CMPE 436: Concurrent and Distributed Programming
Course Syllabus
Fall 2013, TTW 675

Instructor: Assoc. Prof. Alper Sen **Email:** alper.sen@boun.edu.tr
Office Hours: After class **Course Web:** http://www.cmpe.boun.edu.tr/courses/cmpe436
Reference Textbooks:
"Concurrent and Distributed Computing in Java" by Vijay K. Garg, Wiley & Sons, 2004.
http://users.ece.utexas.edu/~garg/jbk.html
"Principles of Concurrent and Distributed Programming", M. Ben-Ari

Prerequisites:
The student should have basic programming skills. Background in Algorithms and Operating Systems will be helpful, but is not essential.

Course Contents:
This is a senior-level undergraduate course in concurrent and distributed computing. It will expose students to theoretical as well as practical aspects of designing and implementing concurrent and distributed systems. The course assumes that the student knows programming. The first half of the course focuses on concurrent systems and the second half on distributed systems. The course will cover concurrent and distributed programming aspects of Java; the students are expected to pick up the sequential aspects of Java on their own.

Course Organization:
The course is organized as a series of lectures by the instructor, reading, assignments, project and exams. The course will have programming as well as non-programming assignments and a programming project. All programming assignments and projects will require use of Java language. Assignments are due at their specified date and time. We will reduce assignment grades by 25 points (out of 100) for each day that they are late.

There will be one mid-term and one final exam. If your work or a personal situation forces you to unexpectedly miss exams, you should expect to get a zero on those occasions. If you miss an exam because of illness, you are expected to provide a statement from a doctor stating that, in his/her opinion, it was impossible for you to attend because of illness. A slip showing you visited the Health Center or your personal doctor is not sufficient for this. In other situations, you should contact me beforehand.

Tentative Grading:
25% Assignments, 25% Midterm, 30% Term project and presentation, 10% pariticpation+attendance, 10% Final Exam.

Right to take final exam: Midterm grade > 20, Term project and presentation grade > 50

Academic Honesty:
Cheating will not be tolerated. Feel free to discuss homework, programming assignments with classmates, and the instructor. However, write the homework and programming assignments yourself. Indicate clearly the name(s) of people you collaborated with. You must not show your program code to any student in the class. You must not search for solutions on the internet, copy, study, analyze or even look at any source code produced by other CMPE436 students from this

year, or from years past. We will check for cheating, and any incident will be reported to the department.

Course Evaluation: Standard   **Add/Drop Policy:** Standard

Schedule (tentative):

Introduction, Concurrent and Distributed Systems, Processes, Threads, (Chapter 1) Java tutorial
Fundamentals of Concurrent Computing, Mutual Exclusion, Locks (Chapter 2)
Synchronization Primitives, Semaphores, Monitors (Chapter 3)
Deadlock
Dynamic Data Race Detection for Multithreaded Programs
Model Checking for Synchronization Problems (Verification, Promela)
Distributed Programming Tools: UDP, TCP, RMI (Chapter 6)
Fundamentals of Distributed Computing: Models and Clocks: Partial Order Model, Logical and Vector Clocks (Chapter 7)
Resource Allocation: Mutual Exclusion, Dining Philosophers (Chapter 8)
Global Snapshot (Chapter 9)
Global Properties: Predicate Detection (Chapter 10)
Detecting Termination and Deadlocks (Chapter 11)
Message Ordering: FIFO, Causal, Total Order (Chapter 12)
Parallel Architectures, Parallel Patterns
Project presentations