CSCE 526: Service-Oriented Computing

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2. Credit: 3-hrs; Contact: 3 lectures of 50 minutes each or 2 lectures of 75 minutes each per week

3. Instructor Dr. Michael Huhns

4. Textbook(s) and Other Required Material: Munindar P. Singh and Michael N. Huhns, *Service-Oriented Computing*, Wiley & Sons, Inc., 2005.
   a. The text will be supplemented with research papers.
   b. All necessary software will be available for use on CSE laboratory computers or for free download for academic purposes.

5. Specific Course Information
   a. Catalog Description: Cooperative information systems and service-oriented computing. Techniques for achieving coordinated behavior among a decentralized group of information system components. Distributed databases, multiagent systems, conceptual modeling, Web services, and applications.
   b. Prerequisites: CSCE 311
   c. CSCE 5xx elective

6. Specific Goals for the Course
   a. LEARNING OUTCOMES: {Assessment Methods Shown in Braces}
      i. Design and launch Web services.
      ii. Use, in their own programs, Web services published by others.
      iii. Employ the publish, find, bind architecture for Web services and to use the corresponding standards, in particular, Web Services Description Language (WSDL), Simple Object Access Protocol (SOAP), and Universal Description, Discovery and Integration (UDDI).
      iv. Conceptually model Web services and formulate specifications of them in the Resource Description Framework (RDF) and the Web Ontology Language (OWL).
      v. Perform matchmaking on Web services.
      vi. Develop registration and discovery techniques for Web services.
      vii. Apply principles of distributed transactions, business processes, business protocols, rules, and agents to specify, monitor, and manage the behavior of composed services.
      viii. Construct multiagent-based Web services.
      ix. Evaluate emerging and proposed standards for the main components of Web services architectures.

b. As an elective this course cannot be counted upon to contribute to the attainment of any student outcome.

7. Topics Covered:

Part I Basics
    1 Computing with Services
    2 Basic Standards for Web Services: XML and XML Schema, SOAP, WSDL, UDDI
    3 Programming Web Services: REST
    4 Enterprise Architectures
    5 Principles of Service-Oriented Computing

Part II Description
    6 Modeling and Representation: Ontologies, KR, UML,
    7 Resource Description Framework: RDF, RDFS, N-Triples
    8 Web Ontology Language: OWL
    9 Ontology Management: UBL, Cyc, IEEE SUO, Consensus

Part III Engagement
    10 Execution Models: CORBA, P2P, Jini, Grid Computing
    11 Transaction Concepts: ACID, Schedules, Serializability, Extensions
    12 Coordination Frameworks for Web Services: WSCL, WSCI, WS-Coordination, BTP
    13 Process Specifications: Workflows, BPEL4WS, BPML, ebXML, PSL
    14 Formal Specification and Enactment

Part IV Collaboration
    15 Agents and Composition: OWL-S, Planning, Rules, SWRL
    16 Multiagent Systems
    17 Organizations: Contracts, Commitments, Policies, Negotiation
    18 Communications

Part V Selection
    19 Semantic Service Selection

Difference between Undergraduate and Graduate Work:
Graduate students are assigned more difficult problems and graded on a different scale than undergraduates.

Syllabus Flexibility: High.

Modification and Approval History:
Initial description …
Revised June 2011 by M. Huhns