# CSE 445/598 Distributed Software Development

## Syllabus and Course Information

http://www.public.asu.edu/~ychen10/teaching/cse445/

### Catalog Description

Distributed system architectures and design, service-oriented computing, and frameworks for development of distributed applications and software components.


### Textbook

Y. Chen, W.T. Tsai, Service-Oriented Computing and Web Software Integration,
Fourth Edition, Kendall/Hunt Publishing, 2014, ISBN 9781465251619.
Part I (Chapters 1 through 6) of the book will be used for this course, while Part II (Chapters 7 through 14) will be used for CSE446/598.

### Course Objectives and Outcomes

1. To develop an understanding of the software engineering of programs using concurrency and synchronization
    - The student can identify the application, advantages and disadvantages of concurrency, threads and synchronization.
    - The student can apply design principles for concurrency and synchronization.
    - The student can design and write programs demonstrating the use of concurrency, threads and synchronization.
2. To develop an understanding of the development of distributed software
    - The student can recognize alternative distributed computing paradigms and technologies.
    - The student can identify the phases and deliverables of the software lifecycle in the development of distributed software.
    - The student can create the required deliverables in the development of distributed software in each phase of a software lifecycle.
    - The student understand the security and reliability attributes of distributed applications
3. To develop an ability to design and publish services as building blocks of service-oriented applications
    - The student understand the role of service publication and service directories
    - The student can identify available services in service registries.
    - The student can design services in a programming language and publish services for the public to use.
4. To build skills in using a current technology for developing distributed systems and applications
    - The student can develop distributed programs using the current technology and standards.

- The student can use the current framework to develop programs and web applications using graphical user interfaces, remote services, and workflow.

### Assignments and Project

Five programming assignments/projects will be given.
Assignment 1: Develop simple Web applications using existing Web services
Assignment 2/Project 2: Developing an event-driven distributed software system using multithreading.
Assignment 3/Project 3: Developing Web services that that analyze and process other Web page contents.
Assignment 4/Project 4: XML scheme definition, XML file creation, XML file validation, XML file transformation. Implement the tasks as Web services.
Assignment 5/Project 5: Integrate the services developed in previous assignments and implement a Web application with authentication, authorization, and realistic functionality, such an online shopping site, an online banking system, or an online data management system.

### 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 writing project. It can include research that extends the scope of the CSE445 course contents.

### 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

### Contribution to EC 2000 Professional Component

Engineering Topics: 100%

## Additional Information

### Instructor

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

### Major Topics Covered in the Course

1. Introduction to distributed computing architectures and paradigms, service-oriented architecture and computing paradigm. (2 weeks)
2. Programming with concurrency and multithreading, performance under multi-core and hyper-threading support. (2.5 weeks)
3. Service-oriented software development, WSDL, SOAP, service provider, service broker, service hosting, and service client. (2 weeks)
4. XML and related technologies: XML processing, XML schema, XSLT, XPath, DOM, SAX. (2 weeks)

5. Web-based application development and state management, Web execution model, application architecture, session state, caching, file system, dynamic graphics generation, mobile computing (3 weeks)
6. Security and reliability, forms security, authentication and authorization, secure socket layer protocol, and reliable messaging. (2 weeks)

## Required Software

This course will use Microsoft Visual Studio .Net 2010 (2008 acceptable) and Eclipse (Java) as the main programming environments. To use .Net 2008 to develop Web services, you need to have a computer with the Windows XP professional or Windows 7 and with IIS (Internet Information Service) optional component. Students registered to a CSE course at ASU will be given an account at MSDN Academic Alliance Software Center (http://msdn07.e-academy.com/asu_eng), where they can download .Net 2010, Windows, and many other software packages.

## 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 | 30% |
| Lecture Exercises | 11% (Test what is covered in the lecture) |
| Quizzes 1, 2, 3, 4 | 12% |
| Mid-Term Exam | 22% |
| Final Exam | 25% |
| Total | 100% |

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 inquires 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.

### Academic Integrity and Honor Code

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. 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:

`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.