

THE SCHOOL OF CLOUD COMPUTING

Cloud Developer using Microsoft Azure

Overview

Cloud Developer using Microsoft Azure Nanodegree Program

THIS NANODEGREE PROGRAM WAS
CREATED IN COLLABORATION WITH



Microsoft Azure is one of the most popular cloud services platforms used by enterprises, making it a crucial tool for cloud computing professionals. The Cloud Developer using Microsoft Azure Nanodegree program teaches students how to deploy, build, migrate, and monitor applications on Azure, thereby preparing learners for success on Microsoft's AZ-204 Azure Developer Associate Expert certification.

A graduate of this program will be able to:

- Deploy storage and app solutions to Azure for a system that allow users to log in, view content, and publish content.
- Use Azure Functions, Cosmos DB, Event Hub to implement a serverless microservice back-end architecture.
- Perform a "lift and shift" application migration to Azure through:
 - Migrate and deploy the pre-existing web app to an Azure App Service.
 - Migrate a PostgreSQL database backup to an Azure Postgres database instance.
 - Refactor the notification logic to an Azure Function via a service bus queue message.
 - Use Azure Monitor, Azure App Insights, and Azure Metric Insights to enhance the performance of an application that has been deployed to Azure or post-migration.

Program Information



TIME

4 months
Study 10 hours/week



LEVEL

Practitioner



PREREQUISITES

- At least 1-3 years of web development experience, preferably programming in Python.
- Experience creating and managing databases such as SQL Server or PostgreSQL.
- Comfortability using Git as a version control system to clone, pull, or push code.
- A free or existing Azure account, needed to create and provision Azure services.



HARDWARE/SOFTWARE REQUIRED

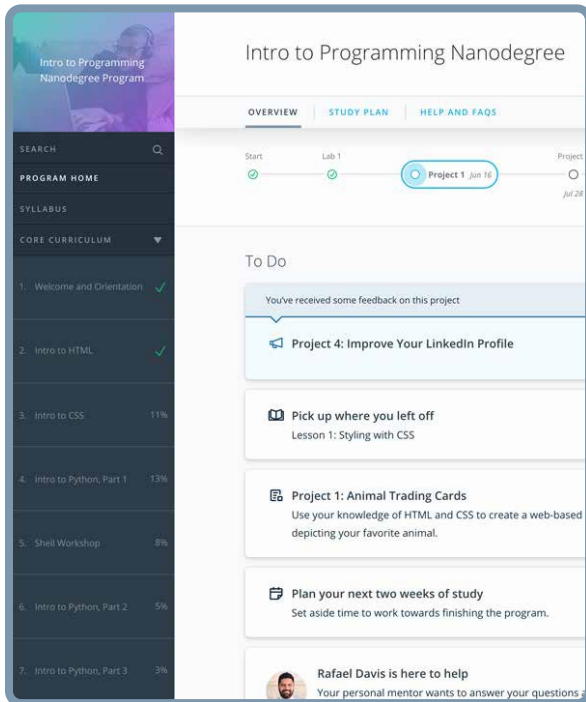
A computer running recent versions of Windows, Mac OS X, or Linux and an unmetered broadband Internet connection. You'll also need a free or existing Azure account in order to create and provision Azure services.



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

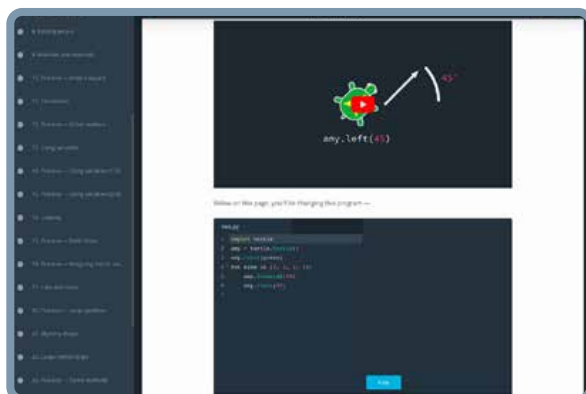
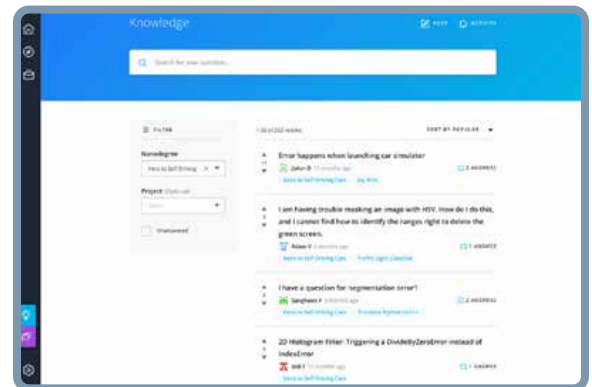
Learners leverage the power of community through a simple, yet powerful chat interface built within the classroom. Learner Hub connects learners with their technical mentor and fellow learners.

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 anytime 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



Chris Vasquez

FULL-STACK PRODUCT ENGINEER,
UDACITY

After beginning in restaurant and retail management, Chris transitioned his career to tech, leveraging Udacity and other training platforms to master several different programming languages on his journey to becoming a full-stack software engineer.



Ann K. Hoan

ENGINEER & RESEARCH SCIENTIST

Ann is a Senior Software Engineer & AI Research Scientist at Raytheon BBN Technologies, where she currently works on maritime predictive modelings for the Department of Defense. She also has experience building applications at startups and deploying AWS cloud infrastructure for the Department of Veterans Affairs.



Golois Mouelet

PREMIER FIELD ENGINEER,
MICROSOFT

Golois is an experienced engineer specialized in building resilient and scalable cloud native applications as well as migrating software and systems to Azure. He has worked with enterprises on both cloud migration projects and application performance, and is Azure Certified both as a Developer and Solution Architect.



Nathan Anderson

DEVOPS ENGINEER, GOODYEAR
TIRE & RUBBER COMPANY

Nathan has worked on implementing DevOps solutions for the past 8 years across the financial, educational, logistics, and manufacturing industries.



Course 1: Azure Applications

In this course, you will learn the basics of deploying an application to Azure. Understand the benefits and costs of cloud deployments, different types of service models, and how to navigate the Microsoft Azure platform. Distinguish two types of compute services in Azure, virtual machines and app services, when to use each, and how to deploy applications onto the related service. Connect two useful types of cloud storage to a cloud application: Azure SQL databases and blob containers. Differentiate between the different security options available in Azure, and how to implement Microsoft's OAuth 2.0 capabilities with Azure Active Directory, along with useful monitoring and logging tools in the cloud.

Project

Deploy an Article CMS to Azure

You will deploy an article content management system (CMS), built with a Python Flask application, to Microsoft Azure. The CMS system lets a user log in, view published articles, and publish new articles. First, you will deploy storage solutions for the application to interact with, such as a SQL database that contains a user table and an article table for the webapp to query, along with a Blob Storage container where images are stored. In addition to a simple username/ password login, you will then need to add an option to "Sign in with Microsoft" for authentication using OAuth 2.0 and Azure Active Directory. Lastly, you will add logging to the cloud application to be able to track successful or unsuccessful login attempts.

LESSON TITLE

LEARNING OUTCOMES

INTRODUCTION TO MICROSOFT AZURE DEVELOPMENT

- Assess the value, cost, and benefits of hosting their applications and systems in the cloud.
- Interpret the benefits/challenges of IaaS vs. PaaS vs. SaaS and where Microsoft Azure fits into each of these.
- Navigate the Azure Portal.

AZURE COMPUTE SERVICES

- Choose the correct Azure Compute Service for their applications and storage needs.
- Create a Subscription and Resource Group.
- Manage and clean up Resource Groups.
- Create a Linux VM.
- Create an App Service and App Service Plan.
- Manage basic app service settings.
- Justify which resource to use for app deployment based on costs, scalability, availability and workflow.

Nanodegree Program Overview

Course 1: Azure Applications, cont.

LESSON TITLE	LEARNING OUTCOMES
AZURE STORAGE OPTIONS	<ul style="list-style-type: none">• Create a SQL Database in Azure.• Make updates to the schema of an Azure SQL Database and add data to it.• Create an Azure Blob Storage Container.• Upload blobs to the container.• Set up configurations for an app service to connect to both a SQL Database and Azure Blob Storage Container.
SECURITY AND MONITORING BASICS	<ul style="list-style-type: none">• Differentiate security options between different Azure resources.• Compare security responsibilities between the developer and cloud provider for different applications.• Implement OAuth2 such as Sign in with Microsoft in their apps.• Utilize Azure Active Directory for single sign-on and multi-factor authentication in their app.• Monitor and analyze the log output of an app service running in Azure.





Course 2: Azure Microservices

In this course, you will learn how to implement a serverless microservice back-end architecture in Python using Azure cloud serverless offerings. You'll compare and contrast common Azure microservices architecture and compute options, configure an instance of a MongoDB database with Azure CosmosDB, and allow the API to talk to this database. You will also apply Enterprise Logic Apps and Event Grid to structure an application workflow. Finally, you'll deploy published API endpoints so they provide the necessary responses to complete the client-side requests of the front-end web application.

Project

Deploying the Neighborly App with Azure Functions

In this project, you will implement a serverless microservice backend architecture for a social networking web application called Neighborly, a service for neighbors to exchange helpful information, goods, and services. First, you'll build the back-end services that leverage an API to communicate with a MongoDB database. Then, you'll integrate the client-side application and server-side API endpoints in Python. You'll finish by deploying and managing their service with AKS for future CI/CD integration.

LESSON TITLE

LEARNING OUTCOMES

INTRODUCTION TO MICROSERVICES

- Distinguish the benefits of a microservice architecture versus a monolithic architecture.
- Compare and contrast different services as a viable option for building microservices in Azure.
- Outline the different microservices patterns in Azure.
- Identify various compute options for microservice: Kubernetes Service, Docker, and Function (as a Service).
- Identify the costs of implementing microservices.

SERVERLESS FUNCTIONS

- Define Azure Functions as well as common bindings and triggers.
- Create Azure Functions in the Azure CLI and VS IDE.
- Create a MongoDB database in CosmosDB and connect it with Azure Functions.
- Secure an API endpoint with function-level authorization keys.

Nanodegree Program Overview

Course 2: Azure Microservices, cont.

LESSON TITLE

LEARNING OUTCOMES

ENTERPRISE LOGIC APPS AND EVENT GRID

- Create an Event Grid Topic in Azure Portal.
- Apply Event Grid output binding for Azure Functions.
- Create a workflow by using Azure Logic Apps.
- Design a Logic App workflow for email.

DEPLOYING YOUR SERVICES

- Deploy API endpoints in Azure CLI to Azure.
- Deploys a client-side Flask application to App Services.
- Dockerize an application to a container and upload it to Azure Container Registry.
- Deploy a client-side application to Kubernetes Service in Azure.





Course 3: Azure Migration

This course focuses on the techniques, processes, and nuances of migrating an existing application to Azure. It will cover the whole end-to-end process of an Azure migration from predicting costs of the migration to refactoring the code to ensure the application and corresponding databases are compatible with Azure. In addition, the course walks through best practices of the different application components migrated to Azure: web applications, background processes, and databases.

Project

Migrate App to Azure

You will strategically migrate a pre-existing conference registration system to Azure. Taking in consideration cost, you will architect a resilient and scalable system in Azure with the knowledge that the legacy application is very expensive, unable to scale at peak, has one single point of failure and performance issues, and is underutilized during off hours. First, you'll migrate and deploy the pre-existing web app to an Azure App Service. Then, you'll migrate a PostgreSQL database backup to an Azure Postgres database instance. Finally, you will refactor the notification logic to an Azure Function via a service bus queue message.

LESSON TITLE

LEARNING OUTCOMES

INTRODUCTION TO CLOUD MIGRATION

- Assess cloud migration needs.
- Identify different types of migration and their use cases.
- Implement a migration plan using the migration cycle.

MIGRATING WEB APPLICATIONS

- Assess web application migration paths with cost prediction.
- Migrate existing web applications to Azure Web App.
- Migrate a web application using lift and shift method.

MIGRATING DATABASE WORKLOAD

- Assess Azure Database options with cost prediction.
- Migrate a database using Azure Database Migration Service.
- Manually migrate a database from backups.

MIGRATING BACKGROUND JOB PROCESSING SERVICES

- Architect offline background job services with cost prediction.
- Migrate services to Azure Web Jobs, Azure Functions, and Azure Durable Functions.
- Migrate background job services to Azure Batch.

Nanodegree Program Overview

Course 4: Azure Performance

This course enables students to acquire skills which allow them to collect data about the health & performance of an application, analyze and display the collected data to make informed decisions, and create automation to remedy application health or performance issues. You will set up and use Application Insights on a variety of Azure resources, and use the Application Insights SDK in a Python application to collect and transmit data about the application. You'll also query, transform, and display the collected application data so that the data can easily be analyzed, and use automation in Azure to manage cloud resources.

Project

Enhancing Applications

In this project, you will collect and display performance and health data about an application post-migration to Azure. First you'll set up Application Insights monitoring on a virtual machine scale set (VMSS) and implement monitoring in an application to collect telemetry data. Then you will create auto-scaling for a VMSS and an Azure Automation account to create a RunBook that automates the resolution of performance issues. Finally, you'll create alerts to trigger auto-scaling on an Azure Kubernetes Service (AKS) cluster and trigger a Runbook to execute.

LESSON TITLE

LEARNING OUTCOMES

APPLICATION INSIGHTS

- Set up Application Insights.
- Configure Application Insights on a VMSS.
- Configure Application Insights for an AKS cluster.
- Collect telemetry data.

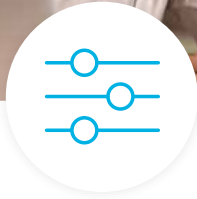
APPLICATION ANALYTICS

- Create an Azure Log Analytics Workspace.
- Collect and ingest log data.
- Write queries to return only relevant data of application performance.
- Create reporting charts from data.

AZURE MANAGEMENT

- Create an Azure Automation Account.
- Autoscale rules for VMSS.
- Create a RunBook.

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.

Our Review Process

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.



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