UDACITY

NANODEGREE PROGRAM SYLLABUS

Android Kotlin Developer

Overview

Built in collaboration with Google, this program will prepare you to become a professional Android developer, and allow you to create a diverse portfolio of projects to show employers. By the end of this program you will be able to use Android development platform best-practices, Android Studio, Android Jetpack and Kotlin to build your own applications for the world's most-used mobile platform.

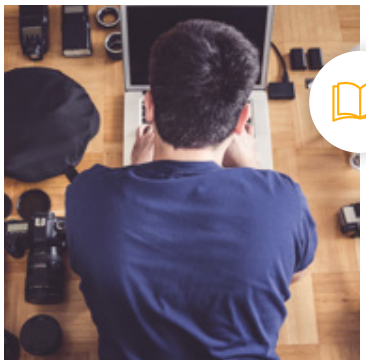
A graduate of this program will be able to:

- Design engaging interfaces that implement modern Android components to effectively build compelling features for the end user.
- Incorporate remote data into an app by utilizing RESTful interfaces and web APIs.
- Organize, store, retrieve, and display content on an Android device to provide users with a more consistent, performant, and accessible experience, even while offline.
- Integrate hardware capabilities such as location to provide users with mobile enriched features within an Android app.
- Architect an Android app using the established MVVM pattern for scalability and performance.

IN COLLABORATION WITH

Google

Estimated Time: 4 Months at 10 hours / week



Prerequisites: Experience with Object-Oriented Programming

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: Developing Android Apps, Part 1

In this course, use common Android UI components to build a basic user interface, handle user input and Android lifecycle events, and create dynamic and navigable interfaces using constraint-based layouts. You'll also learn how to use the Gradle build process to declare library dependencies and establish application parameters, and integrate application functionality with other applications or components with Android.

Course Project
Build a Shoe Store Inventory App

In this project, you will build an Android application with Kotlin! You will build a multi-screen Android app and create a navigation graph to take the user through the app. You will use fundamental Android development skills to set up a development environment for an Android app, use Android Studio's Layout Editor, and implement best practices for navigation and user interface in Android. You'll also follow recommended Android app architecture guidance with ViewModel and LiveData lifecycle classes.

	LEARNING OUTCOMES	
LESSON ONE	**Build your First App**	• Explore the basics of Android, such as creating text, images, and interactive buttons • Set up the development environment and create a Dice Roller Android app • Navigate the Main Map Anatomy of an Android app.
LESSON TWO	**Layouts**	• Learn different kinds of views and resources • Explore arranging elements with the Android Studio's Layout Editor • Connect views with data through data binding
LESSON THREE	**App Navigation**	• Learn how to build apps that contain multiple screens known as destinations • Use Android Studio tools to create and visualize a map, or graph, of destinations that show navigation paths in your app • Learn the navigation patterns and user interface that Android users expect to see, so that your app will be intuitive and familiar

LESSON FOUR	**Activity and Fragment Lifecycle**	• Learn all about the Android Activity Lifecycle • Create a one-screen app called Dessert pusher • Debug common issues through an understanding of lifecycles
LESSON FIVE	**App Architecture (UI Layer)**	• Learn one way to structure an Android app and the benefits that come with this design • Learn about two classes in the lifecycle library: ViewModel and LiveData

Course 2: Developing Android Apps, Part 2

In this course, you will learn how to implement data persistence in your application, display collections of data to users using RecyclerView, and use APIs to connect to, store, and retrieve data. You will also learn best practices of Material Design to create a quality user experience and learn how to make an app more accessible to as many users as possible.

Course Project
Build an Asteroid Radar App

In this project, you will build an app using a free, open source API provided by the NASA JPL Asteroid team. You will create an application that connects to the internet to retrieve and display live data, implement networking best practices to fetch and display data and images, and create a database to store and access user data over time. You will also learn to use RecyclerView to create a clear and compelling UI to display the data. Finally you will test your app with Talkback enabled and make your app more accessible for as many users as possible.

	LEARNING OUTCOMES	
LESSON ONE	**Recycler View**	• Implement the ViewHolder pattern to optimize performance when displaying large sets of data with RecyclerView. • Display large collections of data in a user consumable and navigable format. • Optimize application performance when updating data collections that affect the UI.
LESSON TWO	**Connect to the Internet**	• Build an application that connects to an internet server to retrieve and display live data • Simplify fetching data and images, to make sure the app reasonably conforms to networking and image loading best practices
LESSON THREE	**Behind the Scenes**	• Learn how to implement offline caching by building an app that lets users watch DevByte videos • Take an online-only app and transform it to work offline by adding offline caching

LESSON FOUR

Designing for Everyone

- Improve your app design to support multiple languages as well as support multiple device sizes and orientations
- Learn how to make your app accessible for users who might need assistance navigating, like supporting talkback and push-button navigation

Course 3: Advanced Android Apps with Kotlin, Part 1

In this course you will learn how to enhance your application's functionality and drive user engagement using Android's robust notification system, build custom views, and use canvas drawing to allow for the update of a display based on data or user interactions. You will also be able to create simple animations to enhance the presentation of content and overall usability of the application.

Course Project
Design an App with Application Loading Status

In this project you will create an Android app that will download a file from the internet, and create notifications, custom views and animations to build a status bar in your app. You will be able to create a notification to send messages to a user within an Android app, and design and style the notifications. You will also build custom views using canvas and paint, animate UI elements with property animations, and use MotionLayout to enhance the user experience of your app.

	LEARNING OUTCOMES	
LESSON ONE	**Using Notifications**	• Send messages to users using notifications • Design and style notifications • Add buttons and actions to notifications • Send push messages using Firebase Cloud Messaging
LESSON TWO	**Creating Custom Views**	• Create custom views for your app
LESSON THREE	**Drawing on Canvas Objects**	• Build an app that allows users to paint directly on the screen
LESSON FOUR	**Clipping Canvas Objects**	• Create and display transformed and clipped regions to the screen • Translate the origin of a drawing surface of a region • Draw multiple shapes on a canvas

LESSON FIVE	**Android Property Animations**	• Use animations to draw attention to important UI elements and beautiful designs • Animate UI elements with property animations
LESSON SIX	**Using Motion Layout to Animate Android Apps**	• Use declarative XML with MotionLayout to coordinate animations across multiple views

Course 4: Advanced Android Apps with Kotlin, Part 2

In this course you will learn how to build an app with location awareness and Google Maps. You will also learn best practices and techniques for testing to enable you to scale your app quickly and safely, while mitigating any negative effects, and how to use Firebase for authentication and remote storage.

Course Project
Build a Location Reminder App

In this project, you will build a To-do List app that includes Google Maps and location services. You'll learn how to add Google Maps and style map views in your Android application, and enable location services and tracking. With location services and reminders, your app will remind users to perform an action when the user is at a specific location.

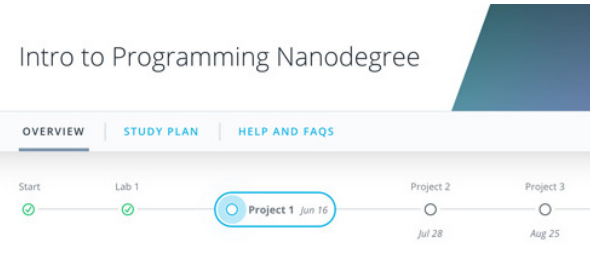
Capstone Project
Design and Build an Android Application

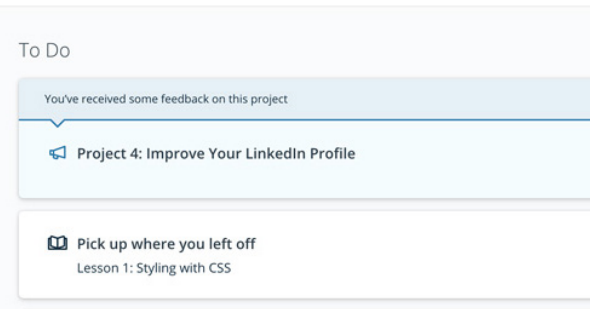
In this project, you will have the opportunity to design and build either 1) a custom Android application inspired by your own idea or 2) a Political Preparedness application that will deliver civic data to end users via the app. You'll apply skills acquired throughout the Nanodegree to design an engaging user interface that incorporates data from RESTful interfaces and web APIs, and utilizes mobile hardware to enhance application functionality and provide an engaging user experience. The project will allow you to showcase recommended Android app architecture patterns, delivering a highly functional and scalable application that takes full advantage of the Android platform.

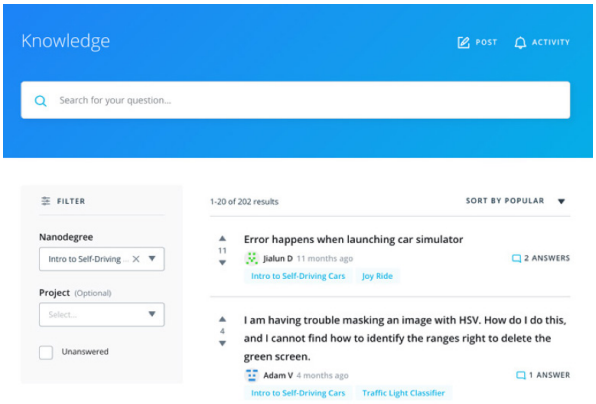
	LEARNING OUTCOMES	
LESSON ONE	**Wandering in Google Maps with Kotlin**	• Add Google Maps functionality to an Android app • Style Google Maps views in multiple ways in an Android app
LESSON TWO	**Virtual Treasure Hunt with Geofences**	• Enable location services and tracking

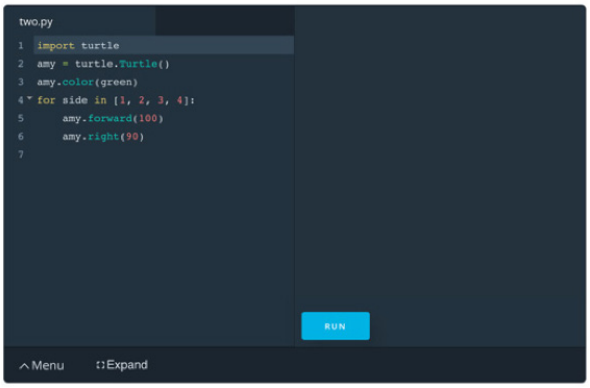
LESSON THREE	**Testing: Basics**	• Learn how to test your app before distribution to avoid crashes or unpredictable behavior
LESSON FOUR	**Introduction to Test Doubles and Dependency Injection**	• Use test doubles and dependency injection to test an app • Write tests with Espresso for UI testing • Use mockito to create an integration test
LESSON FIVE	**Survey of Advanced Testing Topics**	• Implement end to end testing using navigation, coroutines, room and databinding.
LESSON SIX	**Implementing Login on Android with FirebaseUI**	• Implement user login and identity management for your app using the open-source library FirebaseUI • Enable login and logout for your app's users • Control navigation in your app based on whether a user is logged in

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 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 technical mentor and fellow students in your Nanodegree 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

Work with a mentor to create a custom study plan to suit your personal needs. Use this plan to keep track of your progress toward your goal.

PROGRESS TRACKER

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

Learn with the Best

Dan Galpin

INSTRUCTOR

Dan Galpin is a Developer Advocate for Android at Google, focusing on Android performance tuning, developer training, and games. He has over 10 years of experience in mobile, developing at almost every layer of the phone stack.

Aleks Haecky

DEVELOPER ADVOCATE

Aleks is a Writer and Developer Advocate with over 20 years of experience developing media and tools that bring technologies and programming to developers. They believe in the power of education, and Android development as a skill that can change lives.

Sean McQuillan

DEVELOPER ADVOCATE

Sean has a decade of experience as a startup engineer in San Francisco where he learned how to build successful apps. Sean is passionate about building high quality products - quickly. When he is not working on Android you can find him fiddling on the piano or crocheting hats.

Murat Yener

ANDROID DEVELOPER ADVOCATE

Murat has been an Android Developer back to Froyo, worked on wearable and other form factor Android devices. He is a code geek, open source committer, Java Champion and the author of Expert Android Studio and Professional Java EE Design Patterns books.

Learn with the Best

Chet Hasse

CHIEF ANDROID ADVOCATE AT GOOGLE

After being on, and leading, the UI Toolkit team on Android for several years, Chet joined the Developer Relations team. His focus and passion has always been UI, graphics, animation, performance, and anything that puts the pixels on the screen, in addition to helping developers write great apps.

Meghan Mehta

ANDROID DEVELOPER ADVOCATE AT GOOGLE

Meghan is a Developer Advocate on the Android team. She has been a mobile developer for many years at Disney, Foursquare, Yelp and now Google. She loves sharing her knowledge and experience with other developers. When she is not working you can find her singing, dancing, or baking!

Caren Chang

DEVELOPER PROGRAMS ENGINEER

Caren is a Developer Programs Engineer for the Android Frameworks team at Google.

Lyla Fujiwara

ANDROID DEVELOPER ADVOCATE AT GOOGLE

Lyla authored many of the fundamental Android samples and trainings for Android Jetpack, Kotlin and testing. She's also had the honor of teaching everyone from high-school students to senior developers how to make Android apps. These days, she's part of the team bringing you the Google News Android app.

Learn with the Best

Asser Samak

ANDROID DEVELOPER ADVOCAT
AT GOOGLE

Aser has been building educational Android apps with Udacity & Google for the past 4 years, he enjoys teaching with a focus on best-practices and building a solid foundation at an early stage. Aser loves solving the Rubik's cube which is featured in many of his videos - try to find them all.

Joshua Donlan

SENIOR ANDROID DEVELOPER
AT HALOGEN TV

Joshua has 20 years experience as a web and mobile application developer helping launch multiple startups and grow established companies alike. His client portfolio includes Fortune 100 companies Audi, Disney, Mitsubishi, American Express, BD Pharmaceuticals, and more.

Kevin Moore

STAFF SOFTWARE ENGINEER
AT AFFIRM

Kevin has been doing Android development for over 9 years, developing many different types of apps. In addition, Kevin has been writing articles, Tech editing books, and creating videos for raywenderlich.com and LinkedIn Learning.

Jesus Valdez

SENIOR ANDROID DEVELOPER
AT HANDY

Kevin is a mechatronics engineer with an MS in machine learning. He works as a mobile developer, and is proficient in: Mobile Development, Image Processing, Machine Learning, Electronics, and Automation.

Learn with the Best

Aida Issayeva

ANDROID ENGINEER AT
CLARITY MONEY

Aida is an Android Engineer at Clarity Money, a personal finance management app. Previously, she has built android applications for various industries, ranging from cloud gaming services to satellite data communications. When she's not coding, she's chasing great food experiences all over the world.

Mohamed Habib

ANDROID ENGINEER
AT ANDELA

Mohamed is an experienced Android Engineer with 5 years of experience, passionate about teaching and mentoring, he has a strong engineering professional with a bachelor's degree in Computer Science from Ain Shams University.

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?

Android dominates the market of mobile operating systems, with over **75% of the global market share**. Kotlin is Google's preferred language for Android app development, and the Android Developer with Kotlin Nanodegree program will teach you how to develop cutting-edge applications on the world's most popular mobile platform. Kotlin has become the fastest-growing programming language, according to GitHub, and it's increasingly being used by companies like Google, Square, Pinterest, CapitalOne, and Atlassian.

In this Nanodegree program, you'll learn the fundamentals of building Android applications using Kotlin. This program will prepare you to become a professional Android developer, and allow you to create a diverse portfolio of apps to show employers. By the end of this program you will be able to use Android development platform best-practices, Android Studio, Android Jetpack and Kotlin to build industry-defining applications for the world's most-used mobile platform.

WHAT JOBS WILL THIS PROGRAM PREPARE ME FOR?

This Nanodegree program is designed to prepare you for a job as a professional, junior to mid-level Android Developer within a wide range of organizations and environments: from large corporations where you'd likely be part of a development team, to entrepreneurial start-ups and contract projects where you could be working independently to deliver an application.

HOW DO I KNOW IF THIS PROGRAM IS RIGHT FOR ME?

If you are a programmer who is interested in mastering the Android platform and building top-rated Android apps in Kotlin, this is the program for you. If you are not ready for this intermediate-level program, or if you are new to programming, please check out our **Android Basics Nanodegree program**.

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.

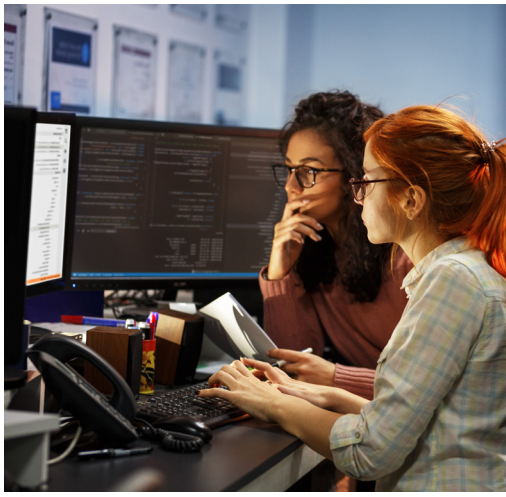
WHAT ARE THE PREREQUISITES FOR ENROLLMENT?

A well-prepared student should:

- Be comfortable with Object-Oriented Programming and the Android platform.
- Have experience navigating GitHub, and be comfortable using a Modern IDE.
- Be familiar with threads and concurrency, and with modular app architectures.
- Have familiarity with modern language syntax including:

FAQs Continued

- Optionals/Nullable Types
- Methods with default and variable arguments
- Data Classes
- Object Expressions
- Lambdas
- Extension Functions



IF I DO NOT MEET THE REQUIREMENTS TO ENROLL, WHAT SHOULD I DO?

We have a number of Nanodegree programs and free courses that can help you prepare, including:

- Android Basics Nanodegree program
- How to Use Git and GitHub

TUITION AND TERM OF PROGRAM

HOW IS THIS NANODEGREE PROGRAM STRUCTURED?

The Android Kotlin Developer Nanodegree program is comprised of content and curriculum to support five (5) projects. We estimate that students can complete the program in four (4) 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.

SOFTWARE AND HARDWARE

WHAT SOFTWARE AND VERSIONS WILL I NEED IN THIS PROGRAM?

All students will need a personal computer that is capable of running Android Studio. Please see the System Requirements listed on the Android Studio download page and ensure that your computer meets these minimum requirements.

Access to an Android device is helpful, but not necessary. You may use the emulator in Android Studio to run your apps if you do not have a physical Android device.