CSE494/CSE598
Software Integration and Engineering

Syllabus and Course Information
Spring 2012
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Course Description
Software development using architecture design, composition, workflow, services, data resources, data representations, data management, and development tools.
Prerequisite: CSE445

Textbook

Course Objectives and Outcomes
1. To understand software architecture and software process
   - Students understand the requirement and specification process in problem solving.
   - Students understand software life cycle and process management
   - Students can identify advantages and disadvantages of software architectures and their trade-offs in different applications.
2. To understand and apply composition approach in software development
   - Students can apply software architecture to guide software development in the problem solving process.
   - Students understand interface requirement of software services
   - Students can compose software based on interfaces of services and components
   - Students can develop software system using different composition methods and tools
3. To understand and apply data and information integration in software development
   - Students can compose software systems using different data resources in different data formats.
   - Students can integrate application logic with different databases.
   - Students can apply the entire software life cycle to develop working software systems.
Topics Covered in the Course (Tentative)

The course will be delivered in 27 lectures, with 75 minutes each lecture.

1. Unit 1 - Advance SOA and REST Architecture (6 lectures)
   - Introduction
   - Web data Presentations and Standards
   - Advanced Services
   - REST Concepts and RESTful Services

2. Unit 2 - Software Development by Composition and Integration (8 lectures)
   - Enterprise Application Architecture
   - Workflow-based Software Development
   - BPEL
   - Other Composition Languages

3. Unit 3 - Event-Driven Development and Device Integration (3 lectures)
   - Device Integration
   - Robotics Applications
   - VPL application composition

4. Unit 4 - Application and Data Integration (5 lectures)
   - ADO
   - XML Database
   - LINQ
   - Web Caching and Recommendation

5. Unit 5 - Ontology and Semantic Web (2 lectures)
   - RDF Ontology
   - OWL Ontology

6. Unit 6 - Cloud Computing and Software as a Service (2 lectures)
   - Software as a Service, Platform as a Service, and Infrastructure as a Service
   - Multi-tenancy
   - MapReduce
   - Prioritization and Scheduling
   - Examples, Google App Engine, Hadoop, Microsoft Azure, Oracle Cloud, Saleforce

CSE494 Assignments and Projects:

Potential software development assignments and projects on selected topics.

- Software service development in Windows Communication Foundation
- Software composition in BPEL in Oracle SOA Suite
- Data-driven software development using Workflow Foundation
- Software composition using mashup in Yahoo! Pipes
- Software and data integration using LINQ
- Ontology development
- Software development in a cloud computing environment
CSE598 Requirement
Students in CSE 598 session are required by the Graduate College and the Computer Science and Engineering Program to take additional workload. In this course, CSE598 students will be given additional reading and additional assignment questions, including a research and presentation that extends the scope of the undergraduate course content.

Weight and Grading Scale
The performance will be assessed by assignments, programming projects, quizzes, a mid-term and a final exam. Their weights are:

- Homework Assignments / Projects: 35%
- Lecture Exercises: 6% (Test what is covered in the lecture)
- Quizzes 1, 2, 3, 4: 15%
- Mid-Term Exam: 20%
- Final Exam: 24%
- Total: 100%