analytics
- Speech enable a Bot application with Azure Cognitive Speech Services and Bot Channels

Nanodegree Program Overview

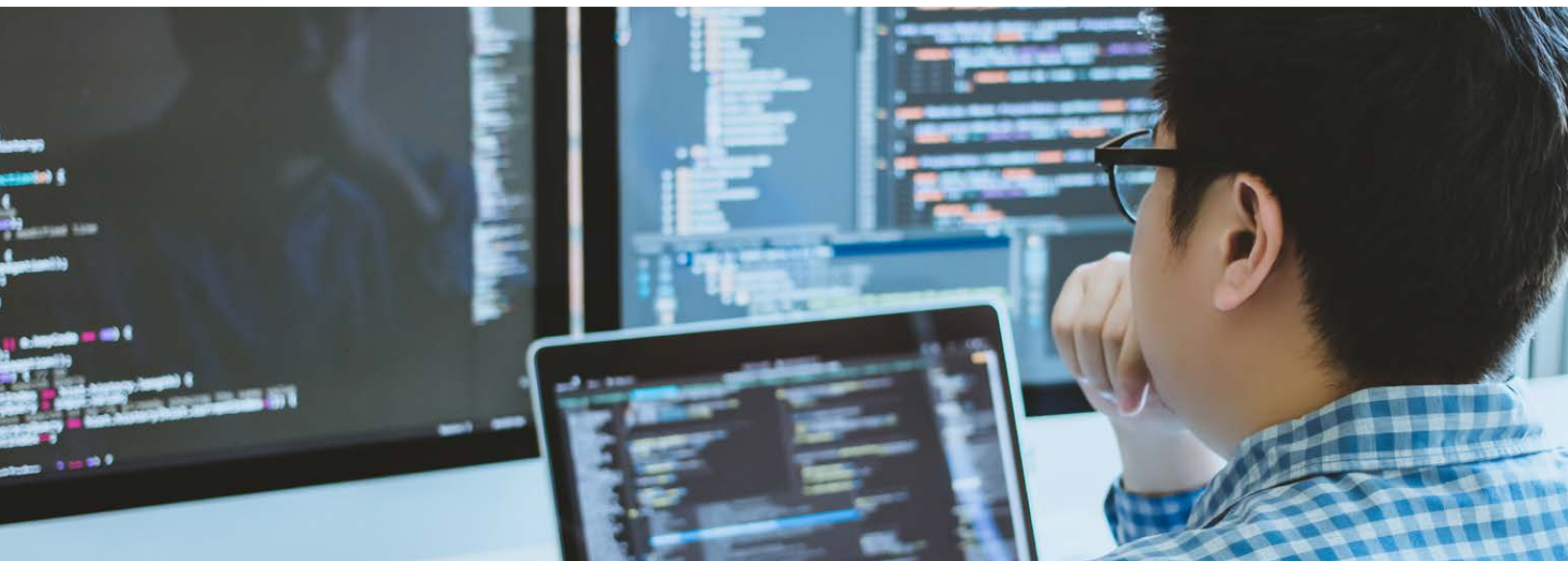
COURSE 3: Building Knowledge Mining Solutions With Azure Cognitive Search

This course addresses the skills necessary to design and implement an Azure Cognitive Search solution for knowledge mining. In this course, you will learn how to add data sources to Azure Cognitive Search, enrich the data with AI, properly index the enriched data, and expose the index to client applications for search scenarios. You will begin by learning how to design an Azure Cognitive Search solution and finish the course by building out an AI-enriched data mining application from end to end.

Project

Build an AI Enriched Corporate Training Catalog

Students will create a knowledge-mining solution to help employees gain insights into training materials made available by their company. They will combine 4 datasets: a set of Udacity courses, a set of Microsoft Learn courses, a generated set of corporate training, and a set of open-source papers. Students will enrich these data using built-in skills such as OCR, key phrase extraction, and custom entity recognition, as well as a custom skill. Students will connect a user-facing search interface to this solution and demonstrate various query capabilities of the solution.





LESSON TITLE

LEARNING OUTCOMES

DESIGNING AND AZURE COGNITIVE SEARCH SOLUTION

- Create a list of requirements that match various business needs
- Create a high-level architecture diagram based on the available components of Azure Cognitive Search

IMPORTING DATA INTO AZURE COGNITIVE SEARCH

- Import data from different types of sources using the Azure Portal wizard
- Implement enrichments such as document cracking and text analysis during data import
- Configure and customize indices to utilize different features of Azure Cognitive Search
- Create and schedule an indexer to populate indexes
- Create different types of search queries using correct syntax such as basic, semantic, and fuzzy searching
- Create properly formed search queries to utilize the range of functionality available in Azure Cognitive Search such as ordering, filtering, and faceting

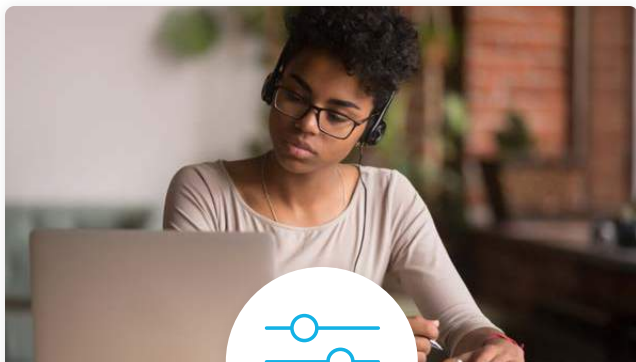
ENRICHING DATA IN AZURE COGNITIVE SEARCH

- Fully configure built-in Azure Cognitive Search skills including updating the skillset definition, the indexes, and the indexer
- Fully configure custom Azure Cognitive Search skills including updating the skillset definition, the indexes, and the indexer

CONSUMING AZURE COGNITIVE SEARCH IN AN EXTERNAL APPLICATION

- Configure a stand-alone search application to securely connect to Azure Cognitive Search utilizing the search query endpoints
- Monitor and report on usage metrics such as storage used, number of indices, indexers, and data sources, as well as monitoring metrics such as search latency and queries per second

Our Nanodegree Programs Include:



Pre-Assessments

Our in-depth workforce assessments identify your team's current level of knowledge in key areas. Results are used to generate custom learning paths designed to equip your workforce with the most applicable skill sets.



Dashboard & Progress Reports

Our interactive dashboard (enterprise management console) allows administrators to manage employee onboarding, track course progress, perform bulk enrollments and more.



Industry Validation & Reviews

Learners' progress and subject knowledge is tested and validated by industry experts and leaders from our advisory board. These in-depth reviews ensure your teams have achieved competency.



Real World Hands-on Projects

Through a series of rigorous, real-world projects, your employees learn and apply new techniques, analyze results, and produce actionable insights. Project portfolios demonstrate learners' growing proficiency and subject mastery.



Real-life Reviewers for Real-life Projects

Real-world projects are at the core of our Nanodegree programs because hands-on learning is the best way to master a new skill. Receiving relevant feedback from an industry expert is a critical part of that learning process, and infinitely more useful than that from peers or automated grading systems. Udacity has a network of over 900 experienced project reviewers who provide personalized and timely feedback to help all learners succeed.



Vaibhav
UDACITY LEARNER

"I never felt overwhelmed while pursuing the Nanodegree program due to the valuable support of the reviewers, and now I am more confident in converting my ideas to reality."

now at
CODING VISIONS INFOTECH

All Learners Benefit From:



Line-by-line feedback for coding projects



Industry tips and best practices



Advice on additional resources to research



Unlimited submissions and feedback loops

How it Works

Real-world projects are integrated within the classroom experience, making for a seamless review process flow.

- Go through the lessons and work on the projects that follow
- Get help from your technical mentor, if needed
- Submit your project work
- Receive personalized feedback from the reviewer
- If the submission is not satisfactory, resubmit your project
- Continue submitting and receiving feedback from the reviewer until you successfully complete your project

About our Project Reviewers

Our expert project reviewers are evaluated against the highest standards and graded based on learners' progress. Here's how they measure up to ensure your success.

900+

Expert Project Reviewers

Are hand-picked to provide detailed feedback on your project submissions.

1.8M

Projects Reviewed

Our reviewers have extensive experience in guiding learners through their course projects.

3

Hours Average Turnaround

You can resubmit your project on the same day for additional feedback.

4.85 /5

Average Reviewer Rating

Our learners love the quality of the feedback they receive from our experienced reviewers.



UDACITY

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For more information visit: www.udacity.com/enterprise

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