ECE 454/750-5: Distributed Computing
Spring 2011

Instructor: Paul Ward, DC2522, pasward@ccng.uwaterloo.ca
Office hours: F: 11:30 AM - 1:00 PM DC 2522 or by appointment

TAs: Marko Novakovic, DC-2546, mnovakovic@uwaterloo.ca
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Lectures: MWF: 10:30 AM - 11:20 AM, DWE 3522
Tutorial: M: 4:30 PM - 5:20 PM, DWE 3518

References: Advanced Linux Programming (http://www.advancedlinuxprogramming.com/)

Course Web Page: http://www.ccng.uwaterloo.ca/~ece454-2011/

Evaluation: 454: Programming Projects: 40% ; Midterm: 10% ; Final Exam: 50%
             750-5: Programming Projects: 30% ; Research Survey: 20% ; Final Exam: 50%

Projects: There will be two programming projects, to be completed in groups of two. The first project will be due on June 6th and the second will be due on the last day of lectures. Late submissions are not accepted. Submission is via CourseBook. Marked projects will be handed back by the TAs in the tutorial. At the instructor’s discretion, an extension may be granted for the first project and alternate submission mechanisms may be provided. If such an extension is granted, students who submit the project on the original due date will be awarded a bonus.

Research Survey: Students taken ECE 750-5 are required to submit a research survey on an instructor-approved topic. Guidelines on how to do a research survey are given on the course web page (see http://www.ccng.uwaterloo.ca/~ece454-2011/project.shtml). It is strongly recommended that you discuss your proposed topic with the instructor early in the term. The research survey is due on the last day or lectures, and should be e-mailed to the instructor in PDF format.
**Course description:** Principles of distributed systems, architectures and middleware, communication and processes in distributed systems, remote-procedure call, message-passing systems, naming, synchronization, transactions, replication, dependability.

**Course objectives:** By the end of this course, a student should be able to:

1. Understand Protocols, Algorithms, and Mechanisms underlying distributed systems
2. Be able to design, implement, and maintain distributed middleware
3. Understand design tradeoffs in distributed systems
4. Understand when and where to use (and when not to use) distributed systems
5. Understand the basics of distributed-systems management
6. Understand the principles and practice of dependable distributed systems
7. Understand the evolving role of data centers and cloud computing

**Topics Covered:**

1. Introduction: Need, requirements, and examples. Advantages and drawbacks.
4. Communication: RPC, RMI, Messaging, Streaming. Web Services, SOAP, UDDI, WSDL.
5. Processes: threads, concurrency, servers, code migration.

Examples will be drawn from current distributed systems in industry, and will include distributed file systems, including, NFS, AFS, and Coda, publish/subscribe systems, including TIB/Rendezvous and Jini.
Required Information from the Administration

**Academic Integrity**: In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check www.uwaterloo.ca/academicintegrity/ for more information.]

**Grievance**: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4, [www.adm.uwaterloo.ca/infosec/Policies/policy70.htm](http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm). When in doubt please be certain to contact the department’s administrative assistant who will provide further assistance.

**Discipline**: A student is expected to know what constitutes academic integrity [check www.uwaterloo.ca/academicintegrity/] to avoid committing an academic offence, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about “rules” for group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate Associate Dean. For information on categories of offences and types of penalties, students should refer to Policy 71, Student Discipline, [www.adm.uwaterloo.ca/infosec/Policies/policy71.htm](http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm). For typical penalties check Guidelines for the Assessment of Penalties, [www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm](http://www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm).

**Appeals**: A decision made or penalty imposed under Policy 70 (Student Petitions and Grievances) (other than a petition) or Policy 71 (Student Discipline) may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72 (Student Appeals), [www.adm.uwaterloo.ca/infosec/Policies/policy72.htm](http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm).

**Note for Students with Disabilities**: The Office for Persons with Disabilities (OPD), located in Needles Hall, Room 1132, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the OPD at the beginning of each academic term.

**Turnitin.com**: Plagiarism detection software (Turnitin) will be used to screen assignments in this course. This is being done to verify that use of all material and sources in assignments is documented. In the first week of the term, details will be provided about the arrangements for the use of Turnitin in this course. Note: students must be given a reasonable option if they do not want to have their assignment screened by Turnitin. See: [http://uwaterloo.ca/academicintegrity/Turnitin/index.html](http://uwaterloo.ca/academicintegrity/Turnitin/index.html) for more information.