

Course Description The Web, as it exists today, primarily supports human understanding and the interpretation of the vast information space it encompasses. However the Web was originally designed with a goal to support not only human-human communication but also as one that would enable automated machine processing of data with minimal human intervention. The Semantic Web is Tim Berners-Lee's vision of a machine understandable and unambiguously computer interpretable Web. The rationale behind such a system is that most of the data currently posted on the web is buried in HTML files suitable for human reading and not for computers to manipulate meaningfully. The semantic Web, an extension of the current web, can be thought of as a globally linked database where information is given well-defined meaning using metadata for better enabling computers and humans to work in close co-operation. The realisation of a Semantic Web will thus make machine reasoning more ubiquitous and devastatingly powerful, creating an environment where intelligent software agents can roam, carrying out sophisticated tasks for their users.

This course is about investigating the next generation of the Web whose key distinguishing characteristics will be the support for and use of semantics in new, more effective, more intelligent, ways of managing information and supporting applications.

Detailed Syllabus Topics to be covered include:

- Introduction to the Semantic Web
- Introduction to Ontologies
- Ontology Languages for the Semantic Web
 - Resource Description Framework (RDF)
 - Lightweight ontologies: RDF Schema
 - Web Ontology Language (OWL)
 - A query language for RDF: SPARQL
- Ontology Engineering
- Semantic web and Web 2.0
- Applications of Semantic Web

Reading List

- [A] Grigoris Antoniou, Frank Van Harmelen, *A Semantic Web Primer*, MIT Press, 2008.
- [A] Pascal Hitzler, Markus Krotzsch, Sebastian Rudolph, *Foundations of Semantic Web Technologies*, CRC Press, 2009.
- [B] Dean Allemang, James Hendler, *Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL*, Morgan Kaufmann, ISBN-10: 0-12-373556-4.
- [B] Geroimenko, Vladimir; Chen, Chaomei (Eds.) 2nd ed., 2006, XIV, 248 p. 108 illus., Hardcover ISBN: 978-1-85233-976-0, *Visualizing the Semantic Web XML-based Internet and Information Visualization*, Springer-Verlag London Ltd; 2Rev Ed edition (Oct 2005).
- [B] Michael C. Daconta, Leo J. Obrst, Kevin T. Smith, *The Semantic Web: A Guide to the Future of XML, Web Services, and Knowledge Management: A Guide to the Future of XML, Web Services and Knowledge Management*, John Wiley & Sons (20 Jun 2003).
- [B] S Powers, *Practical RDF (Paperback)*, OReilly (1 Aug 2003).
- [B] Thomas B. Passin, *Explorer's Guide to the Semantic Web (Paperback)*, Manning Publications (8 Jul 2004).

Resources Course notes, web page, study guide, worksheets, handouts, lecture rooms with two OHPs.

Module Evaluation Course questionnaires, course review.