

Subject Code: 1ET2030209	Subject Title: Semantic Web (Elective – II)
Pre-requisite	Fundamental knowledge of HTML , XML, Java

Course Objective:

The Semantic Web is an extension of the current Web that will allow to find, share, and combine information more easily. The course aims to make the student understand how to find, share, combine and integrate web information. The course sketches the architecture of the Semantic Web to explore the component technologies. The course intends to covers Web3.0 with their roles and illustrates the design principles of the Semantic Web by applying the technologies. The course shall be helpful to students to understand certain limitations of the Semantic Web technologies and be aware of the kind of services it can and cannot deliver.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
2	-	2	4	60	40	30	20	150

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	Semantic Web 3.0 : Today's Web ,From Today's Web to the Semantic Web, Semantic Web Technologies ,A Layered Approach	3	10
2	Structured Web Documents in XML : Introduction, XML Language, Structuring, Namespaces, Addressing and Querying XML Documents ,Processing	3	10
3	Describing Web Resources in RDF : Introduction, RDF: Basic Ideas ,RDF: XML-Based Syntax ,RDF Schema: Basic Ideas ,RDF Schema: The Language RDF and RDF Schema in RDF Schema ,An Axiomatic Semantics for RDF and RDF Schema ,A Direct Inference System for RDF and RDFS ,Querying in SPARQL	5	20
4	Web Ontology Language: OWL : Introduction OWL and RDF/RDFS, Three Sublanguages of OWL ,Description of the OWL Language ,Layering of OWL ,Examples, OWL in OWL ,Future Extensions	3	10
5	Logic and Inference: Rules : Introduction ,Example of Monotonic Rules: Family Relationships ,Monotonic Rules: Syntax ,Monotonic Rules: Semantics ,Description Logic Programs (DLP) ,Semantic Web Rules Language (SWRL) ,No monotonic Rules: Motivation and Syntax ,Example of No monotonic Rules: Brokered Trade ,Rule Markup Language (RuleML)	5	20
6	Applications: Introduction. Horizontal Information Products at Elsevier, Openacademia: Distributed Publication Management, Bibster: Data Exchange in a Peer-to-Peer System ,Data Integration at Audi ,Skill Finding at Swiss Life, Think Tank Portal at EnerSearch, e-Learning ,Web Services ,Other Scenarios	4	15
7	Ontology: Introduction, Constructing Ontology Manually, Reusing Existing Ontology, Semiautomatic Ontology Acquisition, Ontology Mapping	4	15

Course Outcome:

On successful completion of the course students would be able to

- understand the rationale behind Semantic Web.
- Model ontology using Resource Description Framework (RDF).
- design RDF Schemas for ontology.
- Model and design ontology using Web Ontology Language (OWL).
- query ontology using SPARQL.
- understand and reflect on the principles of Ontology Engineering.
- make an association between Semantic web and Web 2.0.
- understand Semantic web technologies to real world applications.

List of References:

1. A Semantic Web Primer By Grigoris Antoniou Frank van Harmelen, The MIT Press Cambridge
2. Building an intelligent Web: theory and practice By Rajendra Akerkar, Pawan Lingras
3. Web Data Management - S. Abiteboul, I. Manolescu, P. Rigaux, M. Rousset and P. Senellart - Cambridge University

E-Resources / Web Links:

1. <http://www.uksg.org/sites/uksg.org/files/10-Macgregor-PH55T26P4JR0U723.pdf>
2. <https://www.w3.org/standards/semanticweb/>
3. <https://semanticweb.org/>

List of Experiments:

Note: The experiment list provided beneath is for reference only. The course teacher may change/formulate it as per his/her methodology and requirement.

1. Develop Mark sheet XML Document and display Mark sheet based on CSS and XSL presentation Format
2. Develop Java Based Program using JAXP or XML API in reading XML file for Students Information and Display HTML Table
3. Create DTD file for student information and create a valid well-formed XML document to store Student information against this DTD file.
4. Create XMS schema file for student information and create a valid well-formed XML document to store student information against this DTD file
5. Practical that shows Semantic Web Representation in RDF Schema
6. Prepare an RDF File using RDF Editor Tool
7. Demonstrate an Ontology using RDF Gravity Tool.
8. Querying RDF/N3 using SPARQL and .NET API.
9. Study of Web graph Mining.