

**SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES**

**III MCA - I Semester**

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**16MCA314C**

**SEMANTIC WEB**

**Course Objectives:**

- The main objective of the course is to develop a critical appreciation of semantic technologies as they are currently being developed.
- To explain the features, rationale and advantages of Semantic Web technology
- To explain the concepts of graph-based RDF model and RDF Schema.
- To analyze the requirements and features of web ontology language (OWL).
- To discuss the methodologies in ontology engineering and research issues in Semantic Web technology.

**Syllabus:**

**UNIT I : Web Intelligence**

Empowering the Information Age-Thinking and Intelligent Web Applications The Information Age -The World Wide Web - Limitations of Today's Web -The Next generation Web What is Decidable- Mathematical Logic- Kurt Godel- knowledge Representation- Computational Logic- AI - The Semantic Web-What is Machine Intelligence-What is Machine Intelligence -Alan Turing-Turing test-Machine Intelligence- Description Logic- Ontology - Inference Engines - Software Agents-Limitations and Capabilities.

**UNIT II : Ontology in Computer Science and Knowledge Representation in Description Logic**

Defining the term Ontology-Differences among taxonomies- Thesauri and Ontologies- Classifying Ontologies- Web Ontology description languages-Ontologies- Categories and intelligence.

Introduction-Example-Family of Attribute Languages-Inference problems.

**UNIT III : RDF and RDF Schema**

Introduction- Xml essentials- RDF-RDF Schema- A Summary of RDF/RDF Schema Vocabulary.

**UNIT IV : OWL**

Introduction- Requirements for web ontology Description Languages- Header Information, Versioning and Annotation Properties-Properties- Classes-Individuals- Data types- A summary of the OWL Vocabulary.

## **UNIT V : Semantic Web Services**

Introduction- Web Service Essentials- OWL-S Service Ontology-OWL-S example-Semantic Web applications-Semantic Search- Semantic Bioinformatics- E-Learning.

### **Course Outcomes:**

- Able to sketch the overall architecture of the Semantic Web.
- Able to identify the component technologies of the Semantic Web and explain their roles.
- Able to model ontologies using Resource Description Framework (RDF) and to design RDF Schemas for ontologies.
- Able to model and design ontologies using Web Ontology Language (OWL).
- Able to illustrate the design principles of the Semantic Web by applying the technologies.
- Understand certain limitations of the Semantic Web technologies, and be aware of the kinds of services it can and cannot deliver.
- Use ontology engineering approaches in semantic applications
- Apply Semantic web technologies to real world applications.

### **TEXT BOOKS :**

1. Thinking on The Web, 2/e, 2010, H. Peter Alesso and Craig F. Smith, Wiley India, New Delhi, India. (Unit 1,5)
2. Semantic Web Concepts, Technologies and Applications, 2010, Karin K. Breitman, Marco Antonio Casanova, Walter Truszkowski, Springer International Edition, NewDelhi, India. (Unit 2,3,4,5)

### **REFERENCE BOOKS :**

1. A Semantic Web Primer, 2/e, 2008, Grigoris Antoniou and Frank VanHarmelen, The MIT Press, Cambridge Massachusetts, London, England, England(Online).
2. Towards the Semantic Web: Ontology Driven Knowledge Management, 2004, John Davis Dieter Fensal, Frank Van Harmelen, John Wiley&Sons, Ltd. England.
3. Information Sharing on the Semantic Web, 2010, Heiner Stuckenschmidt, Frank Van Harmelen, Springer International Edition, NewDelhi, India.
4. Creating the Semantic Web with RDF, 2001, John Hjelm, Wiley, New Delhi, India.
5. Introduction to the Semantic Web and Semantic Web Services, 2010, Liyang Yu, Chapman Hall, New York.