Training Course on Metadata Management and Geospatial Data Standards

Professional Development Training Course Outline

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

Course Introduction

In today's data-driven world, **Metadata Management** and adherence to **Geospatial Data Standards** are paramount for unlocking the full potential of spatial information. This course delves into the critical role of **metadata** as "data about data," providing essential context, lineage, quality, and accessibility for diverse **geospatial datasets**. Without robust metadata, spatial data remains fragmented and challenging to discover, share, and utilize effectively, hindering critical decision-making across various sectors. Training Course on Metadata Management and Geospatial Data Standards emphasizes how comprehensive metadata empowers organizations to build reliable **Spatial Data Infrastructures (SDIs)**, fostering data interoperability, reducing duplication, and enhancing overall data governance.

The growing complexity of **geospatial data ecosystems** necessitates the adoption of universally recognized standards. This program will extensively cover key international standards from the **International Organization for Standardization (ISO)**, particularly the **ISO 19100 series** for geographic information, and the **Open Geospatial Consortium (OGC)**, which develops specifications for location-based services and data. By understanding and implementing these standards, professionals can ensure seamless **data exchange**, improve **data quality**, and facilitate **cross-organizational collaboration**. This course is designed to equip participants with the practical skills and knowledge to navigate the evolving landscape of geospatial data, promoting **data discoverability**, **usability**, and **trust** in spatial information for impactful real-world applications.

Programme Curriculum

Training Course on Metadata Management and Geospatial Data Standards

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Course Duration

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Course Objectives

1. Master the fundamental concepts of Metadata Management and its crucial role in geospatial data lifecycles.
2. Apply the ISO 19115 standard for Geographic Information Metadata to create compliant and comprehensive metadata records.
3. Implement OGC standards (e.g., WMS, WFS, GeoJSON) for geospatial data interoperability and web service integration.
4. Develop robust data governance frameworks leveraging metadata for improved data quality and compliance.
5. Utilize metadata authoring tools (e.g., ArcGIS Pro, QGIS, FME) for efficient metadata creation and validation.
6. Analyze and assess the quality of geospatial datasets using ISO 19157 Data Quality standards .
7. Design and contribute to the development of effective Spatial Data Infrastructures (SDIs) at various scales.
8. Understand the legal, ethical, and policy implications of geospatial data sharing and metadata publishing.
9. Leverage metadata for enhanced geospatial data discoverability, searchability, and reusability .
10. Automate metadata creation and validation processes using scripting and geospatial automation techniques.
11. Explore emerging trends in Big Data geospatial analytics and the role of metadata in machine learning (ML) and AI applications.
12. Mitigate data inconsistencies and fragmentation through adherence to international geospatial standards.
13. Foster a culture of data literacy and standardization within organizations for sustainable geospatial data management.

Organizational Benefits

- Organizations can easily find, understand, and reuse valuable geospatial data assets, reducing redundant data collection and improving efficiency.
- Adherence to standards ensures data consistency, accuracy, and completeness, leading to more reliable analyses and informed decision-making.
- Standardized metadata and data formats facilitate seamless data exchange and integration across departments, organizations, and platforms.
- Minimizes data duplication, simplifies data maintenance, and accelerates data processing, leading to significant cost savings and increased productivity.
- Establishes clear guidelines for data management, ensuring regulatory compliance (e.g., GDPR, national data acts) and reducing legal risks.
- Provides readily available, high-quality data, enabling faster project initiation, execution, and reliable outcomes.
- Maximizes the value derived from geospatial technology investments by ensuring data assets are well-managed and utilized.
- Accurate and accessible spatial data supports better planning, resource distribution, and policy development.
- Fosters a common understanding of data among diverse stakeholders, enabling more effective collaboration on joint projects.
- Ensures long-term usability and accessibility of historical and current geospatial data through consistent metadata documentation.

Target Audience

1. GIS Professionals & Analysts
2. Data Managers & Stewards.
3. IT Professionals & System Administrators
4. Project Managers & Team Leaders.
5. Researchers & Academics
6. Government Officials & Policy Makers
7. Urban Planners & Environmental Scientists.
8. Consultants.

Course Outline

Module 1: Introduction to Metadata and Geospatial Data

- Definition & Importance
- Geospatial Data FundamentalsChallenges of Poor Metadata.
- Metadata's Role in SDI
- Metadata Lifecycle.
- **Case Study**: A municipal planning department struggled with fragmented legacy datasets. Implementing a metadata standard helped them catalog existing data, identify gaps, and improve discoverability for urban development projects, reducing redundant data acquisition by 30%.

Module 2: Introduction to Geospatial Data Standards (ISO & OGC)

- Why Standards Matter
- ISO/TC 211 Overview.
- OGC Overview
- Key Standard Categories
- Global Impact of Standards

- **Case Study**: A multi-national environmental agency adopted OGC Web Services (WMS/WFS) to share climate model outputs and observations across different national agencies, enabling a unified view of environmental data and collaborative research.

Module 3: Deep Dive into ISO 19115

- ISO 19115 Structure.
- Mandatory vs. Optional Elements
- Practical Application.
- Metadata Profiles.
- Relationship to Other ISO Standards
- **Case Study**: The European Union's INSPIRE Directive mandated ISO 19115 for geospatial datasets. A government agency successfully implemented this, allowing seamless discovery of environmental data across member states through centralized portals.

Module 4: OGC Web Services

- Introduction to Web Services
- Web Map Service (WMS)
- Web Feature Service (WFS)
- Web Coverage Service (WCS)
- OGC API Standards
- **Case Study**: A logistics company integrated real-time traffic data from various providers using OGC WMS and WFS, optimizing delivery routes and improving fleet management efficiency.

Module 5: Data Quality (ISO 19157) & Metadata

- Dimensions of Data Quality
- ISO 19157 Overview
- Documenting Data Quality
- Data Provenance & Lineage.
- Fitness for Purpose.
- **Case Study**: A cadastral agency used ISO 19157 to document the positional accuracy of its land parcel data. This transparency built public trust and reduced disputes related to property boundaries.

Module 6: Metadata Authoring Tools & Practices

- Desktop GIS Tools
- Online Metadata Editors
- Metadata Templates.
- Automated Metadata Generation.
- Metadata Validation.
- **Case Study**: A research institute adopted a standardized metadata template and trained its researchers on using a specific online editor. This led to a significant increase in the quantity and quality of metadata for their scientific datasets, improving data sharing with collaborators.

Module 7: Spatial Data Infrastructure (SDI) Concepts

- Definition & Components
- Benefits of SDI
- Levels of SDI.

- Role of Policy & Governance
- SDI Development Strategy.
- **Case Study**: The UK's Ordnance Survey played a pivotal role in developing a national SDI, providing fundamental geospatial data and services that underpin numerous public and private sector applications, from emergency services to urban planning.

Module 8: Geospatial Data Management Best Practices

- Data Catalog & Discovery Portals.
- Data Versioning & Archiving
- Naming Conventions & Folder Structures
- Data Security & Access Control.
- Data Curation & Maintenance
- **Case Study**: A large utility company implemented a comprehensive data catalog for its infrastructure data. This reduced the time employees spent searching for relevant data by 40%, leading to faster decision-making for maintenance and upgrades.

Module 9: Legal, Ethical, and Policy Considerations

- Data Ownership & Intellectual Property.
- Data Privacy & Confidentiality
- Open Data & Data Sharing Policies
- Licensing & Usage Agreements.
- Ethical Use of Geospatial Data
- **Case Study**: A non-profit organization working with vulnerable populations developed a strict data privacy policy and anonymization procedures for its geospatial data to comply with GDPR, ensuring the ethical handling of sensitive location information.

Module 10: Geospatial Data Exchange & Transformation

- Data Formats & Conversion
- Coordinate Transformation & Reprojection.
- Data Integration Techniques.
- Schema Mapping & Harmonization
- Tools for Data Transformation.
- **Case Study**: A multi-agency flood response team used FME to integrate real-time sensor data, weather forecasts, and topographic maps from various formats and coordinate systems, enabling a unified operational picture during flood events.

Module 11: Emerging Trends in Geospatial Data & Metadata

- Big Data & Geospatial Analytics.
- Cloud GIS & Data Lakes
- Artificial Intelligence (AI) & Machine Learning (ML) in Geospatial
- Real-time Geospatial Data.
- Blockchain for Data Provenance
- **Case Study**: A smart city initiative implemented AI-powered tools for automated feature extraction from satellite imagery, significantly reducing the manual effort in updating city infrastructure maps and associated metadata.

Module 12: Advanced Metadata Creation & Management

- Extending ISO 19115.
- Metadata Harvesting & Harvesting Services

- Metadata Quality Assurance
- User Feedback & Metadata Improvement.
- Integration with Enterprise Data Management
- **Case Study**: A national mapping agency developed a centralized metadata harvesting system, automatically pulling metadata from various regional offices and validating it against national standards, creating a comprehensive national geospatial data catalog.

Module 13: Geospatial Web Services Implementation

- Setting up WMS/WFS Servers.
- Consuming OGC Services in GIS Software
- Developing Web Mapping Applications
- Security for Geospatial Web Services
- Performance Optimization
- **Case Study**: A small consulting firm built a client-facing web application for visualizing environmental data by consuming publicly available WMS layers from government agencies, demonstrating the power of interoperable web services.

Module 14: Practical Exercise: Building a Metadata Strategy & SDI Component

- Needs Assessment
- Developing a Metadata Strategy.
- 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

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