ITP 111 : What is the Cloud? : An Introduction to Cloud Computing with DevOps
Units: 2
Fall 2022 : Tuesday / Thursday 10am – 10:50am

Location: See schedule of classes

Instructor: Nathan Greenfield
Office Hours: See contacts on Blackboard
Contact Info: All general course/assignments questions should be asked on Piazza (every student will receive an invitation at the start of the semester). Other questions should be asked via email: ngreenfi@usc.edu.
Course Description
This course is an introduction to digital infrastructure and digital architecture that makes up the Cloud. Digital infrastructure refers to both physical and virtual digital system and the interconnecting pieces between them. Digital architecture is the structured and intentional combination of digital systems to achieve a goal. Together these pieces are the foundation for anything on the Cloud, from serving a basic website to allowing millions of customers to simultaneously stream movies anywhere in the world. This is a survey course that serves as the gateway to the ITP Cloud Computing with DevOps minor. We will introduce many topics that will be investigated in more depth in subsequent classes.

Learning Objectives
This course offers an overview of DevOps (software DEVelopment and information technology OPerationS). Students will learn the history of DevOps and the Cloud. They will examine Cloud Computing in relation to topics like business processes, startup feasibility, security, privacy, and social impact. Students will also examine several real-world examples of deployed digital infrastructure and the underlying architectures.

Learning Outcomes
By the end of this course, students will...
- Understand the fundamentals of digital networks including their composition, how to secure them, and how to maintain them
- Be able to articulate the difference between physical and virtual infrastructure
- Define “the Cloud” and explain different examples of cloud services
- Model the appropriate infrastructure for a variety of use cases
- Articulate the impact of digital infrastructure on current events

Prerequisite(s): None
Co-Requisite(s): None
Concurrent Enrollment: None
Recommended Preparation: None

Course Notes
Students will be assigned a letter grade. Lecture slides and assignments will all be posted on Blackboard. Course discussions will occur on Piazza. Lectures will feature in-class polls conducted via PollEverywhere. Students can respond to these polls via their mobile device or laptop. Lectures will be immediately followed by a lab that introduces the technical aspects covered in lecture.

Technological Proficiency and Hardware/Software Required
Students must have access to laptop that they bring to class. Students should have basic technical knowledge of their computer, including the ability to install software, download course material, and properly submit their assignments online.

ITP has laptops that are available to borrow for ITP classes. Visit the ITP office during the week (Monday - Friday, 8:30 am - 5 pm) to fill out a loan contract to receive a laptop and power adapter. You must return the laptop each week though you may renew the laptop for another week. If you do not return it after a week, you will lose the privilege to a loaner laptop and the laptop will be repossessed.

You will not be able to save your work on the ITP lab computers and the ITP laptops. Once restarted, all work will be deleted. Use an external USB drive or cloud storage to save your work. ITP is not responsible for any lost work.
ITP offers Open Lab use for all students enrolled in ITP classes. These open labs are held beginning the second week of classes through the last week of classes. They are listed on the ITP website at http://itp.usc.edu.

Required Readings and Supplementary Materials
Additional readings such as excerpts from other books or online articles will be provided on Blackboard.

Participation
Participation will be evaluated based on the percentage of in-class polls students participate in. Students must participate in at least 80% of the in-class polls to receive the full participation grade.

Current Events
To promote class discussion, each student will be required to submit an article for class discussion. Articles must be posted with a hyperlink to the article and a one-paragraph summary to the class Piazza news board for the appropriate week at least 24 hours prior to the second class meeting of each week. The news story should directly relate to topics covered in the previous week’s lecture. News stories should be no more than one month old and cannot duplicate another submitted news article. Stories behind a pay-wall, subscription-wall or otherwise requires a login should be submitted as a PDF along with the link. Students should be prepared to give a short two-minute summary of the article and any surrounding background details to facilitate class discussion. Press releases or other public relations announcements with no analysis are not news content. You must validate the veracity of the news story, for example unsubstantiated Reddit posts do not count.

Weekly Quizzes
Reading will be assigned weekly and be tested on with an in-class quiz at the beginning of each meeting. These quizzes will be relatively short multiple-choice questions and will be administered in the first 10 minutes of every class meeting.

Assignments
Homework assignments will be posted on Blackboard under the “Assignments”. Each assignment will include instructions, a due date, and a link for electronic submission. All assignments must be submitted using this link. Do not email your assignments to the course staff. Lab assignments are often the first step of a larger task that will continue in a homework assignment.

Homework assignments will be accepted up to two days late. Assignments submitted within 24 hours after the due date receive a 20% deduction. Assignments submitted before 48 hours of the due date receive 50% deduction. Any work submitted later will get no credit. Extensions are only provided in the event of a documented reason satisfactory to the instructor, such as an illness or family emergency.

Plagiarism detection tools will be used throughout the semester. All work submitted will be compared with current, previous, and future students’ submissions using these tools. If your submission significantly matches another student’s submission, you will be referred to SJACS with a recommended penalty of an F in the course.

Exams
There are two exams in this course. The exams are cumulative of the course’s material. To make up for a missed exam, the student must provide a satisfactory reason (as determined by the instructor) along with documentation. Make-up exams are only allowed under extraordinary circumstances.
Joining After the Class First Meeting
If you join the class after the first lecture meeting it is your responsibility to contact the instructor and establish a timeline in which you will catch up on class material. Students who do not promptly contact the instructor will be held to the same due dates as the other students.

Grading Breakdown

<table>
<thead>
<tr>
<th>Item</th>
<th>% of Grade</th>
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<tbody>
<tr>
<td>Participation</td>
<td>10</td>
</tr>
<tr>
<td>Current events</td>
<td>10</td>
</tr>
<tr>
<td>Weekly quizzes</td>
<td>10</td>
</tr>
<tr>
<td>Homework</td>
<td>20</td>
</tr>
<tr>
<td>Midterm exam 1</td>
<td>15</td>
</tr>
<tr>
<td>Midterm exam 2</td>
<td>15</td>
</tr>
<tr>
<td>Final paper</td>
<td>20</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
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Final Paper
Instead of a final exam, you will demonstrate your mastery of the course material by analyzing the digital infrastructure currently deployed by a large company or an industry tool or trend and its impact. You must propose the topic of this paper before you begin work. The paper must represent the student’s sole effort; online tutorials or other examples may be consulted, but they must be improved upon and noted in the final documentation. Failure to note and provide links to reference material will be considered cheating.

Sample topics
- “How does StackOverflow work?” This paper investigates the underlying infrastructure that supports StackOverflow. The paper will briefly define StackOverflow (including identifying customers, revenue models, and business history). The paper will present a broad, high level version of the current StackOverflow infrastructure and explain how StackOverflow arrived at their current solution.
- “What is the Simian Army and why did Netflix develop it?” This paper discusses the Simian Army, a solution Netflix developed to plan for and handle service problems. It explains why Netflix developed the Simian Army, overviews its components, and its value to Netflix’s daily operations.

Paper timeline
Week 12: Final paper requirements released
Week 13: Final paper definition, scope, and topics delivered
Week 15: Results of current research presented (including bibliography), paper outlines delivered
Final Exam Period: Final draft of final paper delivered

Grading breakdown:
- Definition, scope, and topic proposal (10%)
- Week 15 check-in results (30%)
- Final bibliography (20%)
- Final paper (40%)
Tentative Course Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Work assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Introduction</td>
<td></td>
</tr>
<tr>
<td>Week 2</td>
<td>Cloud economics</td>
<td>Quiz</td>
</tr>
<tr>
<td>Week 3</td>
<td>AWS overview</td>
<td>Quiz; Current events;</td>
</tr>
<tr>
<td>Week 4</td>
<td>Global infrastructure</td>
<td>Quiz; Current events;</td>
</tr>
<tr>
<td>Week 5</td>
<td>Security</td>
<td>Quiz; Current events;</td>
</tr>
<tr>
<td>Week 6</td>
<td>Security</td>
<td>Quiz; Current events; HW1</td>
</tr>
<tr>
<td>Week 7</td>
<td>Midterm, Networking</td>
<td>Current events;</td>
</tr>
<tr>
<td>Week 8</td>
<td>Networking</td>
<td>Quiz; Current events;</td>
</tr>
<tr>
<td>Week 9</td>
<td>Networking</td>
<td>Quiz; Current events; HW2</td>
</tr>
<tr>
<td>Week 10</td>
<td>Compute</td>
<td>Quiz; Current events;</td>
</tr>
<tr>
<td>Week 11</td>
<td>Compute</td>
<td>Quiz; Current events; HW3</td>
</tr>
<tr>
<td>Week 12</td>
<td>Storage</td>
<td>Quiz; Current events; HW4</td>
</tr>
<tr>
<td>Week 13</td>
<td>Storage, Databases</td>
<td>Quiz; Current events;</td>
</tr>
<tr>
<td>Week 14</td>
<td>Databases</td>
<td>Quiz; Current events; HW5</td>
</tr>
<tr>
<td>Week 15</td>
<td>Review, Midterm</td>
<td></td>
</tr>
<tr>
<td>FINAL</td>
<td>Final papers due</td>
<td>For the date and time of the final period for this class, consult the USC Schedule of Classes at <a href="http://www.usc.edu/soc">www.usc.edu/soc</a>.</td>
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Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, policy.usc.edu/scientific-misconduct.

Support Systems:

Counseling and Mental Health - (213) 740-9355 – 24/7 on call studenthealth.usc.edu/counseling
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call suicidepreventionlifeline.org
Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press “0” after hours – 24/7 on call studenthealth.usc.edu/sexual-assault
Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) - (213) 740-5086 | Title IX – (213) 821-8298 equity.usc.edu, titleix.usc.edu
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298 usc-advocate.symphlicity.com/care_report
Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity | Title IX for appropriate investigation, supportive measures, and response.

The Office of Disability Services and Programs - (213) 740-0776 dsp.usc.edu
Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.
USC Campus Support and Intervention - (213) 821-4710
campusupport.usc.edu
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101
diversity.usc.edu
Information on events, programs and training, the Provost’s Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call
dps.usc.edu, emergency.usc.edu
Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call
dps.usc.edu
Non-emergency assistance or information.

Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC)
ombuds.usc.edu
A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.