

Training Course Mobile GIS App Development

Professional Development Training Course Outline

Category	GIS	Duration	10 Days
Base Fee	\$3,000 USD	Delivery Mode	Online / On-site Hybrid

Course Introduction

Training Course Mobile GIS App Development dives deep into the dynamic world of **Mobile GIS App Development**, equipping participants with the cutting-edge skills to design, build, and deploy robust geospatial applications for various mobile platforms. Leveraging industry-leading tools like **ArcGIS Runtime SDK** and the powerful open-source **QField**, this program focuses on practical, hands-on development. Participants will master spatial data collection, real-time mapping, offline capabilities, and advanced GIS analysis on mobile devices, transforming traditional fieldwork and enabling data-driven decisions in real-time.

The course emphasizes a **practical, project-based learning approach**, ensuring participants gain immediate and applicable expertise. From foundational concepts of **mobile geospatial data** to advanced **API integration** and **user interface design**, every module is crafted to build proficiency in creating highly functional and intuitive mobile GIS solutions. This training is essential for professionals seeking to lead the charge in **digital transformation** within **geospatial industries**, empowering organizations with efficient and accurate field data workflows.

Programme Curriculum

Training Course Mobile GIS App Development

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10 days

Course Objectives

1. Understand core concepts of **mobile geospatial data**, **GPS accuracy**, and **field data collection workflows**.
2. Gain proficiency in utilizing **ArcGIS Runtime SDK for mobile app development**, including **2D and 3D mapping**.
3. Learn to configure and optimize **QField for efficient offline data collection** and synchronization with QGIS.
4. Develop skills in consuming and integrating various **geospatial web services** and **APIs** for dynamic map content.
5. Create intuitive and effective **UI/UX for mobile GIS applications**, ensuring optimal field usability.
6. Implement robust strategies for **offline map packages**, **data synchronization**, and conflict resolution.
7. Understand how to integrate mobile apps with **cloud-based GIS platforms** for scalable data management.
8. Equip apps with capabilities for **on-device spatial analysis** and immediate data insights.
9. Implement techniques for **mobile data validation**, error reduction, and high-quality field input.
10. Explore strategies for developing mobile GIS applications compatible with multiple operating systems.
11. Utilize mobile GIS for **location intelligence** applications, enhancing business and operational insights.
12. Develop problem-solving skills for common **mobile GIS deployment** and field challenges.
13. Understand **emerging trends in mobile GIS**, **AI in geospatial**, and **IoT integration**.

Organizational Benefits

- Organizations will experience a dramatic improvement in the **speed and accuracy of field data collection**, reducing manual errors and eliminating paper-based workflows. This leads to more reliable and timely data for decision-making.
- With **real-time data acquisition** and visualization, organizations can better manage field assets, personnel, and operations, leading to improved resource allocation and cost savings.
- Access to **up-to-date geospatial information** directly from the field empowers quicker and more informed decisions across various departments, from urban planning to disaster response.
- Equipping field teams with custom-built mobile GIS applications streamlines workflows, automates repetitive tasks, and boosts overall productivity, allowing staff to focus on higher-value activities.
- Developing in-house mobile GIS capabilities allows organizations to create tailored solutions that directly address unique operational challenges, fostering innovation and providing a

significant **competitive edge** in the market.

- Minimizing data entry errors, optimizing field routes, and streamlining reporting processes directly contribute to substantial **cost reductions** in field operations and data management.
- The training emphasizes best practices for **secure data handling** and validation within mobile GIS environments, ensuring data integrity and compliance.
- Organizations will gain the expertise to build scalable mobile GIS solutions that can adapt to evolving needs and integrate with existing enterprise systems.

Target Audience

1. GIS Professionals & Analysts.
2. Software Developers
3. Field Scientists & Researchers
4. Urban Planners & Engineers
5. Environmental Consultants
6. Public Sector Employees.
7. Data Managers.
8. Project Managers.

Course Outline

Module 1: Introduction to Mobile GIS and Its Ecosystem

- Understanding the evolution and importance of **Mobile GIS** in modern industries.
- Key components of a mobile GIS ecosystem: hardware, software, data, and users.
- Overview of **ArcGIS Runtime** and **QField** as leading platforms for mobile geospatial development.
- Challenges and best practices in **mobile geospatial data collection** and management.
- Case Study: **Utility Asset Inspection** – How mobile GIS revolutionized routine inspections, enabling real-time updates and maintenance tracking.

Module 2: Fundamentals of Geographic Information Systems (GIS) for Mobile Developers

- Review of core GIS concepts: spatial data types (vector, raster), coordinate systems, and projections.
- Understanding geodatabases and data models for efficient mobile storage.
- Introduction to geospatial analysis techniques relevant to mobile applications.
- Data sources for mobile GIS: GPS, remote sensing, public APIs, and enterprise databases.
- Case Study: **Precision Agriculture** – Using mobile GIS to map field boundaries, soil samples, and crop health for optimized farming.

Module 3: Introduction to ArcGIS Runtime SDK for Mobile Development

- Setting up the development environment for **ArcGIS Runtime SDK** (e.g., Android Studio, Xcode).
- Understanding the ArcGIS Runtime architecture and key classes for mapping.
- Displaying maps and layers from **ArcGIS Online**, ArcGIS Enterprise, and local sources.
- Basic map interactions: pan, zoom, identify features, and display pop-ups.
- Case Study: **Emergency Response Mapping** – Developing an app to visualize incident locations and available resources in real-time for first responders.

Module 4: Advanced Mapping and Visualization with ArcGIS Runtime

- Working with different layer types: feature layers, raster layers, tiled layers, and scene layers
- Symbolization and rendering techniques for effective data visualization on mobile.
- Integrating **ArcGIS basemaps** and custom basemaps.
- Creating and managing **graphics overlays** for dynamic annotations and temporary data.
- Case Study: **Real Estate Site Selection** – Building an app to visualize property parcels, zoning information, and demographics in 2D and 3D for prospective buyers.

Module 5: Data Collection and Editing with ArcGIS Runtime

- Implementing **GPS tracking** and displaying current location on the map.
- Enabling **feature editing** capabilities: adding, updating, and deleting geometries and attributes.
- Designing user-friendly forms for efficient data input in the field.
- Working with attachments (photos, videos) and related records.
- Case Study: **Environmental Data Survey** – Developing an app for field scientists to collect water quality samples, vegetation types, and wildlife observations.

Module 6: Offline Capabilities with ArcGIS Runtime

- Strategies for developing **offline-first mobile GIS applications**.
- Generating and managing **mobile map packages (.mmpk)** and **geodatabase sync**.
- Synchronizing offline edits with an enterprise geodatabase.
- Handling network connectivity changes and conflict resolution.
- Case Study: **Forestry Management** – Creating an app for foresters to collect tree inventory data in remote areas with no internet access and sync later.

Module 7: Introduction to QField for Field Data Collection

- Setting up **QField** on mobile devices and configuring it with QGIS projects.
- Preparing **QGIS projects** for optimal use in QField (e.g., project properties, symbology).
- Designing and implementing **smart forms** within QGIS for QField data entry.
- Understanding QField's interface and basic data collection functionalities.
- Case Study: **Public Utilities Inventory** – Using QField to map and update utility poles, hydrants, and service lines with custom attributes.

Module 8: Advanced QField Workflows and Customization

- Working with **QField Sync plugin** for seamless data transfer between desktop and mobile.
- Leveraging QField for **GPS-enabled navigation** and point collection.
- Utilizing expressions and conditional visibility in QField forms for dynamic data entry.
- Offline mapping and synchronization strategies with QField and **QFieldCloud**.
- Case Study: **Archaeological Site Survey** – Employing QField to document archaeological finds with precise coordinates and detailed descriptions.

Module 9: Geospatial Data Management for Mobile Apps

- Choosing appropriate data formats for mobile GIS
- Strategies for optimizing data size and performance for mobile devices.
- Data validation rules and integrity checks for field-collected data.
- Version control and collaborative editing in a mobile GIS environment.
- Case Study: **Land Parcel Management** – Implementing a mobile GIS solution for surveyors to update land parcel boundaries and ownership details, ensuring data consistency.

Module 10: Integrating Web Services and APIs in Mobile GIS

- Consuming **REST APIs** for dynamic content (e.g., weather data, traffic).
- Working with **OGC Web Services** (WMS, WFS) in mobile applications.
- Implementing geocoding and reverse geocoding functionalities.
- Integrating routing and navigation services.
- Case Study: **Logistics and Delivery Optimization** – Developing an app that integrates real-time traffic and routing APIs for efficient delivery operations

Module 11: User Experience (UX) and User Interface (UI) Design for Mobile GIS

- Principles of effective **mobile UI/UX design** for geospatial applications.
- Designing intuitive navigation and interactive map components.
- Accessibility considerations for diverse users and field conditions.
- Testing and refining user experience for optimal performance.
- Case Study: **Tourist Navigation App** – Designing a user-friendly mobile GIS app for tourists to explore points of interest with interactive maps and multimedia.

Module 12: Performance Optimization and Debugging

- Techniques for optimizing mobile GIS app performance (e.g., data loading, rendering).
- Strategies for efficient battery usage and network bandwidth.
- Debugging mobile GIS applications and troubleshooting common issues.
- Error handling and robust application design.
- Case Study: **Large-Scale Infrastructure Monitoring** – Optimizing a mobile GIS app to efficiently display and update thousands of infrastructure assets without performance degradation

Module 13: Deployment and Security of Mobile GIS Apps

- Packaging and deploying mobile GIS applications to app stores (Google Play, Apple App Store).
- Security best practices for **mobile geospatial data** and applications.
- User authentication and authorization within mobile GIS workflows.
- Data encryption and secure communication protocols.
- Case Study: **Sensitive Data Collection (e.g., Public Health)** – Implementing a secure mobile GIS app for collecting and transmitting sensitive public health data with strict privacy controls.

Module 14: Advanced Topics: AI, IoT, and Cloud Integration

- Introduction to **AI and Machine Learning in Mobile GIS**: image recognition, predictive analytics.
- Integrating **IoT sensor data** with mobile GIS for real-time monitoring.
- Leveraging **cloud computing** for scalable mobile GIS backends and data processing.
- Exploring emerging trends like Augmented Reality (AR) in mobile GIS.
- Case Study: **Smart City Infrastructure Management** – Developing a mobile app that integrates real-time sensor data from smart city devices for monitoring environmental conditions and traffic.

Module 15: Building a Mobile GIS App Project (Capstone)

- Project planning and requirements gathering for a practical mobile GIS application.

- Designing the application architecture and data model.
- Implementing core functionalities using **ArcGIS Runtime** or **QField**.
- Testing, debugging, and refining the application.
- Case Study: **Custom Field Survey Application** – Participants work on a personalized project, applying all learned concepts to build a fully functional mobile GIS app for a specific industry need.

Training Methodology

This training program employs a **highly interactive and practical methodology** to ensure maximum learning and skill acquisition. The approach combines:

- **Instructor-Led Sessions:** Engaging lectures and demonstrations covering theoretical concepts and practical applications.
- **Hands-on Labs & Exercises:** Extensive practical sessions where participants build and configure mobile GIS applications using **ArcGIS Runtime SDK** and **QField**. This includes coding exercises, software configuration, and data preparation.
- **Real-world Case Studies:** Analysis of diverse industry-specific case studies to illustrate the practical application of mobile GIS concepts and solutions.
- **Project-Based Learning:** A culminating capstone project where participants apply their acquired knowledge to develop a complete mobile GIS application, fostering problem-solving and critical thinking skills.
- **Interactive Discussions & Q&A:** Encouraging participant engagement, knowledge sharing, and addressing individual queries.
- **Troubleshooting Workshops:** Dedicated sessions to address common challenges encountered during mobile app development and field deployment.
- **Peer Learning & Collaboration:** Opportunities for participants to work in groups, share insights, and learn from each other's experiences.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call +254769199797

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

- a. The participant must be conversant with English.
- b. Upon completion of training the participant will be issued with an Authorized Training Certificate

- c. Course duration is flexible and the contents can be modified to fit any number of days.
- d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.
- e. One-year post-training support Consultation and Coaching provided after the course.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
21 Sep 2026	02 Oct 2026	Online	\$2,000
21 Sep 2026	02 Oct 2026	Physical	\$3,000
21 Sep 2026	02 Oct 2026	Physical	\$0
21 Sep 2026	02 Oct 2026	Physical	\$0
21 Sep 2026	02 Oct 2026	Physical	\$0
21 Sep 2026	02 Oct 2026	Physical	\$0
21 Sep 2026	02 Oct 2026	Physical	\$0
21 Sep 2026	02 Oct 2026	Physical	\$0

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