

**TRAINING TRAINS**

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உங்கள் கடை மற்றும் வியாபாரத்திற்கு ஏற்ற **Website & Android App** மற்றும் **Software** மிகச்சிறந்த முறையில் செய்து கொடுக்கப்படும்.

Expertise : **AI, Machine Learning & Data Science \ Cybersecurity & Ethical Hacking**  
**IoT, Blockchain & Cloud Computing \ Full Stack Web & Mobile Development**  
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# Android Developer – 100+ Lab Exercises (Basic, Intermediate, Advanced)

## □ Basic Level (30+ Exercises)

**Goal:** Establish a foundation in Android Studio, layouts, UI controls, and Java/Kotlin basics.

### Environment Setup & Basics

- Install Android Studio and SDK.
- Create your first "Hello World" app.
- Understand Android project structure.
- Run app on emulator & physical device.
- Understand activity lifecycle.

### UI Design and Components

- Design Linear, Relative, Constraint layouts.
- Add EditText, Button, TextView, ImageView.
- Use Toasts and Snackbar notifications.
- Implement simple event handling (click listeners).
- Create splash screen activity.

### Intents & Navigation

- Navigate between activities using intents.
- Pass data between activities.
- Use implicit intents (browser, phone, email).
- Implement activity transitions.
- Handle back button behavior.

### User Interaction

- Build a basic login and registration screen.
- Input validation and error handling.
- Add progress bar and spinner.
- Display alert dialog and confirm dialogs.
- Implement rating bar and seek bar.



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## □ Intermediate Level (40+ Exercises)

**Goal:** Enable app functionality through networking, storage, and modern Android architecture.

### List Views & RecyclerView

- Create ListView with custom adapter.
- Implement RecyclerView with ViewHolder.
- Add item click listeners.
- Create horizontal and vertical scrollable lists.
- Enable swipe to delete and undo action.

### Data Persistence

- Store and retrieve data using SharedPreferences.
- Build SQLite database CRUD operations.
- Use Room database with LiveData and ViewModel.
- Backup/restore local data.
- Build a local note-taking app.

### Networking

- Fetch data from a REST API using Retrofit.
- Parse JSON responses.
- Load images using Glide/Picasso.
- Display data in RecyclerView from API.
- Handle loading/error states.

### Multimedia & Sensors

- Play audio and video from internal & external sources.
- Use camera to capture and display photo.
- Access GPS location (Google Play Services).
- Read accelerometer and gyroscope data.
- Add vibration and flashlight controls.



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## □ Advanced Level (40+ Exercises)

**Goal:** Master modern Android app development with Jetpack, Firebase, security, and deployment.

### Jetpack Libraries

- Implement ViewModel and LiveData.
- Use Navigation Component for screen flow.
- Work with Data Binding and ViewBinding.
- Create bottom navigation and tab layouts.
- Use WorkManager for background tasks.

### Firebase Integration

- Firebase Authentication (Email/Google login).
- Realtime Database and Firestore usage.
- Firebase Storage for image upload.
- Cloud Messaging for push notifications.
- Firebase Analytics and Crashlytics.

### Advanced App Features

- Implement dark mode and themes.
- Offline-first data sync strategies.
- In-app purchases and subscriptions (Google Billing).
- Biometric login (fingerprint/face).
- Support multi-language (i18n) apps.

### Security & Performance

- Encrypt sensitive data (Jetpack Security).
- Secure API keys using NDK or Secrets Manager.
- Obfuscate code using ProGuard/R8.
- Profile and debug performance bottlenecks.
- Reduce APK size using modularization.

### Capstone Projects

- Build a social media clone (login, feed, posts).
- Create a weather app using OpenWeatherMap API.



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- Develop a quiz app with leaderboard.
- Design an e-commerce app with cart & payment mockup.
- Build a task manager with notifications and Firebase sync.

## □ Optional Tools & Technologies

- Java & Kotlin
- Android Jetpack, XML, Retrofit, Room, Glide
- Firebase, Google Maps API, Jetpack Compose
- GitHub, Postman, Android Profiler