Subject Name : Semantic Web

Subject Code : CE 704-3 / IT 704-3

Teaching Scheme (Credits and Hours)

Teaching scheme				Total Credit	Evaluation Scheme					
L	T	P	Total		Theory		Mid Sem Exam	CIA	Pract.	Total
Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	Marks
04	00	02	06	5	3	70	30	20	30	150

Learning Objectives:

- To Introduce Semantic Web Vision
- Understanding about XML,RDF,RDFS,OWL
- Querying Ontology
- Ontology Reasoning
- Migration from Document to Data Web
- LOD Cloud

Outline of the Course:

Sr. No	Title of the Unit	Minimum Hours
1	Foundation of Semantic Web Technologies	3
2	Basic Description Logics	18
3	Structured Web Documents in XML	5
4	Describing Web Resources in RDF	10
5	Web Ontology Language: OWL	8
6	SPARQL	6
7	Linked Open data	10

Total hours (Theory): 60

Total hours (Lab): 30

Total hours: 90

Detailed Syllabus:

Sr. No	Topic	Lecture Hours	Weightage(%)
1	**Foundation of Semantic Web Technologies** • Introduction • Current web vs Semantic Web • Semantic Web Technologies • A layered approach	3	5
2	Descriptive Logic • Introduction • Definition of the basic formalism • Reasoning algorithms • Language extensions	18	30
3	**Structured Web Documents in XML** • Introduction • XML • Structuring • Namespaces • Addressing and querying XML document • Processing	5	8
4	**Describing Web Resources: RDF** • Introduction • RDF: Basic Ideas • RDF: XML-Based Syntax • RDF serialization • RDF Schema: Basic Ideas • RDF Schema: The Language • RDF and RDF Schema in RDF Schema	10	15
5	**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	8	12
6	**SPARQL** • SPARQL simple Graph Patterns, Complex Graph Patterns, Group Patterns, Queries with Data Values, Filters • OWL Formal Semantics,	6	10

7	**Linked Open data** • Introduction • Principles of Linked Data • Web of Data • LOD Cloud • Linked Data Source : Dbpedia, Freebase	10	20
	Total	**60**	**100**

Instructional Method and Pedagogy:

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lecture and laboratory which carries 10 marks in overall evaluation.
- One internal exam will be conducted as a part of internal theory evaluation.
- Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation.
- Surprise tests/Quizzes/Seminar/tutorial will be conducted having a share of five marks in the overall internal evaluation.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Experiments shall be performed in the laboratory related to course contents.

Learning Outcome:

- Understand the semantic web Vision and technologies
- Understand about ontology
- Understanding about Data Web(Linked open data Cloud)

Text Book:

- A Semantic Web Primer by Grigoris Antoniou Frank van Harmelen, The MIT Press Cambridge
- Foundation of Semantic Web Technologies, Pascal Hitzler, Markus and Sebastian
- Linked Data : Evolving the Web into a Global Data space by Tom Heath, Christian Bizer , Morgan & Claypool publication
- Basic Description Logic by Franz Baader, Warner Nutt

List of experiments:

Sr. No	Name of Experiment
1	Working with XML,
2	Working with XML Schema, DTD
3	Design Of Ontology using RDF
4	Design RDF document with different Serialization format (e.g. tutle,N-triple)
5	Design Of Ontology using RDFS
6	Design Of Ontology using OWL
7	Case study : Pizza Ontology
8	Querying Ontology using SPARQL
8	Design of any domain specific Ontology in Protégé
9	Case Study : Dbpedia
10	Case study : LOD Cloud