Knowledge Graph Construction for Research Data Training Course

Professional Development Training Course Outline

Category	Research and Data Analysis	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

In the era of data-driven research and semantic technologies, Knowledge Graph Construction has become an essential skill for researchers and data professionals. Knowledge Graph Construction for Research Data Training Course is designed to provide participants with cutting-edge skills and tools for building and optimizing knowledge graphs from complex research data. Leveraging techniques from semantic web, data integration, ontology development, and linked data, the course will empower participants to turn raw data into structured, interconnected knowledge that enhances discoverability, reusability, and analytics. The course offers hands-on experience using tools like RDF, SPARQL, OWL, and graph databases such as Neo4j and GraphDB.

The program is ideal for professionals seeking to gain expertise in data curation, semantic annotation, and graph-based modeling for research insights. With real-world case studies, participants will learn to manage heterogeneous datasets, apply semantic standards, and construct scalable knowledge graphs that support AI applications, data interoperability, and FAIR data principles. By the end of the training, learners will be able to build knowledge graphs that are queryable, semantically rich, and optimized for research workflows and scholarly communication.

Programme Curriculum

Knowledge Graph Construction for Research Data Training Course

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Course Objectives

1. Understand the fundamentals of knowledge graphs and semantic technologies
2. Apply FAIR data principles to research data organization
3. Design and implement domain-specific ontologies
4. Use RDF and SPARQL for semantic data modeling and querying
5. Perform data integration from diverse research sources
6. Build scalable and queryable knowledge graphs
7. Analyze and visualize knowledge graphs with graph analytics
8. Transform structured and unstructured data into linked data
9. Employ tools like Protégé, Neo4j, and GraphDB effectively
10. Enable semantic search and intelligent data discovery
11. Ensure data interoperability through semantic web standards
12. Evaluate and validate knowledge graphs for research quality
13. Explore the application of knowledge graphs in AI and machine learning

Target Audiences

1. Academic researchers and scholars
2. Data scientists and engineers
3. Library and information science professionals
4. AI and machine learning practitioners
5. Biomedical and life science researchers
6. Digital humanities scholars
7. IT professionals in education and research
8. Graduate students in data-related fields

Course Duration: 5 days

Course Modules

Module 1: Introduction to Knowledge Graphs

- Definition and evolution of knowledge graphs
- Components: nodes, edges, semantics
- Importance in research and academia
- Linked Data and Semantic Web concepts
- Tools overview: RDF, OWL, SPARQL
- *Case Study: Google Knowledge Graph and its impact on search*

Module 2: Ontology Design and Development

- Basics of ontologies and taxonomies
- Using Protégé for ontology modeling
- Ontology alignment and reuse
- Class, properties, and axioms explained
- Semantic reasoning and inference

- *Case Study: Ontology-driven clinical trial research*

Module 3: Semantic Data Modeling

- Mapping raw data to RDF triples
- Understanding RDFS and OWL structures
- Semantic annotations for research data
- Using SHACL for data validation
- Transforming CSV/Excel to RDF
- *Case Study: Environmental datasets semantic modeling*

Module 4: SPARQL Query Language

- Introduction to SPARQL syntax and endpoints
- Writing SELECT, CONSTRUCT, ASK queries
- Federated queries and performance optimization
- Query debugging and validation
- SPARQL vs SQL: comparative analysis
- *Case Study: Biomedical research SPARQL queries*

Module 5: Data Integration and Interlinking

- Data cleansing and preprocessing for semantic integration
- Linking datasets using URIs and vocabularies
- Cross-domain data harmonization
- Tools for mapping: Karma, OpenRefine
- Provenance and trust in integrated graphs
- *Case Study: Integrating social science datasets*

Module 6: Knowledge Graph Storage and Management

- Overview of triplestores and graph databases
- Neo4j vs GraphDB vs Blazegraph
- Indexing and scalability considerations
- Data security and access control
- Best practices in versioning and updates
- *Case Study: Graph-based academic repository management*

Module 7: Visualization and Analysis of Knowledge Graphs

- Graph visualization principles and tools
- Using Gephi, Cytoscape, and Neo4j browser
- Network metrics and centrality analysis
- Community detection and clustering
- Use of dashboards for research storytelling
- *Case Study: Visualizing citation networks in research*

Module 8: Knowledge Graphs for AI and Research Innovation

- How AI leverages knowledge graphs
- Integration with NLP and ML pipelines
- Semantic enrichment for data labeling
- Real-time inference and predictive modeling
- Future trends and ethical considerations
- *Case Study: AI-driven literature review using KG*

Training Methodology

- Interactive lectures with real-time tool demonstrations
- Hands-on lab exercises using real research datasets
- Guided projects with instructor feedback
- Peer learning through group discussions and forums
- Assessment through quizzes, assignments, and case reports

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.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

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

Register Online Now

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