

**Kutztown University
Kutztown, Pennsylvania**

**Computer Science Department
College of Liberal Arts and Sciences**

I. Course Description: CSC 480: Selected Topics in Computer Science: Introduction to Semantic Web Technologies

This course covers important issues in the design and implementation of the Semantic Web. Topics include knowledge representation techniques, knowledge representation languages, Semantic Web tools, the role of ontologies, and the development of Semantic Web applications.

3 s.h. 3 c.h. Prerequisite: CSC242 or CSC237 or acceptance into the graduate program.

II. Rationale

The World Wide Web (WWW) has become an integral part of daily life. The Semantic Web is the next generation of the WWW, allowing for the meaning of data to be exchanged by machines. The ability to understand information by machines allows the machines to perform some of the tedious tasks currently performed by humans. It is important for computer science students to understand the emerging topics encompassed by the Semantic Web to further extend their knowledge and this research field.

III. Course Objectives

Upon completion of the course the student will be able to:

- A. Summarize the use of Description Logic in knowledge representation.
- B. Explain the rationale and advantages of the Semantic Web.
- C. Create an XML document.
- D. Describe the RDF syntax.
- E. Explain the utilization of XML and RDF Schema.
- F. Analyze an RDF graph.
- G. Summarize the advantages of ontology.
- H. Produce the OWL definition file for a specific domain.
- I. Design an ontology-based application.
- J. Identify the optimal knowledge representation language for specified applications.

IV. Course Assessment

The course assessment will be a subset of tests, projects, papers, presentations, quizzes, homework, team assignments and final exam.

V. Course Outline

- A. Knowledge Representation
 - a. Description Logic

- B. Overview of the Semantic Web
 - a. Semantics
 - b. Understanding content
 - c. Semantic applications

- C. Extensible Markup Language (XML)
 - a. Structure
 - b. Document Type Definitions (DTDs)
 - c. Schema

- D. Resource Description Framework (RDF)
 - a. Syntax
 - b. Schema

- E. Ontology
 - a. Introduction
 - b. Development methodology
 - c. OWL
 - d. Examples
 - e. Query language
 - f. Ontology applications

VI. Instructional Resources

Alesso, H. Peter and Smith, Craig F. *Developing Semantic Web Services*. Natick, MA, A K Peters, Limited, 2004. (available in KU ebrary)

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Thuraisingham, Bhavani. *XML databases and the semantic web*. Boca Raton, FL, CRC Press, 2002. (QA76.9.D3 T4583 2002)

Tyugu, É. Kh and Yamaguchi, Takahira. *Knowledge-Based Software Engineering*, IOS Press, 2006. (available in KU ebrary)

Zhuge, Hai, *Knowledge Grid*. World Scientific Publishing Co., 2004. (available in KU ebrary)