CSE446
Software Integration and Engineering
Syllabus and Course Information

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

Prerequisites by Topic
CSE 445: Multithreading, service-oriented architecture, service development, XML processing, Web application development, security and reliability of Web applications.

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

Textbook
It is acceptable to use the 5th edition.
Part I (Chapters 1 through 6) of the book is used for CSE445
Part II (Chapters 7 through 11) of the book is used for CSE446

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.
**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.

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

2. **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

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

4. **Unit 4 - Application and Data Integration (5 lectures)**
   - ADO
   - XML Database
   - LINQ: Language Integrated Queries

5. **Unit 5 - Big Data, AI, and Cloud Computing (6 lectures)**
   - Big Data Essentials
   - Big Data Analytics and Applications
   - Artificial Intelligence and Machine Learning
   - RDF and OWL Ontology
   - Cloud Computing
   - Software as a Service

**Assignments and Projects:**

Potential software development assignments and projects on selected topics.

- Asynchronous service development
- RESTful service development
- Software development using Workflow Foundation
- Software composition in BPEL using Oracle SOA Suite
- Visual IoT/Robotics application development
- Software and data integration using LINQ
- Big data processing and cloud computing environment

**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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</thead>
<tbody>
<tr>
<td>Homework Assignments / Projects</td>
<td>30%</td>
</tr>
<tr>
<td>Lecture Exercises</td>
<td>11%</td>
</tr>
<tr>
<td>Biweekly Tests (Quizzes) 1, 2, 3, 4, 5</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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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. All individual tests must be done independently. Working together during tests is not permitted.

The instructor and the TA will **CAREFULLY** check any possible proliferation or plagiarism by comparing among the student submissions, previous student submissions, and the publications in the public Web sites. We will use the document/program comparison tools like MOSS (Measure Of Software Similarity: http://moss.stanford.edu/) to check all assignments and tests 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:

http://www.asu.edu/studentaffairs/studentlife/judicial/academic_integrity.htm

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.

Fulton Schools of Engineering Honor Code (http://engineering.asu.edu/integrity/honor-code/)

1. Seek out, acquaint myself with, and obey the instructor’s rules concerning the materials I am allowed to use and the types of collaboration in which I am permitted to engage in each of my courses.
2. Help my fellow engineering students to succeed both academically and professionally, while both following the instructor’s guidelines on collaboration and encouraging my classmates to behave ethically.
3. Ensure that all of my individual work products reflect my own abilities and not those of someone else. I will never copy the work of others or give others the opportunity to copy mine.
4. Contribute a fair share of work to all teamwork in which I participate, and acknowledge the contributions of others. I will accept responsibility for the integrity of all work submitted by my team.
5. Use only aids authorized by the instructor during all examinations, quizzes, projects, assignments and other evaluations.
6. Provide aid to, or receive aid from other students only as permitted by the instructor.
7. Give full credit to others for their words and ideas, whether directly quoted or paraphrased, using proper citation practices in all of my work, including text, figures and computer code, and all materials obtained from the Internet.
8. Never act dishonestly including lying, cheating, stealing, or attempting to corrupt the academic enterprise in any way.
9. Ensure that all data I record or report are objective, true, accurate and properly documented.
10. Treat all students, faculty and staff with respect, courtesy and dignity, the way I would like to be treated myself.
11. Recognize that it is how I act when no one else is watching that defines my true character.
12. Act at all times with integrity, as the true professional that I am to become.

Title IX is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. If you or someone you know has been harassed on the basis of sex or sexually assaulted, you can find information and resources at http://sexualviolenceprevention.asu.edu/faqs/students.