San José State University
College of Science/Computer Science Department
CS 218 – Topics in Cloud Computing, Section 1, Spring 2020

Course and Contact Information

Instructor:	Dr. Kong Li
Office Location:	ENG 250
Email:	kong.li@sjsu.edu (Email subject starts with CS218)
Office Hours:	Mon 4:30PM – 5:30PM or by appointment
Lecture Days/Time:	Mon & Wed 3:00PM – 4:15PM (1/23/2020 - 5/11/2020)
Classroom:	MacQuarrie Hall 422
Prerequisites:	CS 149. Students who do not provide documentation of having satisfied the class prerequisite requirements by the second class meeting will be dropped from the class.

Course Description
Topics in cloud computing, including distributed system models, virtual machines, virtualization, cloud platform architectures (IaaS, PaaS, SaaS), service-oriented architectures, cloud programming and software environments, peer-to-peer computing, ubiquitous cloud, cloud security and trust management. Prerequisite: CS 149.

Catalog Course Description is available at http://info.sjsu.edu/web-dbgen/catalog/courses/CS218.html

Faculty Web Page and Messaging
Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on Canvas Leaning Management System course login website at https://sjsu.instructure.com. Each submission of any assignment (homework, report, etc.) is "self-contained" and should be made on Canvas. You are responsible for regularly (i.e. every couple of days) checking with the messaging system (email, announcements, discussions) through Canvas and through MySJSU on Spartan App Portal at http://one.sjsu.edu to learn of any updates. Students are encouraged to use the Canvas discussion boards for collaboration.

- Canvas information at http://www.sjsu.edu/ecampus/teaching-tools/canvas/index.html
- Canvas student resources at http://www.sjsu.edu/ecampus/teaching-tools/canvas/student_resources/index.html
- If you are having problems logging on, please submit a ticket at https://isupport.sjsu.edu
- View instructor's comment at https://guides.instructure.com/m/4212/l/54359-how-do-i-view-instructor-comments, and view annotated comment at https://guides.instructure.com/m/4212/l/352349-how-do-i-view-annotation-feedback-comments-from-my-instructor-directly-in-my-assignment-submission

Course Goals

- To learn the cloud definition, service models (IaaS, PaaS, SaaS), and deployment models
- To learn cloud enabling technologies: web, web service (SOAP, REST), virtualization, and data center
- To learn cloud infrastructure mechanisms, specialized mechanisms, and management mechanisms
- To learn fundamental cloud architectures, and advanced cloud architectures
- To learn and practice cloud programming environments, including VMware ESXi, Google App Engine, Amazon AWS, Microsoft Azure, Hadoop MapReduce, and NoSQL
- To learn concepts and theories from parallel and distributed systems
- Time-permitted: to learn other advance topics in cloud computing

Course Learning Outcomes (CLO)

Upon successful completion of this course, students will be able to:
- Understand the above covered topics through completion of homework, quizzes, and examinations.
- Successfully complete labs and projects.
- Work in a team to complete a term project, including independent research, oral presentation, and programming on one latest advancement in cloud computing.

Required Texts/Readings

Textbook
- T. Erl, R. Puttini, and Z. Mahmood, *Cloud Computing: Concept, Technology & Architecture*, Pearson, 2013. ISBN-13: 9780133387520.
    - https://www.pearson.com/us/higher-education/program/Erl-Cloud-Computing-Concepts-Technology-Architecture/PGM239182.html
    - http://www.cloudpatterns.org

- Dan C. Marinescu, *Cloud Computing: Theory and Practice, 2/E*, Elsevier Science & Technology, 2017. ISBN-13: 9780128128107.
    - https://textbooks.elsevier.com/web/product_details.aspx?isbn=9780128128107

Other Readings
- Thomas Erl, Robert Cope, and Amin Naserpour, *Cloud Computing Design Patterns, 1/E*. Prentice Hall 2015. ISBN-13: 9780133858563 (Print), 9780133858624 (Online).
    - https://www.pearson.com/us/higher-education/product/Erl-Cloud-Computing-Design-Patterns/9780133858624.html

- Eric Redmond, and Jim Wilson, *Seven Databases in Seven Weeks: A Guide to Modern Databases and the NoSQL Movement, 2/E*, Pragmatic Bookshelf, 2018. ISBN-13: 9781680502534.
    - https://pragprog.com/book/pwrdata/seven-databases-in-seven-weeks-second-edition

- D. Sitaram and G. Manjunath, *Moving to The Cloud: Developing Apps in the New World of Cloud Computing*, Syngress, 2011. ISBN-13: 9781597497251.
    - http://store.elsevier.com/product.jsp?isbn=9781597497251

- B. Sosinsky, *Cloud Computing Bible*, Wiley, 2011. ISBN-13: 9780470903568.

- http://www.wiley.com/WileyCDA/WileyTitle/productCd-0470903562.html

- K. Hwang, G. Fox, and J. Dongarra, *Distributed and Cloud Computing*, 1st Edition, Elsevier Science & Technology, 2011. ISBN-13: 9780123858801.
  - http://textbooks.elsevier.com/web/product_details.aspx?isbn=9780123858801

- J. Rosenberg and A. Mateos, *The Cloud at Your Service*, Manning, 2010. ISBN-13: 9781935182528.
  - https://www.manning.com/books/the-cloud-at-your-service

Additional reading material will be distributed to the class as appropriate.

Course Requirements and Assignments

Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally 3 hours per unit per week) for instruction, preparation/studying, or course related activities, including but not limited to internships, labs, and clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus.

Homework and Lab: Each homework/Lab is *individual*. See separate document for assignment. Bring your machine to practice during lab sessions.

Exam and quiz: Midterm Exam, Final Exam, and quiz is *individual* and will be in the form of, but not limited to, short answer questions, design questions, programming questions, etc., and will be based on the individual assignments and course material. Close book; close notes; no calculator.

Projects: See separate document for projects.
Each team consists of a few students and will work on two projects. The first project involves paper-study with in-class presentation. The second project with a self-proposed topic includes research, design, implementation, and testing. Projects have deliverables throughout the semester. Each group member is expected to participate in every phase of the projects. The quality and completeness of all the deliverables will be considered in grading the projects. All projects will be demonstrated in class.

Final Examination or Evaluation

Refer to the Course Schedule for the datetime of the Final Exam.

Additional Requirements
- To work on homework, Lab, and term project, you must have access to recent 64-bit x86 computers running Windows, Linux, or Mac OS X. The CPU must have hardware assisted virtualization (VT-x/AMD-V) that is enabled in BIOS and the computer must have 6+ GB RAM.
- Familiarity with Java and Eclipse IDE

Grading Information

Except the final course grade which is posted on MySJSU, all other grades (assignments, projects, quizzes, exams) are posted on Canvas.

Student Assessment

Homework and Quiz	20%
Project 1 (paper-study) – Report/slides	5%

Project 2 (Term Project)		20%
Implementation/testing	10%	
Report/demo/slides	10%	
Midterm Exam		25%
Final Exam (comprehensive)		30%

- The instructor reserves the right to change the percentages.
- The final grade of this class is *solely* based on *your* performance in *this* class.
- *Failure to obtain 50% of each component, or failure to take Midterm Exam or Final Exam, will result in a failing grade in this class.*
- The exam dates are final.

Determination of Grade

Grade	Overall Score
A+	95-100
A	90-94.99
A-	85-89.99
B+	80-84.99
B	75-79.99
B-	70-74.99
C+	65-69.99
C	60-64.99
C-	55-59.99
F	0-54.99

Late Penalty

Based on the clock of Canvas, assignments submitted after the deadline earn no credit.

Makeup Exam

NO makeup exams will be given unless (1) you are pre-approved by the instructor before the exam, (2) you have urgent medical excuse for yourself (with medical doctor's written notes covering the exam date), and (3) you bring the proof to the instructor within a week.

Your request WILL NOT be granted if you come back after the scheduled exam date and request a makeup exam.

Classroom Protocol

- Students are encouraged to ask questions in the class.
- Each student is required to engage in classroom activities, submit assignments and reports on time, *and* take exams and tests on time.
- Web-browsing in class is not allowed. Cell Phones are to be turned off during lectures and tests. During exams if you receive a cell phone call or a message of any form, it will be assumed that you have completed your exam and no further work will be allowed.
- Audio/video recording, or taking pictures are not allowed.
- Student causing disruption in the class will be asked to leave the class.

Academic Integrity and Collaboration Policy

The work that you turn in must be original - Every single byte must come from you. You are not allowed to look at anyone else's solution in any form (from other students, web sites, etc.). You may discuss assignments with any one. But any such discussion is at the high level only, and you still must write your solution yourself.

You must take reasonable steps to protect your work. You must not share or publish your solutions to any one or at any web sites (github, stackoverflow, etc.), in this semester or any future semester. You are obligated to protect your files and printouts from access. Github repositories are public by default, do not put your code there unless you make the repository private.

Each assignment submission including programming code will be checked for similarity.

Any cheating incident will result in the reporting of such incident to the university office of Student Conduct & Ethical Development, will result in academic sanctions (including failing the course), as well as possible administrative sanctions, in accordance to the University Academic Integrity Policy at http://www.sjsu.edu/senate/docs/F15-7.pdf.

University Policies

Per University Policy S16-9 *(http://www.sjsu.edu/senate/docs/S16-9.pdf)*, relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on Syllabus Information web page (http://www.sjsu.edu/gup/syllabusinfo), which is hosted by the Office of Undergraduate Education. Make sure to visit this page to review and be aware of these university policies and resources.

CS 218 Topics in Cloud Computing, Section 1, Spring 2020, Course Schedule

The schedule is tentative and subject to change with fair notice. The final exam date is firm and cannot be changed. Any changes will be announced in due time in class and on the course's web site. The students are obliged to consult the most updated and detailed version of the reading material and syllabus, which will be posted on the course's web site.

Course Schedule

Week	Date	Topics	References	HW & Projects
1	1/27	Course Logistics & projects		
1	1/29	Introduction	Erl 3, 4	1/28 Prerequisites due
2	2/3	Introduction (cont'd)	Erl 3, 4	2/2 Honesty pledge due Marinescu 7 & slides
2	2/5	Concepts: CAP, Paxos	Marinescu 3,4	2/4 Last day to drop classes
3	2/10	Web Services	Notes, Erl 5.4, 5.6	(Team size)
3	2/12	Web Services (cont'd) Virtualization	Notes, Erl 5.4, 5.6 Erl 5.3, Marinescu 10	2/11 Last day to add classes
4	2/17	Virtualization (cont'd)	Notes, Erl 5.3, Marinescu 10	2/16 Team Formation due
4	2/19	LAB Docker Container*	Notes	
5	2/24	VMware	Notes	
5	2/26	VMware (cont'd)	Notes	
6	3/2	LAB ESXi *	Notes	3/1 HW1 due (Project 1 paper assignment)
6	3/4	LAB ESXi * (cont'd) Data Center	Notes Erl 5.2, 5.5	
7	3/9	Cloud Mechanisms 1	Erl 7, 8	3/8 Project 2 proposal due
7	3/11	Cloud Mechanisms 1 (cont'd), 2	Erl 7, 8, 9	
8	3/16	Amazon AWS	Notes, Marinescu 2,3, 2.4	3/15 HW2 due
8	3/18	Google, HW1 & HW2 discussion	Notes, Marinescu 2.5	

Week	Date	Topics	References	HW & Projects
9	3/23	**MIDTERM EXAM (close book, close notes). Bring student ID**	up to AWS, exclude papers	
9	3/25	LAB Google App Engine*	Notes	
10	3/30, 4/1	(no class - Spring Recess)		
11	4/6	LAB Google App Engine* (cont'd)	Notes	
11	4/8	Cloud Architecture 1	Erl 11	
12	4/13	Cloud Architecture 1 (cont'd)	Erl 11	(Project presentation length & order)
12	4/15	Cloud Architecture 2	Erl 12	4/14 HW3 due
13	4/20	Microsoft Azure	Notes, Marinescu 2.6	
13	4/22	Microsoft Azure (cont'd)	Notes, Marinescu 2.6	4/21 Project 1 report, slides due
14	4/27	Hadoop	Notes, Marinescu 7.7	
14	4/29	Trends, HW3 discussion	Notes	4/28 Project 2 report, source code, slides due
15	5/4	Project 1 presentation & discussion	Project 1 papers	
15	5/6	Project 2 presentations		
16	5/11	Project 2 presentations (cont'd)		5/11 Last office hour
Final Exam	5/13	**FINAL EXAM Wed, May 13, 12:15 – 14:30 (close book, close notes). Bring student ID**	All (including Project 1 papers)	

http://www.sjsu.edu/up/docs/holiday-calendar.pdf

http://info.sjsu.edu/static/catalog/final-exam-schedule-spring.html

* lab sessions. Bring your machine to class.