The University of Michigan—Flint

CSC 477, Distributed Systems
Or
CSC 577, Advanced Distributed Systems
Winter 2011

Instructor: Dr. Stephen W. Turner
Office: 214B MSB
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Web: http://regal.csesp.umflint.edu/~swturner

Course Hours: Wednesday, 6:00 to 8:45 p.m., 104 MSB
Course Not Meeting: Wednesday March 2 (Spring Break)

Office Hours: As seen on my web page.


In addition, I will present lists of publications (papers) for additional reading.

Course Description:

This course presents a study of distributed systems, which encompass a large number of topics involving the reliable and transparent implementation of a system on top of a collection of networked computers. The topics include architectures of distributed systems; the representation of processes; how processes communicate and how they are named; how activities are synchronized in time; how data is ensured to be consistent across wide geographic areas; ensuring fault tolerance; and security.

Course Objectives:

This course will develop an understanding of:

a. The reasons why we want to use distributed systems to compute: how they can be used to effectively improve our computing power.
b. The various definitions of distributed systems, including architectural issues and what constitutes middleware.
c. The definition of processes and threads and their role in distributed systems.
d. Low and high-level communication protocols, including layered protocol designs, as well as specific techniques such as RPC, message-oriented, stream-oriented, and multicast communication.
e. How to identify entities through naming techniques.
f. Ensuring synchronization through management of clocks.
g. Improvement of reliability through replication.
h. Ensuring consistency in shared data.
i. Various fault-tolerance mechanisms: process resilience, reliable communication, commit techniques, and recovery from errors.
j. Ensuring security in communication, access control, and management of security mechanisms.

**Grading Policy:**

Grades will be based on 100 possible points, using the following distribution schedule:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
<th>Due Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>60%</td>
<td>(Due dates based on class progress)</td>
</tr>
<tr>
<td>Exam 1</td>
<td>10%</td>
<td>Due Wednesday February 9</td>
</tr>
<tr>
<td>Exam 2</td>
<td>10%</td>
<td>Due Wednesday March 23</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20%</td>
<td>Due Saturday April 23, 6:45 p.m. (*)</td>
</tr>
</tbody>
</table>

(*) This represents the end-time of the final exam period for this class. Therefore, it represents the due-date and time of the final, which will be a take-home exam.

Letter grades reported to the University are based on the following table, indicating the minimum points required for you to ensure that you receive the grade listed.

**Undergraduate Grading Scale:**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>99-100%</td>
</tr>
<tr>
<td>A</td>
<td>92-98%</td>
</tr>
<tr>
<td>A-</td>
<td>89-91%</td>
</tr>
<tr>
<td>B+</td>
<td>86-88%</td>
</tr>
<tr>
<td>B</td>
<td>82-85%</td>
</tr>
<tr>
<td>B-</td>
<td>79-81%</td>
</tr>
<tr>
<td>C+</td>
<td>76-78%</td>
</tr>
<tr>
<td>C</td>
<td>70-75%</td>
</tr>
<tr>
<td>D</td>
<td>60-69%</td>
</tr>
<tr>
<td>F</td>
<td>0-59%</td>
</tr>
</tbody>
</table>

**Graduate Grading Scale:**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>98-100%</td>
</tr>
<tr>
<td>A</td>
<td>88-97%</td>
</tr>
<tr>
<td>A-</td>
<td>84-87%</td>
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<tr>
<td>B+</td>
<td>81-83%</td>
</tr>
<tr>
<td>B</td>
<td>71-80%</td>
</tr>
<tr>
<td>B-</td>
<td>67-70%</td>
</tr>
<tr>
<td>C+</td>
<td>64-66%</td>
</tr>
<tr>
<td>C</td>
<td>60-65%</td>
</tr>
<tr>
<td>F</td>
<td>0-59%</td>
</tr>
</tbody>
</table>
Examinations:

All exams are written, take-home exams.

Examination Policy:

The midterms and final are required. The final will be comprehensive, although weighted towards the later material. All exams will primarily contain questions covered in the text and its related homework, although certain laboratory assignments will also be included.

No make-up exams will be given except for documented illness or personal emergency. To be eligible for a make-up, the student must notify me prior to the time of the exam and provide documentation for the situation when arranging the make-up. A student not taking an exam will receive a score of 0 (zero). To accommodate unusual circumstances, alternative times for exams may potentially be arranged in advance.

Assignments:

Assignments are due in class on the day specified on the assignment description. I will accept late assignments. However, late assignments carry with them a 10% reduction in the grade, per class day. All assignments must be turned in by two calendar weeks of their due date or you will receive a zero (0) grade for the assignment. Please note that if you are unable to turn an assignment in on the due date, then it will be considered late unless you have made arrangements with me at least twenty-four (24) hours before the assignment is due. No assignments will be accepted after the last scheduled day of lecture.

Academic Misconduct:

It is expected in this course that small groups of students work together on some assignments. For individual (homework) assignments, you are expected to do your own work without collaboration. For group assignments, the policy is as follows: within your own group, collaborative discussions and preparation of assignment solutions are expected. However, discussions across groups are discouraged. That is, you are expected to come up with group-prepared solutions for your assignments as long as you keep the work within your own group. If it becomes obvious that the above policies are violated, then it will be considered plagiarism, which is not tolerated. If I deem that such an event has occurred, all students involved will at minimum receive zero credit for the assignment and may receive a zero credit (failing grade) for the class. I advise you to protect your work.

Written reports (research papers and short papers) will (at minimum) be checked using plagiarism detection software. The requirement for this material is that it must contain no greater than 20% “plagiarized” material, as reported by the software. This means that your written work must be primarily in your own words and not copied word-for-
word from a paper or a web site. Students must ensure this level of conformance by
testing the material themselves, prior to final submission. Reports that are submitted in
which “plagiarized” material is reported to be greater than 50% will automatically
receive a grade of 0.

Attendance Policy:

You will be held accountable for all classroom and lab learning experiences and all
announcements made during scheduled class time. Announcements may be emailed or
posted on the course web page at

http://regal.cesp.umflint.edu/~swturner/Classes/csc577/csc577.html

However, you cannot assume that they will always be conveyed in that fashion.

Students with Disabilities:

Students with disabilities that may restrict their full participation in course activities are
encouraged to meet with the instructor or to contact the Office of Accessibility Services
(part of the Student Development Center, located at 264 University Center).

Notes:

I reserve the right to modify course policies, the course calendar, assignment point
values, and due dates. Any extenuating circumstances that hinder your participation in
the course should be discussed with me as soon as those circumstances are known.
Make-ups for graded activities may be arranged if an absence is caused by documented
illness or personal emergency. A written explanation, including supporting
documentation, must be submitted to me; if the explanation is acceptable, then an
alternative to the graded activity will be arranged. Whenever possible, make-up
arrangements must be completed prior to the scheduled activity.