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

**Course and Contact Information**

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| **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

**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

       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**

| Lecture | Topic |
|---|---|
| 1 - 3 | Introduction, Motivation and Overview of distributed computing. Basic Algorithms in message passing systems. Broadcast Converge cast. Homework Assignment and discussion. |
| 4 - 5 | Basic Algorithms in message passing systems. Building distributed DFS and BFS spanning tree. Introduction to Java, listeners, ActiveMQ. Homework and discussion. |
| 7- 8 | Causality and Time. Basic definitions. Logical clock, Vector clocks, Consistent Cuts, Distributed Snapshots. Leader Election algorithms. Usage /practical example. |
| 9-10 | Consensus and byzantine fault tolerance. Paxos. Homework and discussion. |
| 11-12 | Message Oriented Communication, Consistency and Replication, Fault Tolerance. Process Resilience-Distributed Commit and Recovery |
| 13-14 | Distributed Object Based systems: RMI CORBA, Distributed File System- NFS, HDFS/Hadoop webHDFS. Homework and discussion |
| 15- 18 | Distributed Web Based Systems HTTP<br>        Webservices , SOAP<br>        RESTful services<br>        Microservices architecture<br>    Final Exam Project discussions |
| 19 – 20 | Case Study and Hands on Zookeeper, Kafka and Cassandra |
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| Final Exam | Thursday, December 14, 2017 at 1945 - 2200 |