San José State University
Computer Science Department
CS249, Distributed Computing, Section 1, Fall 2017

Course and Contact Information

Instructor: Tanuja Phadke
Office Location: DH 282
Telephone: (510) 209-9524
Email: tanuja.phadke@sjsu.edu
Office Hours: Th:8:40pm-9:00pm
Class Days/Time: TTh 1945 - 2200
Classroom: MH225
Prerequisites: Java or any other programing language. Basic algorithm

Faculty Web Page

Course materials such as presentation slides, notes, assignments, etc. can be found on my faculty web page at http://www.sjsu.edu/people/tanuja.phadke/courses

Course Description

An advanced course that focuses on distributed systems and distributed algorithms. Discussion and hands-on exercises are key to successful completion of the course. The class will focus on the fundamental concepts associated with the distributed systems and their practical applications. This is an interactive class and students will be required to work in groups of up to a maximum 3 students each. Special emphasis is placed on learning the concepts and developing the ability to algorithmic thinking.
Course Learning Outcomes (CLO)

Upon successful completion of this course, students will be able to:

- Understand what distributed systems are.
- Understand various distributed systems challenges and algorithms.
- Strong grasp of distributed algorithms
- Explain the software challenges associated with distributed algorithms.
- Become a better programmer.
- Improved presentation skills.
- Learn to work in team.

Required Texts/Readings

Textbooks

*Distributed computing Fundamentals, Simulations and Advanced topics, (Second Edition)* by Hagit Attiya, Jennifer Welch.

*Distributed Systems Principles and Paradigms (Second Edition)* by Andrew A Tanenbaum, Maarten van Steen

Course Requirements and Assignments

Assignments include programming exercises (preferably in java or python), a written submission and oral presentation, and a final project. Students can work in a group of max 3 students depending on the complexity of the final project and homework assignment. Grading is based on a class curve. All students must uphold academic honesty, especially for the required term paper, per university policy detailed at [http://www2.sjsu.edu/senate/f88-10.htm](http://www2.sjsu.edu/senate/f88-10.htm)

Final Examination

The final exam with be demo of the final project and will be held on December 14 at 1945 - 2200

Grading Information

Grading consists of homework which include coding exercises, and a final project weighted as follows. Grading is based on a class curve. All assignments (especially the oral presentation) must be completed by the student on the due date specified to receive credit for the class. Late assignments or exams are not accepted. All students must uphold academic honesty, especially for the required term paper, per university policy detailed at [http://www2.sjsu.edu/senate/f88-10.htm](http://www2.sjsu.edu/senate/f88-10.htm)

60% Programing homework assignment and Oral presentation

40% Final Project

12/14/2017 1945 - 2200

Classroom Protocol

Students are expected to attend all classes.
## University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs’ Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/

## CS249 Fall 2017 Tentative Course Schedule

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 - 5</td>
<td>Basic Algorithms in message passing systems. Building distributed DFS and BFS spanning tree. Introduction to Java, listeners, ActiveMQ. Homework and discussion.</td>
</tr>
<tr>
<td>7- 8</td>
<td>Causality and Time. Basic definitions. Logical clock, Vector clocks, Consistent Cuts, Distributed Snapshots. Leader Election algorithms. Usage/practical example.</td>
</tr>
<tr>
<td>9-10</td>
<td>Consensus and byzantine fault tolerance. Paxos. Homework and discussion.</td>
</tr>
<tr>
<td>11-12</td>
<td>Message Oriented Communication, Consistency and Replication, Fault Tolerance. Process Resilience-Distributed Commit and Recovery</td>
</tr>
<tr>
<td>13-14</td>
<td>Distributed Object Based systems: RMI CORBA, Distributed File System- NFS, HDFS/Hadoop webHDFS. Homework and discussion</td>
</tr>
<tr>
<td>15- 18</td>
<td>Distributed Web Based Systems HTTP Webservices , SOAP RESTful services Microservices architecture Final Exam Project discussions</td>
</tr>
<tr>
<td>19 – 20</td>
<td>Case Study and Hands on Zookeeper, Kafka and Cassandra</td>
</tr>
<tr>
<td></td>
<td>Final Exam Thursday, December 14, 2017 at 1945 - 2200</td>
</tr>
</tbody>
</table>