Semantic Web Technologies for Research Data Integration 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 big data and multidisciplinary research, the integration of complex, heterogeneous datasets is critical for driving innovation and insights. Semantic Web Technologies for Research Data Integration Training Course is designed to equip researchers, data scientists, librarians, and information professionals with cutting-edge skills to apply semantic web technologies—such as RDF, SPARQL, OWL, and Linked Data—to structure, connect, and retrieve research data efficiently. This course empowers learners to address interoperability challenges, enhance machine-readability, and ensure data reusability and accessibility following FAIR (Findable, Accessible, Interoperable, Reusable) principles.

With a strong emphasis on practical application and real-world case studies, this course dives deep into metadata standards, ontologies, data linking strategies, and semantic annotation tools used in modern research environments. Participants will gain hands-on experience in transforming traditional datasets into semantically enriched formats and explore how knowledge graphs and AI-driven semantic systems revolutionize data discovery and integration across disciplines.

Programme Curriculum

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Course Objectives

1. Understand the foundational principles of semantic web technologies.
2. Apply RDF (Resource Description Framework) for structured data representation.
3. Create and use ontologies using OWL for domain-specific modeling.
4. Perform powerful queries with SPARQL on structured datasets.
5. Implement Linked Data principles to interconnect research resources.
6. Enhance data interoperability across diverse systems and domains.
7. Apply FAIR data principles using semantic technologies.
8. Leverage knowledge graphs for research data discovery.
9. Use semantic annotation tools to enrich metadata.
10. Explore AI applications in semantic web data integration.
11. Convert relational data into RDF using mapping tools.
12. Utilize existing vocabularies and ontologies for standardized representation.
13. Analyze real-world semantic integration use cases across research fields.

Target Audiences

1. Academic researchers
2. Data scientists and analysts
3. University librarians
4. Research data managers
5. Software engineers in research environments
6. Digital humanities scholars
7. Biomedical informaticians
8. Policy makers in data governance

Course Duration: 5 days

Course Modules

Module 1: Introduction to Semantic Web

- Semantic web concepts and architecture
- Key components: RDF, OWL, SPARQL
- The role of metadata in semantic integration
- Evolution from Web 2.0 to Web 3.0
- Use cases in academic research
- **Case Study**: Semantic Web for Environmental Research Data

Module 2: RDF and Structured Data Modeling

- RDF triples and graph structures
- URI and namespace management
- Tools for RDF creation (e.g., Protégé, GraphDB)
- Converting data to RDF
- RDF vs. other data formats (XML, JSON)
- **Case Study**: RDF for Genomics Research Data

Module 3: OWL and Ontology Engineering

- Basics of OWL (Web Ontology Language)
- Classes, properties, and individuals
- Ontology development workflow
- Reasoners and consistency checking
- Ontology alignment and reuse
- **Case Study**: Biomedical Ontologies for Clinical Research

Module 4: SPARQL for Querying Semantic Data

- SPARQL query structure and syntax
- Filtering and aggregating RDF data
- Advanced queries and federated endpoints
- SPARQL in research databases
- Tools for SPARQL query execution
- **Case Study**: Using SPARQL in Social Science Research

Module 5: Linked Open Data & FAIR Principles

- Understanding Linked Data principles
- Publishing and consuming LOD
- Integrating LOD in research workflows
- FAIR data principles and assessment
- Tools for FAIRification of research data
- **Case Study**: Linking Climate Data Using LOD

Module 6: Semantic Annotation & Metadata Enrichment

- Importance of semantic metadata
- Annotation tools and platforms (e.g., BioPortal, Annotorious)
- Automating semantic tagging
- Enriching metadata for discoverability
- Interlinking annotated datasets
- **Case Study**: Metadata Annotation in Archaeological Archives

Module 7: Knowledge Graphs for Research Integration

- Concepts and structure of knowledge graphs
- Building and populating knowledge graphs
- Visualizing and querying knowledge graphs
- Integrating multi-source research data
- Knowledge graphs vs. traditional databases
- **Case Study**: Knowledge Graphs in Neuroscience Research

Module 8: AI and Future Trends in Semantic Data

- Role of AI in semantic data integration
- Natural Language Processing and entity recognition
- Machine learning over knowledge graphs
- Future of semantic search in academia
- Ethical concerns in automated semantic systems
- **Case Study**: AI-Powered Semantic Systems in Open Science

Training Methodology

- Interactive lectures and expert presentations
- Hands-on lab sessions with real datasets

- Group discussions and collaborative activities
- Use of open-source semantic tools and platforms
- Case-based learning and application projects

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
23 Nov 2026	27 Nov 2026	Physical	$6,000

Start Date	End Date	Location	Price
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