NANODEGREE PROGRAM SYLLABUS
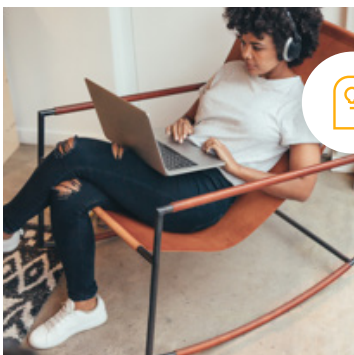
Data Product Manager

Overview

Leverage market data to amplify product development. Learn how to apply data science techniques, data engineering processes, and market experimentation tests to deliver customized product experiences. Begin by leveraging the power of SQL and Tableau to inform product strategy. Then, develop data pipelines and warehousing strategies that prepare data collected from a product for robust analysis. Finally, learn techniques for evaluating the data from live products, including how to design and execute various A/B and multivariate tests to shape the next iteration of a product.

Estimated Time: 3 Months at 10 hours / week

Prerequisites: Prior Data Analysis & Product Management Experience Recommended

Flexible Learning: Self-paced, so you can learn on the schedule that works best for you.

Need Help? udacity.com/advisor Discuss this program with an enrollment advisor.

Course 1: Applying Data Science to Product Management

As products become more digital, the amount of data collected is increasing. Product managers now have the opportunity to utilize this data to not only enhance existing products, but create completely new ones. Understand the role of data product managers within organizations and how they utilize data science, machine learning, and artificial intelligence to solve problems. Learn how to visualize your data with Tableau for statistical analysis and identify unique relationships between variables via hypothesis testing and modeling. Evaluate the output captured in statistical analyses and translate them into insights to inform product decisions.

Course Project
Develop a Data-Backed Product Proposal

A key responsibility of data product managers is analyzing market data to propose new product opportunities. In this project, you will apply the skills acquired in this course to create the MVP launch strategy for the first flying car taxi service, Flyber, in one of the most congested cities in America -- New York City. Your team acquired taxi data for a comparable initial analysis. The dataset contains real taxi drop-offs and pick-ups in New York City. First, you will analyze the existing use cases for and identify temporal, behavioral, and spatial trends of ground-based taxis from the dataset. Next, you will deep-dive into user research data, to understand the general sentiment, desire, concerns, and use cases of a flying cab service to prospective customers. Finally, you will synthesize your insights to create a data-backed product proposal that recommends what features the first flying taxi service should have to maximize consumer delight, adoption and profits.

LEARNING OUTCOMES		
LESSON ONE	**Introduction to Data Product Management**	• Explain the concept and history of data product management • Distinguish the different types of data product managers • Identify the various internal stakeholders that data product managers work with • Understand the fundamentals of general product management from talking to customers, analyzing data, designing high-level solutions, prioritizing work, setting a roadmap, facilitating development, launch communications, and product iteration

LESSON TWO	**Granularity, Distribution, and Modeling Data**	• Analyze what is being measured in a dataset • Explain the benefits of aggregates or roll-up tables • Compare and contrast the differences between fact & dimensional tables • Calculate and analyze the distribution of a dataset
LESSON THREE	**Trends, Enrichment, & Visualization**	• Identify and differentiate different visualizations, and justify when to apply the right visualization for the appropriate analyses (spatial, temporal, distribution, correlation) - box plot, line chart, donut chart, density map, histogram • Implement enriching datasets, and utilize common online repositories for publicly available datasets for analysis.
LESSON FOUR	**Midterm: Develop a Data-Backed Product Proposal (Part 1)**	• Utilize SQL and other data analysis techniques to explore and enrich a dataset to identify customer pain points, trends, and opportunities
LESSON FIVE	**Setting Product Objectives & Strategy**	• Interpret data and insights to come up with product objectives • Design KPIs that measure if your products are meeting their objectives • Utilize best practices and different techniques for setting up explicit feedback mechanisms • Create experiments that generate meaningful results in a timely, resourceful manner • Drive instrumentation strategies for proper event data collection
LESSON SIX	**Proposal Synthesis & Design**	• Assemble & arrange your narrative based on stakeholders • Weave data visualizations and insights into presentations in a consumable format • Develop the key points to hit in a product proposal presentation

Course 2: Establishing Data Infrastructure

Products that collect data from its users can only leverage such data if it gets processed and stored properly. Data product managers need to ensure their products have the appropriate supporting data pipelines in place so that data collected from users can be extracted, transformed, and loaded into a data lake or warehouse that can be used for statistical analysis. Learn about data infrastructure components including data pipelines, data producers, data consumers, data storage, and data processing. Master the nuances of evaluating strategic decisions for data pipeline technology, including security and compliance. Apply learnings to make step-by-step decisions for data infrastructure of an organization. Create solutions for real-world data infrastructure problems and evaluate tradeoffs.

Course Project
Build a Scalable Data Strategy

Once a product has been launched into the market, the amount of data collected typically dramatically increases, and requires the appropriate infrastructure to support such growth. In this project, you will continue acting as a data product manager for Flyber, a flying-taxi service that has been massively successful in New York City after its first product launch, and create a data strategy to not only handle the massive amount of incoming data, but also process it to get the business insights needed to grow the business. First, you will define the data needs of primary business stakeholders within the organization and create a data model to ensure the data collected supports those needs. Then, you will perform the necessary extraction and transformation of the data to make the data relevant to answer business questions. Lastly, you will interpret data visualizations to understand the scale of Flyber's data growth and choose an appropriate data warehouse to enable that growth.

	LEARNING OUTCOMES	
LESSON ONE	**Introduction to Data Pipelines**	• Understand the importance and need of data pipelines • Understand the various components of data pipelines • Learn how to organize data pipeline components to automate end-to-end data flow • Create conceptual data pipelines • Learn about the influence of Saas and IoT on the data infrastructure world • Understand classic data problems that can be addressed by data pipelines

LESSON TWO	**Data Consumers**	• Learn about primary data consumers and their data needs • Identify data consumers in an organization and relevant data use cases based on their business goals • Understand the components in building a relational data model • Apply relational data models to business scenarios
LESSON THREE	**Data Producers**	• Learn how to create event data models and implement them to get business insights • Understand primary product management KPIs (Active Users, • Session Length, Bounce Rate, Conversion Rate and Click-through-Rate) • Use data collected from event models to calculate product KPIs • Identify primary data producers in an organization • Distinguish between backend data producers (Saas, ERPs and Data stores) • Differentiate between types of data (structured vs. semi-structured vs. unstructured)
LESSON FOUR	**Data Strategy**	• Understand the difference between ETL and ELT processes • Distinguish between batch processing and stream processing • Select the appropriate data processing components for the product based on data needs • Distinguish between a data warehouse and data lake • Differentiate between SQL and NoSQL databases • Determine the appropriate data storage components for a particular data infrastructure of a product based on data needs • Assess capabilities of various data warehousing options (build vs buy, cloud vs on-prem, open source vs proprietary and insource vs outsource) to make strategic decisions for data infrastructure • Understand data security and compliance (PII, PCI, HIPAA, GDPR and CCPA) components related to product use cases

Course 3: Leveraging Data in Iterative Product Design

The best products adapt to market changes over time and are constantly being refined based on user feedback. With a robust data pipeline, the amount of data collected through product usage is extremely valuable to product managers for enhancing their products. Understand which data is best collected through quantitative versus qualitative methods, and how to interpret it. Learn how to apply chi-square tests to determine if results from data analysis are statistically significant. Utilize user data to create user personas that are actionable for development teams to translate into code and for building out user journey maps that describe the stages a user engages with the product along with the associated risks and opportunities. Extract insights from user journey maps to define KPIs of suggested product enhancements and design the relative hypotheses and experiments that are needed to prove the assumptions of product enhancements.

Course Project
Create an Iterative Design Path

As products exist in the market over time, opportunities for product design improvements arise. In this project, you will continue in the role as a data product manager for Flyber, a flying-taxi service that has grown its user base exponentially, and define customer segments and relevant new product feature opportunities. First, you will evaluate data from a conducted A/B test to identify key behavioral and descriptive attributes of users to define user personas and map out the significant stages of the user journey within the Flyber app. Then, you'll create an assumption map to explain the testable risks, opportunities, and correlated KPIs for product design improvements of the app experience, including the most impactful page and most significant subset of users. Lastly, you'll use the completed assumption map as well as the developed user persona and journey to construct hypotheses for new product features of the Flyber app and experiments to validate these hypotheses.

LEARNING OUTCOMES		
LESSON ONE	**Choose & Measure KPIs**	• Describe how data collection and usages changes depending on the state of the software (from pre-launch to product with existing customer base) • Choose common KPIs for different business models (freemium, SAAS, eCommerce) • Calculate the most popular KPIs for user acquisition, activation, retention, and revenue • Suggest additional data that should be collected to allow for KPI tracking.

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LESSON TWO	**Evaluate User Acquisition & Usage Funnels**	• Identify the steps in a typical user acquisition and activation funnel • Run analyses in Tableau to determine rate of user dropoff during each step of a funnel • Visualize a funnel analysis in Tableau in bar chart form
LESSON THREE	**Cohort Analysis**	• Explain the importance of segmenting user data by cohorts • Identify behavioral traits in a data set that could be used to analyze cohort behavior • Apply cohort analysis to segment funnel analysis • Calculate feature use within a product, both among all users and among selected cohorts using existing event data
LESSON FOUR	**Qualitative & Quantitative Data**	• Explain the benefits and drawbacks of quantitative data • Explain the benefits and drawbacks of qualitative data • Determine when qualitative data is most useful during the iterative design process • Describe unstructured and structured methods of qualitative research, including interviews/focus groups, surveys, and prototype testing • Explain the framework of "jobs to be done" as used during qualitative research • Narrow scope and choose which feature(s) to test first using the RICE framework
LESSON FIVE	**A/B Test & Multivariate Test**	• Explain the benefits and drawbacks of A/B testing • Explain the benefits and drawbacks of multivariate testing • Determine what type of test is appropriate given feature(s) of interest • Determine what user actions should be tracked during A/B and multivariate tests • Explain methods to create unbiased control and test groups of users • Apply the correct statistical methods to explain the difference between the experimental and control group data and make a decision

Our Classroom Experience
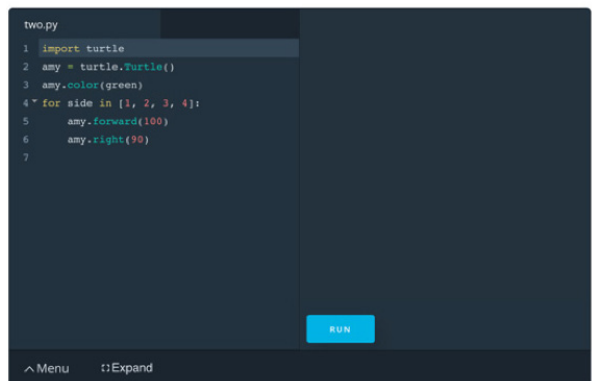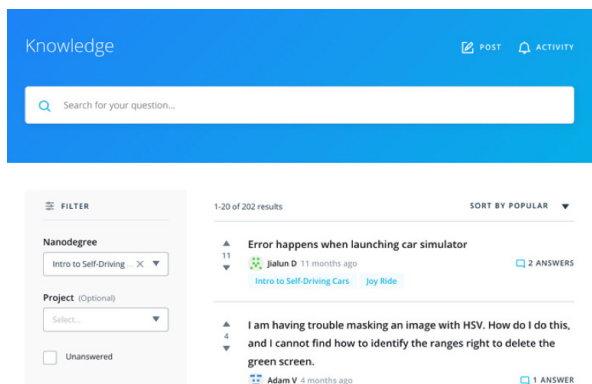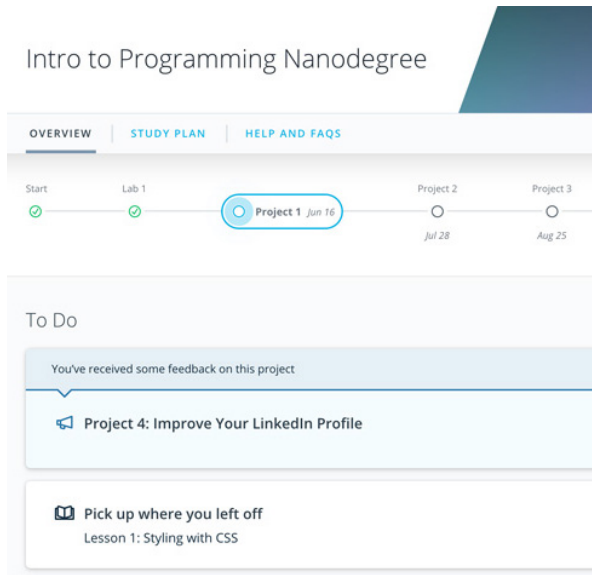
REAL-WORLD PROJECTS
Build your skills through industry-relevant projects. Get personalized feedback from our network of 900+ project reviewers. Our simple interface makes it easy to submit your projects as often as you need and receive unlimited feedback on your work.

KNOWLEDGE
Find answers to your questions with Knowledge, our proprietary wiki. Search questions asked by other students, connect with technical mentors, and discover in real-time how to solve the challenges that you encounter.

STUDENT HUB
Leverage the power of community through a simple, yet powerful chat interface built within the classroom. Use Student Hub to connect with your fellow students in your Executive Program.

WORKSPACES
See your code in action. Check the output and quality of your code by running them on workspaces that are a part of our classroom.

QUIZZES
Check your understanding of concepts learned in the program by answering simple and auto-graded quizzes. Easily go back to the lessons to brush up on concepts anytime you get an answer wrong.

CUSTOM STUDY PLANS
Preschedule your study times and save them to your personal calendar to create a custom study plan. Program regular reminders to keep track of your progress toward your goals and completion of your program.

PROGRESS TRACKER
Stay on track to complete your Nanodegree program with useful milestone reminders.

Learn with the Best

JJ Miclat

SR. PRODUCT MANAGER
AT ZENDESK

JJ is a product leader obsessed with creating simple, novel solutions for the world's most challenging issues. He's sunk his teeth into analytics & data product management for Beats Music, Apple, VSCO, & Collective Health.

Vaishali Agarwal

PRODUCT MANAGER
AT EXPEDIA

Vaishali has 12+ years' experience in tech eco-system ranging from product management, product development, content writing to coding. She is experienced in building platforms, high performance start-up divisions, streamlined operations, and managing customer expectations.

Anne Rynearson

SR. PRODUCT MANAGER
AT DISQO

Anne has 6+ years' experience in product management in the software industry, including EdTech and market research industries. She is an agile leader experienced in launching and growing both consumer and enterprise-facing products. Proven ability to lead cross-functional teams in iterative data-driven product development with a focus on strategic product growth.

All Our Nanodegree Programs Include:

EXPERIENCED PROJECT REVIEWERS

REVIEWER SERVICES

- Personalized feedback & line by line code reviews
- 1600+ Reviewers with a 4.85/5 average rating
- 3 hour average project review turnaround time
- Unlimited submissions and feedback loops
- Practical tips and industry best practices
- Additional suggested resources to improve

TECHNICAL MENTOR SUPPORT

MENTORSHIP SERVICES

- Questions answered quickly by our team of technical mentors
- 1000+ Mentors with a 4.7/5 average rating
- Support for all your technical questions

PERSONAL CAREER SERVICES

CAREER COACHING

- Personal assistance in your job search
- Monthly 1-on-1 calls
- Personalized feedback and career guidance
- Interview preparation
- Resume services
- Github portfolio review
- LinkedIn profile optimization

Frequently Asked Questions

PROGRAM OVERVIEW

WHY SHOULD I ENROLL?
Product Manager is a top 5 job on LinkedIn's Most Promising Jobs for 2019, and one of the most coveted roles in large tech enterprises, as well as entrepreneurial startups. All products developed for today's market are data products - running on data-derived insights to provide the right experience, to the right user, at the right time. Companies like Amazon, Netflix, Google, and more are able to provide personalized and engaging experiences to users because they utilize data science, machine learning, and artificial intelligence to better meet user needs.

In the Data Product Manager Nanodegree program, you will hone specialized skills in Product Management, a role with a starting base salary of $125,000 and be equipped to build products that leverage data to position customers and businesses to thrive. This program is designed for students who want to assume key leadership roles in data product development and strategy in their company.

Leverage market data to amplify product development. Learn how to apply data science techniques, data engineering processes, and market experimentation tests to deliver customized product experiences. Begin by leveraging the power of SQL and Tableau to inform product strategy. Then, develop data pipelines and warehousing strategies that prepare data collected from a product for robust analysis. Finally, learn techniques for evaluating the data from live products, including how to design and execute various A/B and multivariate tests to shape the next iteration of a product.

WHAT JOBS WILL THIS PROGRAM PREPARE ME FOR?
This program will equip you with the skills to assume data product manager roles. You'll learn directly from experienced Product Managers at Zendesk, Expedia, and DISQO, who have constructed this Nanodegree program to equip you with the most in-demand and relevant industry skills.

HOW DO I KNOW IF THIS PROGRAM IS RIGHT FOR ME?
This Nanodegree program is perfect for existing Product Managers, Data Science professionals, and Engineers who are already in data or product-focused roles and want to further their skillset, as well as those who wish to break into the data product domain and help build products that utilize data to provide better product experiences.

In most of the digital products, data is used to enhance product lines, better meet customer needs, make products that customers actually want, or create for a more personalized experience. Data that are collected from a product can be fed into machine learning algorithms and used to improve the overall user journey. If you want to build data-driven products backed by scalable data strategies to deliver the right experience to the right users, at the right time,

FAQs Continued

then this Nanodegree program is right for you.

WHAT IS A COURSE? HOW IS IT DIFFERENT FROM A NANODEGREE PROGRAM?

Udacity's Nanodegree programs are comprised of a series of courses. Each course is a distinct unit of learning, typically ending in a project where students demonstrate mastery of the skills covered. The Data Product Manager Nanodegree Program consists of three courses, outlined in the above syllabus. With the Applying Data Science to Product Management Course, you are getting early access to the first course in the Data Product Manager Nanodegree program.

Students who enroll in a paid course will receive all the same support and services as students in Udacity's Nanodegree programs. The main difference is that a course is a smaller unit of material - a typical Nanodegree program is comprised of 3 or 4 courses.

Every course includes career services including a personal career coach, project reviews from industry professionals, technical mentor support so you can get help when you need it, and a flexible learning plan so you can learn at your own pace.

HOW DO I GET 30% OFF THE DATA PRODUCT MANAGER NANODEGREE PROGRAM?

The Data Product Manager Nanodegree program is one of the first times Udacity has ever offered early access to a Nanodegree program by way of access to individual courses, so get a headstart on your Product Management toolkit today! The options for enrollment are:

Option 1) Enroll today in Course 1, Applying Data Science to Product Management, at 30% off, AND unlock 30% off the Data Product Manager Nanodegree program when it's available. Any progress you make in the course will transfer over into the Nanodegree program!

Option 2) Wait until Fall 2020 and enroll in the complete Data Product Manager Nanodegree Program at full price.

Please note that the following terms apply: Students who enroll in the Applying Data Science to Product Management Course will be eligible for 30% off each month of a monthly subscription to the Data Product Manager Nanodegree Program. Eligible students will automatically receive tvhis offer via email when the Data Product Manager Nanodegree program is available. This discount may not be transferred to a different Nanodegree program or to another student, and may not be combined with other offers or redeemed for cash. Limitations apply. These terms are subject to change without notice.

FAQs Continued

WHAT IS THE DIFFERENCE BETWEEN THE PRODUCT MANAGER, THE GROWTH PRODUCT MANAGER, THE DATA PRODUCT MANAGER, AND THE AI PRODUCT MANAGER NANODEGREE PROGRAMS?

The **Product Manager Nanodegree** program will equip you with the foundational skills to assume entry-level product manager roles. You'll learn directly from experienced Product Managers at Uber and Google, who have constructed this Nanodegree program to equip you with the most in-demand and relevant industry skills. This Nanodegree program teaches the core skill set required in all Product Manager roles, which is the foundation for more specialized roles like Growth Product Manager, Data Product Manager, AI Product Manager, and more.

The **AI Product Manager Nanodegree** program is meant for product managers that are responsible for building and deploying AI products. The AI PM Nanodegree program is focused on the hands-on tasks of scoping a data set, training a model, and evaluating the performance of the model.

The **Growth Product Manager Nanodegree program** is meant for experienced Product Managers who are looking to specialize their skills in product management and be equipped to fill growth-focused roles. You'll learn how to grow the user base of your product, get customers engaged and activated as quickly as possible, and monetize your product to have it generate revenue.

The Data Product Manager Nanodegree program is meant for experienced Product Managers who are looking to specialize their skills in product management and be equipped to fill data-focused roles in the development and strategy behind data products. You'll learn how to build an MVP launch strategy for a new service product that utilizes market insights extracted from extensive data analyses and visualizations, develop a data model with corresponding data pipelines and transformations to evaluate user activity of a product, and identify key behavioral and descriptive attributes of users to construct hypotheses for new product features and experiments to validate these hypotheses.

ENROLLMENT AND ADMISSION
DO I NEED TO APPLY? WHAT ARE THE ADMISSION CRITERIA?
There is no application. This Nanodegree program accepts everyone, regardless of experience and specific background.

WHAT ARE THE PREREQUISITES FOR ENROLLMENT?
No prior experience with data modeling & data engineering is required. However, a basic understanding of data terminology (i.e. big data, database, algorithms, etc.), some experience with data analysis (basic SQL & Tableau), and a general understanding of product management is helpful.

Frequently Asked Questions

IF I DO NOT MEET THE REQUIREMENTS TO ENROLL, WHAT SHOULD I DO?
The following Nanodegree programs are not necessary to complete before starting this program, but could be helpful if you would like to prepare.

You can check out the **Product Manager Nanodegree program**, **SQL Nanodegree program**, or the Programming for **Data Science with Python Nanodegree program**.

TUITION AND TERM OF PROGRAM

HOW IS THIS NANODEGREE PROGRAM STRUCTURED?
The Data Product Manager Nanodegree program is comprised of content and curriculum to support three projects. Once you subscribe to a Nanodegree program, you will have access to the content and services for the length of time specified by your subscription. We estimate that students can complete the program in three months, working 10 hours per week.

Each project will be reviewed by the Udacity reviewer network. Feedback will be provided and if you do not pass the project, you will be asked to resubmit the project until it passes.

HOW LONG IS THIS NANODEGREE PROGRAM?
Access to this Nanodegree program runs for the length of time specified in the payment card above. If you do not graduate within that time period, you will continue learning with month to month payments. See the **Terms of Use** and **FAQs** for other policies regarding the terms of access to our Nanodegree programs.

HOW LONG IS COURSE 1?
The Applying Data Science to Product Management Course, the first course in the Data Product Manager Nanodegree program, is comprised of content and curriculum to support one project. Once you subscribe to a course, you will have access to the content and services for the length of time specified by your subscription. We estimate that students can complete each course in one (1) month, working 10 hours per week.

Each project will be reviewed by the Udacity reviewer network. Feedback will be provided and if you do not pass the project, you will be asked to resubmit the project until it passes.

CAN I SWITCH MY START DATE? CAN I GET A REFUND?
Please see the Udacity Nanodegree program **FAQs** for policies on enrollment in our programs.

Frequently Asked Questions

SOFTWARE AND HARDWARE

WHAT SOFTWARE AND VERSIONS WILL I NEED IN THIS PROGRAM?
You will need to use SQL, Tableau, Google Slides or Microsoft PowerPoint, and Google Sheets or Microsoft Excel, as well as have access to the internet and a 64-bit computer. You will also need access to a computer for which the requirements are:

Minimum browser requirements are:
Chrome 49+
Firefox 57+
Safari 10.1+ (Apple - macOS)
Edge 14+ (Windows)

Minimum operating system (OS) requirements are:
Windows 8.1 or later
Apple MacOS 10.10 (Yosemite) and later
Any Linux OS that supports the browsers mentioned above
Any Chrome OS that supports the browsers mentioned above