

Introduction to Cloud Technologies

ITP 111x (2 Units)



Fall 2014

Description

ITP 111 presents students with the fundamentals of cloud computing. Successful students will be able to make decisions about cloud technologies for their future projects.

Objective

Students completing this course will be able to:

- Recognize terminology and concepts related to cloud computing
- Understand cloud computing security measures
- Differentiate cloud storage options, cloud compute services, and cloud networking options
- Describe cloud resource management services and cloud based database services
- Identify virtual resource deployment and management options

Concepts

Global physical infrastructure and the virtual services they provide. Security on the cloud; cloud storage, computation, networking, and databases; and managing these cloud resources.

Prerequisites

None.

Instructor

Nathan Greenfield

Contacting the Instructor

nathan.greenfield@usc.edu

Instructor Office Hours

Listed on Blackboard under Contacts

Lab Assistants

Listed on Blackboard under Contacts

Contacting the Lab Assistants

Listed on Blackboard under Contacts

Compute Support

<http://viterbi.usc.edu/resources/vit/getting-assistance/>

Lecture / Lab

One hour and 20 minutes, twice a week, for a total of 2 hours and 40 minutes.

Required Textbooks

Cloud Computing Bible. Barrie Sosinsky. John Wiley & Sons. ISBN-13: 978-0470903568.
Amazon Web Services For Dummies. Bernard Golden. For Dummies. ISBN-13: 978-1118571835.

Optional Textbooks

None.

Website

All course material will be on Blackboard (<http://blackboard.usc.edu>).

Grading

The following percentage breakdown will be used in determining the grade for the course.

Assignments	30%
Midterm exam	20%
Presentation	20%
Final exam	30%
Total	100%

Grading Scale

The following shows the grading scale to be used to determine the letter grade.

93% and above	A
90% - 92%	A-
87% - 89%	B+
83% - 86%	B
80% - 82%	B-
77% - 79%	C+
73% - 76%	C
70% - 72%	C-
67% - 69%	D+
64% - 66%	D
63% and below	F

Policies

Exams

No make-up exams (except for documented medical or family emergencies) will be offered nor will there be any changes made to the Final Exam schedule.

There are two exams: one midterm exam and a final exam. These exams are comprehensive of all topics covered.

Assignments

Each assignment must be completely *individually*. The assignments will be posted on Blackboard under the “Assignments” section. Each assignment will include instructions, a due date, and a link for electronic submission. Assignments must be submitted using this link.

It is your responsibility to submit your assignments on or before the due date. Assignments turned in one day late will have 20% of the total points deducted from the graded score.

Assignments turned in two days late will have 50% of the total points deducted from the graded score. After two days, submissions will not be accepted and you will receive a 0.

All assignments will be digitally submitted through Blackboard except where specified. Do not email them to the instructor or lab assistant.

Lab facilities and compute resources

You are required to save your labs using a USB flash drive or a website like [Dropbox](#). You must keep a copy of all labs. You will not be able to save your work on the ITP lab computers. Any work saved to the computer will be erased after restarting the computer. ITP is not responsible for any work lost.

ITP will have open lab hours starting the third week of the semester. The open labs will not have a lab assistant for this specific course. These lab times are there in case you need extra time to complete a lab.

For help with lab computing facilities including lab compute contact Viterbi IT at <http://viterbi.usc.edu/resources/vit/getting-assistance/>. Include the instructor in all communications with Viterbi IT.

Group presentation

In the last 3rd of the semester students will break into groups of 3 to 4 to work on an in-class presentation and supporting white-paper – the focus of which will be current uses of cloud technologies. Before beginning group work, students must have their proposal approved by the instructor. Working on a project which is not approved is not allowed.

Schedule

Week 10: Form teams and submit proposals for approval.

Weeks 10 through 14: Research subject matter.

Week 12: Research presentation in “white-paper” form. (Graded)

Week 13: Work on final presentation

Week 15: Final presentation (Graded)

Basic requirements

The presentation and white-paper must focus on cloud technology use-cases. The white paper should include details about financial implications of using cloud technologies. In-class presentations should focus on the company’s overall benefit from using cloud technologies. Both the white-paper and the in-class presentation must highlight what cloud technologies are being used and how they are being leveraged.

Proposals

Your team will be required to submit a proposal prior to beginning work on the presentation. The necessary components of the proposal will be covered in class.

Grading

Your final presentation and white paper is 20% of your overall semester grade. The grade breakdown is as follows:

Individual contribution	7%
White paper	7%
Presentation	6%
Total	20%

Individual contribution – 7%

This portion of credit is based on how much research you contributed to the final product, your concrete contribution to the white paper and presentation, and the result of peer reviews within your group. If you did not contribute enough to the end result you will lose credit in this section.

White paper – 7%

Credit will be shared by all team members. Approximately 2 weeks before the presentations the result of each individual’s research should be compiled into a white paper. Each member must contribute to the document. The included information should contribute directly to the overall group presentation.

Presentation – 6%

The group presentation grade credit will be shared by all team members. It should incorporate information from the white paper. It must inform the entire class in a clear and concise manner overall research findings but not delve into the details outlined in the white paper. Material presented here by student groups may appear in the final exam.

Peer reviews

During finals students will be required to complete a peer review survey. The results of this evaluation will be taken into account when assigning the individual contribution grades.

Incomplete and Missing Grades

Excerpts for this section have been taken from the University Grading Handbook, located at <http://www.usc.edu/dept/ARR/grades/gradinghandbook/index.html>. Please see the link for more details on this and any other grading concerns.

A grade of Missing Grade (MG) “should only be assigned in unique or unusual situations... for those cases in which a student does not complete work for the course before the semester ends. All missing grades must be resolved by the instructor through the Correction of Grade Process. One calendar year is allowed to resolve a MG. If an MG is not resolved [within] one year the grade is changed to [Unofficial Withdrawal] UW and will be calculated into the grade point average a zero grade points.

A grade of Incomplete (IN) “is assigned when work is no completed because of documented illness or other ‘emergency’ occurring after the twelfth week of the semester (or 12th week equivalency for any course scheduled for less than 15 weeks).”

Academic Integrity

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one’s own academic work from misuse by others as well as to avoid using another’s work as one’s own. All students are expected to understand and abide by these principles. Scampus, the Student Guidebook, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A: <http://www.usc.edu/dept/publications/SCAMPUS/gov/>. Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: <http://www.usc.edu/student-affairs/SJACS/>.

Students with Disabilities

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to your course instructor (or TA) as early in the semester as possible. DSP is located in STU 301 and is open from 8:30am to 5:00pm, Monday through Friday. Website and contact information for DSP

http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html (213) 740-0776 (Phone), (213) 740-6948 (TDD only), (213) 740-8216 (FAX) ability@usc.edu

Emergency Preparedness/Course Continuity in a Crisis

In case of emergency, when travel to campus is difficult, if not impossible, USC executive leadership will announce a digital way for instructors to teach students in their residence halls or homes using a combination of the Blackboard LMS (Learning Management System), teleconferencing, and other technologies. Instructors should be prepared to assign students a “Plan B” project that can be completed ‘at a distance.’ For additional information about maintaining your classes in an emergency, please access:

<http://cst.usc.edu/services/emergencyprep.html>

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Course Outline

Note: Schedule subject to change

Week 1

8/25/14 – Introduction to the Cloud

- Course overview
- History of cloud computing
- Cloud service options
- Cloud deployment models
- Business concerns in the cloud

Reading

Sosinsky: Chapters 1, 2

8/27/14 – Virtualization

- Exploring virtualization
- Load balancing
- Hypervisors
- Machine imaging

Reading

Sosinsky: Chapters 3, 4

Week 2

9/1/14 – Labor Day

- No class

Reading

Sosinsky: Chapter 5, 6

9/3/14 – Cloud platforms compared

- Cloud marketplace overview
- Cloud providers compared

Reading

Sosinsky: Chapters 7, 8, 9, 10

Week 3

9/8/14 – Introduction to AWS

- AWS history
- AWS infrastructure
- AWS services
- AWS ecosystem

Reading

Golden: Chapter 1

Assignment

Homework 1: AWS account setup
(due 9/17/14)

9/10/14 – AWS security and compliance

- AWS physical security
- AWS compliance initiatives
- Understanding public/private keys
- Other AWS security capabilities

Reading

[AWS security overview whitepaper](#)

Week 4

9/15/14 – AWS management console

- AWS URL naming
- Matching interfaces and services

Reading

Golden: Chapter 3

9/17/14 – AWS identity services

- Users, groups, and roles
- Understanding credentials
- Security policies
- IAM abilities and limitations

Reading

[AWS IAM getting started](#)

Assignment

Homework 2: Establish users and groups
(due 9/24/14)

Week 5

9/22/14 – Programming on AWS

- Understanding APIs
- AWS programming interfaces
- Web services

Reading

- Golden: Chapter 2

9/24/14 – AWS storage

- Elastic block store
- Simple storage service

Assignment

Homework 3: Create and use AWS storage
(due 10/6/14)

Week 6

9/29/14 – AWS storage

- Glacier
- Content delivery platforms

Reading

Golden: Chapter 4

10/1/14 – AWS computing

- Elastic cloud compute
- Introduction to servers
- Imaging computers

Reading

[AWS EC2 main page](#)

Week 7

10/6/14 – AWS computing

- Auto scaling
- Elastic load balancing

Reading

Golden: Chapter 5

10/8/14 – Midterm exam

- 20% of overall grade

Week 8

10/13/14 – AWS marketplace

- Cataloging the marketplace
- AMIs
- Selling on the marketplace

Reading

[AWS Marketplace FAQ](#)

Assignment

Homework 4: Webserver
(due 10/28/14)

10/15/14 – AWS networking

- Virtual private clouds
- Cloud models
- Private DNS servers (Route 53)

Reading

Golden: Chapter 6

Week 9

10/20/14 – AWS databases

- Relational database service
- DynamoDB
- ElastiCache
- Redshift

Reading

Golden: Chapter 8

10/22/14 – Other AWS services

- Analytics services
- Application services
- Cloud security

Reading

Golden: Chapter 7

Week 10

10/27/14 – Presentation workshop 1

- Presentation teams selected
- Proposals analyzed

Assignment

Project proposals (due 10/29/14)

10/29/14 – AWS platform services

- Communication services
- Media services

Reading

Golden: Chapter 9

Assignment

Homework 5: TBD

Week 11

11/3/14 – AWS management services

- CloudWatch
- CloudFormation
- CloudTrail
- OpsWorks

Reading

Golden: Chapter 10

11/5/14 – AWS case studies

- Netflix
- Atomic Fiction
- Airbnb

Week 12

11/10/14 – Presentation workshop 2

- Research check-in

11/12/14 – Presentation workshop 3

- Research topic white-paper review

Week 13

11/17/14 – AWS billing

- Managing costs
- Utilization and tracking
- Bottom line impact

Reading

Golden: Chapter 11

11/19/14 – Dealing with disaster

- Geographic and other concerns
- Failure plans
- Examining logs

Reading

Golden: Chapter 12

Week 14

11/24/14 – Presentation workshop 4

- Presentation status report

11/26/14 – Thanksgiving

- No class

Week 15

12/1/14 – Group presentations 1

- Student group project presentations

12/3/14 – Group presentations 2

- Student group project presentations

Final Exam

According to the final exam schedule on the Schedule of Classes