

Course Objective

The course is designed to equip graduate level students with the latest developments in the Semantic Web scenario. Semantic Web is an exciting new development for the future of the WWW. Semantic technologies represent a fascinating combination of web technology, database technology, modeling, formal logic, and artificial intelligence. Students will be introduced to many useful Semantic Web concepts and tools. Finally, students will gain a broad understanding of the most challenging problems and what progress has been made towards solving these problems.

Prerequisites:

- familiarity with the World Wide Web
- Programming skills
- though not required, basic knowledge of databases may be useful

Course Outline

Unit	Topic	Hours
1	Web of Data, Semantics & Formal Languages	4
2	Semantic Web Vision (Layered cake) and Vocabularies (Dublin Core, RSS, FoaF)	2
3	Knowledge Organization Systems – Term Lists; Classification and categorization systems; Relationship Models	2
4	Taxonomy – Descriptive taxonomies; Navigational taxonomies; Data management vocabulary; Role of taxonomies in content management; Building and maintaining taxonomies	2
5	Resource Description Framework	2
6	Ontologies	4
7	Web Ontology Languages	2
8	OWL Semantics	2
9	Ontology Engineering	2
10	Role of Logic	2
11	Reasoning and Rules	2
12	Topic Maps	2

13	Role of Agents	2
14	Linked Data	2
15	Semantic Web & Intelligent Agents	2
16	Applications	4
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Course Readings

- [1]. R. Akerkar, Foundations of the Semantic Web, Narosa Publishing House, New Delhi and Alpha Science Intern., London, ISBN-978-81-7319-985-1.
http://www.narosa.com/books_display.asp?catgcode=978-81-7319-985-1
- [2]. Antoniou, Grigoris and Frank van Harmelen. A Semantic Web Primer, Second Edition. MIT Press, Cambridge, MA, 2008. ISBN 978-0-262-01242-3.
- [3]. Manish Joshi, Harold Boley, Rajendra Akerkar (Eds.). *Advances in Semantic Computing*, e-Book, Technomathematics Research Foundation, 2010,
<http://www.tmrfindia.org/eseries/ebookV2.html>
- [4]. *Foundations of Semantic Web Technologies*, Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, CRC Press/Chapman and Hall (2009), ISBN: 142009050X
- [5]. D. Allemang and J. Hendler. "Semantic Web for the Working Ontologist". Morgan Kaufmann, 2008.

Tools:

- The *Protégé* Ontology Editor (version 4.1 beta) can be downloaded from <http://protege.stanford.edu/>
- [SWOOP](#) is an open-source editor with built-in access to the [Pellet](#) reasoner.
- *Jena*, (<http://jena.sourceforge.net/>) a Java framework for RDF and OWL

Learning Outcomes:

Upon successful completion of this course student will:

- be able to do research in semantic Web technologies,
- be familiar with terminology used in this topical area,
- have read and analyzed important historical and current trends addressing Semantic Web.

Grading:

The evaluation shall be continuous assessment and end-of-semester exam. The continuous assessment will be based on projects, quizzes and presentations. The final end-of-semester exam will account for 30% of the grade. Emphasis will be on practical knowledge; students will be encouraged to learn by discovery.

End-of-Semester Exam	30%
Surprise Quizzes	25%
Project	30%
Presentation	15%

A student not submitting the surprise quizz or not making the Class Presentation will automatically lose one Letter Grade.

Grades:

The candidate has to be evaluated on a 10 point scale. The Grading pattern is as follows

Percentage	G	GP =VxG
$96 \leq P \leq 100$	10	$V \times 10$
$90 \leq P \leq 95$	9	$V \times 9$
$80 \leq P \leq 89$	8	$V \times 8$
$70 \leq P \leq 79$	7	$V \times 7$
$60 \leq P \leq 69$	6	$V \times 6$
$55 \leq P \leq 59$	5	$V \times 5$
$50 \leq P \leq 54$	4	$V \times 4$
$41 \leq P \leq 49$	3	$V \times 3$
$31 \leq P \leq 39$	2	$V \times 2$
$00 \leq P \leq 30$	0	$V \times 0$

Class Format and Schedule

This will be 2 weeks course. Each class session will be of one and half hours duration (except first lecture). Classes will comprise of lecture, hands-on-practice, discussion etc. Students will be encouraged to participate in class discussion and will make at least one presentation during the course.

This class schedule is only a rough guideline and may change depending on the pace at which we complete the material. All reading, homework and project assignments will be announced in class. A tentative schedule is as follows:

Class session	Date & Time	Topics
1	1st Week: Monday (11:00 a.m to 12:00 p.m)	Web of Data
2	Monday (13:30 p.m to 15:00 p.m)	Semantics & Semantic Modelling
3	Monday (15:30 p.m to 17:00 p.m)	Formal Languages
4	Tuesday (09:00 a.m to 10:30 p.m)	Taxonomies
5	Tuesday (11:00 p.m to 12:30 p.m)	Resource Description Framework
6	Tuesday (2:00 p.m to 3:30 p.m)	Concept of Ontology and meta-vocabularies <i>(Project topic assignment)</i>
7	Wednesday (09:00 a.m to 10:30 p.m)	Knowledge Organization Systems
8	Wednesday (11:00 p.m to 12:30p.m)	Ontologies – I (Basics)
9	Wednesday (2:00 p.m to 3:30 p.m)	Ontologies – II (Tools, Examples)
10	Thursday (09:00 a.m to 10:30 p.m)	Ontologies in OWL
11	Thursday (11:00 p.m to 12:30 p.m)	Logic (including Description Logic)
12	Thursday (2:00 p.m to 3:30 p.m)	Project Discussion
13	Friday (09:00 a.m to 10:30 p.m)	Ontology Engineering
14	Friday (11:00 p.m to 12:30 p.m)	Querying the Semantic Web
15	Friday (2:00 p.m to 3:30 p.m)	Semantic Annotations
16	Saturday (09:00 a.m to 10:30 p.m)	Reasoning and Rules
17	Saturday (11:00 p.m to 12:30 p.m)	Linked Data
18	Saturday (2:00 p.m to 3:30 p.m)	Discussion
19	2nd Week: Monday (09:00 a.m to 10:30 p.m)	SemanticWiki
20	Monday (11:00 p.m to 12:30 p.m)	Semantic Web & Intelligent Agents
21	Monday (2:00 p.m to 3:30 p.m)	Semantic Web & Web Mining
22	Tuesday (09:00 a.m to 10:30 p.m)	Topic Maps
23	Tuesday (11:00 p.m to 12:30 p.m)	Outlook & Challenges
24	Tuesday (2:00 p.m to 3:30 p.m)	Application Examples
25	Wednesday(09:00 a.m to 10:30 p.m)	Student Presentations
26	Wednesday(11:00 p.m to 12:30p.m)	Student Presentations
27	Wednesday (2:00 p.m to 3:30 p.m)	Student Presentations

28	Thursday (09:00 a.m to 10:30 p.m)	Project Evaluation
29	Thursday (11:00 p.m to 12:30 p.m)	Project Evaluation
30	Thursday (2:00 p.m to 3:30 p.m)	Discussion & Revision
31	Friday (09:00 a.m to 10:30 p.m)	EoS Exam

Late Work Policy:

Late work will be docked one letter grade (10% of its total value) for each day that it is late. No work will be accepted more than two days late. Exceptions will only be granted if an extenuating circumstance can be proven to the instructor's satisfaction.

Academic Integrity:

All graded work is expected to be your own, unless previous approval has been given for cooperative efforts (such as the team projects). In particular, you are not allowed to ask anyone but your instructor and teaching assistant for help with individual assignments. Examples of violations include, but are not limited to, solving homework problems together, giving and/or receiving program code, and debugging someone else's program. If you are unsure if a particular form of aid is allowed, then check with the instructor first. Violation of this policy could result in failure of the course.

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Course Website: www.tmrfindia.org/raa/tosw.html