CSE446/CSE598
Software Integration and Engineering

Syllabus and Course Information
Dr. Yinong Chen

Course Description
Software development using architecture design, composition, workflow, services, data resources, data representations, data management, and development tools.

Textbook
Part I (Chapters 1 through 6) of the book is used for CSE445/598 (Distributed Software Development). Part II (Chapters 7 through 14) will be used for this course.

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.

CSE446 Assignments and Projects:
Potential software development assignments and projects on selected topics.
• RESTful service development in Windows Communication Foundation
• Software development using Workflow Foundation
• Software composition in BPEL using Oracle SOA Suite
- Software composition using mashup in Yahoo! Pipes
- Software and data integration using LINQ
- Big data processing and 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.

**Prerequisites by Topic**
CSE 360: Software life cycle models; project management, team development environments and methodologies; software architectures; quality assurance and standards.

**Class/Laboratory Schedule**
Lecture: 3 hours per week; Laboratory: none scheduled

**Additional Information**

**Instructor**
Yinong Chen (Ph.D.), Phone (480) 965 2769, Email: yinong@au.edu

**Major Topics Covered in the Course (Tentative)**
The course will be delivered in 27 lectures, with 75 minutes each lecture.

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

3. **Unit 2 - Software Development by Composition and Integration (6 lectures)**
   - Enterprise Application Architecture and Architecture Driven Approach
   - Workflow-based Software Development
   - BPEL
   - Message-based Integration
   - Other Composition Languages

4. **Unit 3 – Internet of Things and Device Integration (3 lectures)**
   - Internet of Things
   - Device Integration
   - Workflow-based Robotics Applications Development

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

6. Unit 5 – Big Data and Ontology (4 lectures)
   • Big Data Essentials
   • Big Data Applications
   • RDF Ontology
   • OWL Ontology

7. Unit 6 - Cloud Computing and Software as a Service (2 lectures)
   • Software as a Service, Platform as a Service, Infrastructure as a Service, and data center
   • Multi-tenancy
   • Examples, Google App Engine, Microsoft Azure, Oracle Cloud, Amazon Cloud

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

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Homework Assignments / Projects</td>
<td>30%</td>
</tr>
<tr>
<td>Lecture Exercises</td>
<td>11%</td>
</tr>
<tr>
<td>Quizzes 1, 2, 3, 4</td>
<td>12%</td>
</tr>
<tr>
<td>Mid-Term Exam</td>
<td>22%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>25%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
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</tbody>
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The final letter grade is decided according to the percentage points obtained as follows:

- A-, A, A+ 89.5-92.4, 92.5-96.4, 96.5-100%
- B-, B, B+ 79.5-82.4, 82.5-86.4, 86.5-89.4%
- C, C+ 69.5-75.4, 75.5-79.4%
- D 59.4-69.4%
- E less than 59.4%

The grade of “I” (incomplete) can be given ONLY when a student, who is doing otherwise acceptable work (passing grade), is unable to complete a part of work (e.g., the final exam) because of documented illness or other conditions beyond the student’s control. In the latter case, the student must discuss with the instructor and complete an application form from the department before the part of work is due or as soon as the circumstances are known. Please see ASU grading policies at: http://students.asu.edu/grades-grading-policies

Extra Credit and Alternative Activity
Missing a graded activity will be given zero credit. In-class exercises and quizzes may not be made up. One additional quiz will be arranged to override one missing or poor quiz score. No extra credit-activities will be given to any individual. Extra credit-activities may be given to the entire class. An alternative to the assignment and exam may be arranged if a student misses the activity and the absence is caused by documented illness or personal emergency that made the completion/attending impossible. A written explanation (including supporting documentation) must be submitted to the instructor before the part of work is due or as soon as the circumstances are known.
**Grading Appeals**

Any inquiries or appeals on grades of homework, projects, or tests must be done in writing by completing the "Grade Inquiry Form" within a week from the day the assignment was returned or comments were published on-line. State the problem and the rationale for any change in grade in your appeal.

**Cooperation**

You are encouraged to cooperate in study group on learning the course materials. However, you may not cooperate on preparing the individual assignments. Anything that you turn in must be your own work: You must write up your own solution with your own understanding. If you use an idea that is found in a book or from other sources, or that was developed by someone else or jointly with some group, make sure you acknowledge the source and/or the names of the persons in the write-up for each problem. When you help your peers, you should never show your work to them. All assignment questions must be asked in the course discussion board. Asking assignment questions or making your assignment available in the public websites before the assignment due will be considered cheating.

The instructor and the TA will **CAREFULLY** check any possible proliferation or plagiarism among the submissions and will search the public Web sites. We will use the document/program comparison tools like MOSS (Measure Of Software Similarity: http://moss.stanford.edu/) to check any assignment that you submitted for grading. The Ira A. Fulton Schools of Engineering expect all students to adhere to ASU's policy on Academic Dishonesty. These policies can be found in the Code of Student Conduct:

https://provost.asu.edu/academicintegrity/policy

ALL cases of cheating or plagiarism will be handed to the Dean's office. Penalties include a failing grade in the class, a note on your official transcript that shows you were punished for cheating, suspension, expulsion and revocation of already awarded degrees.