CSYE 6225: Network Structure & Cloud Computing
FALL 2024

Course Information
Course Title: Network Structure & Cloud Computing
Course Number: CSYE 6225
Term and Year: FALL 2024
Credit Hour: 4
CRN: 22138
Course Format: In class

Instructor Information
Full Name: Kareem El Gebaly
Email Address: k.elgebaly@gmail.com
Office Hours: Tuesday 4 pm EST

Instructor Biography
Kareem holds a PhD in Computer Science from the University of Waterloo, Data Systems Group, specializing in analytics, cloud technologies, and data systems. Currently on sabbatical, Kareem brings extensive experience in industrial-level software development, having contributed to leading teams in the creation of distributed and cloud-native applications. Kareem's teaching philosophy emphasizes a practical, hands-on approach alongside a comprehensive conceptual framework. After work, Kareem enjoys music, swimming, and playing Age of Empires.

Teaching Assistant Information
Full Name: Click or tap here to enter text.
Email Address: Click or tap here to enter text.
Office Hours: Click or tap here to enter text.

Course Prerequisites
• CSYE 6200 or INFO 5100
• Good handle on system issues and troubleshooting: e.g., debugging, scripting, top, chmod, etc.
• Python proficiency: e.g., socket programming, system programming, parallel programming, pip, etc.
• Good grasp of network troubleshooting techniques: e.g., ping, netstat, ifconfig, etc.

Course Description

Prepare you to design, build, and run groundbreaking cloud native apps! How? In this course, conceptual and hands-on will go hand in hand to convey the main concepts and skills you need. The course covers a breadth of topics with a focus on system design, DevOps, and implementation. We will go over a wide and diverse variety of cloud, networks, and systems concepts in this course. In addition, be ready for extensive hands-on practical implementation assignments.

Course Learning Outcomes

Extend your system's and programming knowledge to the cloud and understand how to build scalable, efficient, and fault tolerant systems and applications. Understand how to employ readily available cloud services to your own advantage. In addition, learn the key tools and technologies that increase collaboration and productivity, e.g., appreciate the DevOps ways and culture. To sum up, at the end of the course, you should feel confident and comfortable designing, implementing, deploying, and managing new cloud-based services and applications.

Required Tools and Course Textbooks.

TBD

Course Schedule/Topics Covered.

Week	Date	In Class Topic	Assignment Due (@8pm)
1	09/10	Introduction and overview	
2	09/17	DevOps: Why and how?	A1: due 09/16
3	09/24	Continuous development, testing, deployment, etc.	A2: due 09/23
4	10/1	Computer networks and communication	A3: due 09/30
5	10/8	Distributed systems issues	A4: due 10/07
6	10/15	Computer networks and system issues: continued	A5: due 10/14
7	10/22	Systems design: Cloud nodes	
8	10/29	Systems design: Build your own services and apps	A6: due 10/28
9	11/5	Virtualization and containerization	
10	11/12	Cloud nonfunctional requirement: Reliability, availability, load balancing, elasticity, etc.	A7: due 11/11
11	11/19	Monitoring, operations, configuration, etc.	
12	11/26	Systems architecture: Microservices, serverless, etc.	A8: due 11/25
13	12/3	Systems architecture: Cloud native, event driven, etc.	
14	12/10	Systems architecture: TBD	
15	12/17	Final Exam	Thank you!

Assignment Grading

Participation (e.g., attendance and in-class quizzes) – 15 %
- Assignments 50%
  - A {1, 2, 3, 4, 5}: 4% each
  - A {6, 7, 8}: 10% each
- Midterm Exam – 15%

- Final Exam – 20%
- Bonus assignments – TBD

Grading Scale

	87-89.9% B+	77-79.9% C+	
	84-86.9% B	74-76.9% C	
95-100% A			
90-94.9% A-	80-83.9%B-	70-73.9% C-	
			69.9% or below F

Attendance/Late Work Policy

Attendance Policy

Students registered in MGEN courses (INFO, CSYE, and DAMG) are allowed **a maximum of 2 absences per course, with 3 or more absences resulting in an automatic 'F' for that course.** Students are expected to inform their instructors of any absences in advance of the class; if a student is sick long-term or experiences a medical issue that prevents class attendance, it is strongly encouraged that they speak with their Academic Advisor (coe-mgen-gradadvising@northeastern.edu) to learn more about the Medical Leave of Absence. Should a student anticipate being unable to attend 3 or more classes, they should discuss their situation with their Academic Advisor to explore other types of leave in accordance with the University's academic and global entry expectations. International students should review the Office of Global Services webpage to understand their visa compliance requirements.

Teaching Assistants (TAs) or Instructional Assistants (IAs) will be present at each class to collect student attendance.

Late Work Policy

Students must submit assignments by the deadline in the time zone noted in the syllabus. Students must communicate with the faculty prior to the deadline if they anticipate work will be submitted late. Work submitted late without prior communication with faculty will not be graded.

End-of-Course Evaluation Surveys
Your feedback regarding your educational experience in this class is particularly important to the College of Engineering. Your comments will make a difference in the future planning and presentation of our curriculum.

At the end of this course, please take the time to complete the evaluation survey at **https://neu.evaluationkit.com**. Your survey responses are **completely anonymous and confidential**. For courses 6 weeks in length or shorter, surveys will be open one week prior to the end of the courses; for courses greater than 6 weeks in length, surveys will be open for two weeks. An email will be sent to your Northeastern University Mail account notifying you when surveys are available.

Academic Integrity
A commitment to the principles of academic integrity is essential to the mission of Northeastern University. The promotion of independent and original scholarship ensures that students derive the most from their educational

experience and their pursuit of knowledge. Academic dishonesty violates the most fundamental values of an intellectual community and undermines the achievements of the entire University.

As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and writing, examinations of whatever kind, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Students are responsible for learning the conventions of documentation and acknowledgment of sources in their fields. Northeastern University expects students to complete all examinations, tests, papers, creative projects, and assignments of any kind according to the highest ethical standards, as set forth either explicitly or implicitly in this Code or by the direction of instructors.

Go to http://www.northeastern.edu/osccr/academic-integrity-policy/ to access the full academic integrity policy.

MGEN Student Feedback
Students who would like to provide the MGEN unit with anonymous feedback on this particular course, Teaching Assistants, Instructional Assistants, professors, or to provide general feedback regarding their program, may do so using this survey: https://neu.co1.qualtrics.com/jfe/form/SV_cTIAbH7ZRaaw0Ki

University Health and Counseling Services
As a student enrolled in this course, you are fully responsible for assignments, work, and course materials as outlined in this syllabus and in the classroom. Over the course of the semester if you experience any health issues, please contact UHCS.

For more information, visit https://www.northeastern.edu/uhcs.

Student Accommodations
Northeastern University and the Disability Resource Center (DRC) are committed to providing disability services that enable students who qualify under Section 504 of the Rehabilitation Act and the Americans with Disabilities Act Amendments Act (ADAAA) to participate fully in the activities of the university. To receive accommodations through the DRC, students must provide appropriate documentation that demonstrates a current substantially limiting disability.

For more information, visit https://drc.sites.northeastern.edu.

Library Services
The Northeastern University Library is at the hub of campus intellectual life. Resources include over 900,000 print volumes, 206,500 e-books, and 70,225 electronic journals.

For more information and for education specific resources, visit https://library.northeastern.edu
Network Campus Library Services: Northeastern University Library Global Campus Portals

24/7 Canvas Technical Help
For immediate technical support for Canvas, call 617-373-4357 or email help@northeastern.edu

Canvas Student Resources: https://canvas.northeastern.edu/student-resources/

For assistance with my Northeastern e-mail, and basic technical support:
Visit ITS at https://its.northeastern.edu
Email: help@northeastern.edu
ITS Customer Service Desk: 617-373-4357

Diversity and Inclusion

Northeastern University is committed to equal opportunity, affirmative action, diversity, and social justice while building a climate of inclusion on and beyond campus. In the classroom, members of the University community work to cultivate an inclusive environment that denounces discrimination through innovation, collaboration, and an awareness of global perspectives on social justice.

Please visit http://www.northeastern.edu/oidi/ for complete information on Diversity and Inclusion

Title IX

Title IX of the Education Amendments of 1972 protects individuals from sex or gender-based discrimination, including discrimination based on gender-identity, in educational programs and activities that receive federal financial assistance.

Northeastern's Title IX Policy prohibits Prohibited Offenses, which are defined as sexual harassment, sexual assault, relationship or domestic violence, and stalking. The Title IX Policy applies to the entire community, including male, female, transgender students, faculty, and staff.

In case of an emergency, please call 911.

Please visit https://www.northeastern.edu/ouec for a complete list of reporting options and resources both on- and off-campus.