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

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.

Course Duration

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
23 Nov 2026	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

Ready to enroll or request a customized program? Book online or contact us:

Register Online Now

Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com