DAMG 7250: Big Data Architecture and Governance

Course Information
Course Title: **Big Data Architecture and Portfolio Governance**
Course Number:DAMG7250 – 01&2
Term and Year: Fall 2024
Credit Hour: 4
CRN: 14310
Course Format: Boston In-person + Seattel Virtual

Instructor Information
Full Name: Kam Heydari
Email Address: k.heydari@northeaster.edu
Office Hours: Click or tap here to enter text.

Instructor Biography
Kam Heydari is a seasoned technology leader with over 40 years of experience serving some of the largest investment managers and service providers in the industry. With a deep understanding of data governance and enterprise architecture, Kam has managed national and international Information Technology organizations within global financial services firms for over 28 years. He has spearheaded critical initiatives to optimize technology, business processes, governance, and organizational structures, launching a series of global enterprise strategic initiatives.

In addition to his corporate experience, Kam is the founder of Velero Technology and has held several executive positions, including SVP, Chief Technology Officer – Europe & Head of Global Architecture at Pioneer Investments, Vice President of Application Services at MFS, and Vice President and Technical Director of Asia Pacific & Latin America with State Street in Boston, MA.

Since 2015, Kam has also served as Adjunct Faculty at Northeastern University's Graduate School of Engineering in Boston, MA, teaching courses such as Planning & Managing Information Systems Development and Big Data Architecture and Governance.

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

Course Prerequisites

Graduate level CSYE 6200 Minimum Grade of B or Graduate level DAMG 6105 Minimum Grade of B or Graduate level DAMG 6210 Minimum Grade of B or Graduate level INFO 5100 Minimum Grade of B or Graduate level INFO 6210 Minimum Grade of B

Course Description

Businesses are capitalizing on the opportunities that big data and social media offer. As a result, there is a growing need for a more purposeful approach to data and analytics. In this new data-driven world, where organizations emphasize purposeful data and analytics strategies, students will learn how to design, manage, and execute data-driven projects, as well as understand Big Data technology and architecture.

Course Learning Outcomes

This graduate-level course on creating and managing a data-driven enterprise is designed for current IT technical professionals, data scientists, technical project managers, and aspiring IT professionals and managers. It aims to provide a comprehensive understanding of the complex nature of creating and managing data-driven projects to support both new and legacy data environments.

We will conduct an in-depth exploration of what it means to identify, create, and manage data-driven projects, with the goal of enhancing the organization's data capabilities. The key learning objectives include:

1. Mastering Data-Driven Project Management: Students will gain an understanding of the complexities involved in identifying, creating, and managing data-driven projects to enhance organizational capabilities.
2. Proficiency in Big Data Technology and Architecture: Students will demonstrate proficiency in big data technology and architecture, understanding the intricacies of big data paradigms, data architecture lifecycles, and the basic attributes of big data.

Through lectures, discussions, and lab work, you will gain a deep understanding of the importance of data to an organization. You will learn how to analyze and identify high-value data-driven projects and make appropriate recommendations for achieving an organization's target state using big data technology ecosystems. This analysis will serve as input for creating a comprehensive roadmap to achieve the target state, which will include:

- Current and future uses for data
- Consumption methods for data
- Related big data technologies
- Big data architecture
- Data governance overview
- Standards and guidelines
- Information delivery requirements
- Data quality requirements

- Planning and execution of data-driven projects
- Commonalities and differences between big data and traditional data projects
- Data project lifecycle, from data capture to data consumption

Required Tools and Course Textbooks.
The course materials, including student handbooks, handouts, and articles, will be provided. The class will be taught interactively, encouraging student discussion. We will use a portfolio management tool from Velero Technology called Velero Enterprise Transparency (Velero ETP) and demonstrate a metadata management and governance tool called Velero Metadata during the lecture. The in-class labs will help you gain an understanding of the available tools and create inputs for your project. Our time will be divided between lectures, labs, and discussions.

Course Schedule/Topics Covered. Please insert what is applicable for your class using the below table. See sample provided below and adjust according to your schedule

Week	Date	In Class Topic	Assignment Due
1	**01/10**	**Introduction** - Overview of the course syllabus, tools, and expectations Q&A Each Student will introduce themselves and talk about background, experience, and expectation.	
2	**01/17**	Recap from Class 1 **Lecture #1** ○ Enterprise & Data Architecture ○ Introduction to Business and Technology Alignment (BTA) Framework ○ Data Architecture Life Cycle ○ Big Data Paradigm and basic attributes	**Assignment Due Class 3:** **Company Selection -** Instruction for this assignment will be provided in this week's lecture and the template will be attached to the assignment. → Company background & SWOT analysis
3	**01/24**	Student Presentation of their selected company and projects. The presentation time will be pending on the classroom size –5 minutes per student. **Lecture #2** ○ Project Portfolio Management (PPM) – Velero Product overview and business cases for how to use PPM and product demo. ○ Review how Velero ETP products will be used during this semester. ○ What is Risk?	→ **Assignment Due Class 4 –** Identifying 2 data related issues for the assigned company.
4	**01/31**	**Lecture #3** ○ Risk ○ Project Planning	**Assignment Due Class 5 –**

		○ Associated project information, Mandates, Impact, Resource planning, Impact, Cost, Risk Student Presentation of issues/projects – 5-10 minutes per student based on the class size.	Define a vision diagram for each of your projects. **Group Reading:** Bigdata Database due week 6 ***Velero: Access to Velero ETP will be provided to all students.***
5	**02/7**	**Lecture #4** ○ Data Governance & Metadata ○ Building Data Glossary ○ Deploying Metadata ○ Velero Metadata Demo Students will present Vision Diagram for their projects - 5 minutes per student. Students will create their projects in the tool.	**Assignment Due Class 7** – Students should prepare to Complete the following information for their projects: → ROI, Resource Requirements, Impact, SWOT, Cost Prep, Risks Students will be loading their company information into the Velero product.
6	**02/14**	**Lecture #5** ○ Technology Evaluation Process ○ Functional & Non-Functional Requirements Present Bigdata database assignment – 10-15 Minutes based on the class size	→ **Group Reading/Assignment:** Bigdata BI Tools due **Class 8**
7	**02/21**	Student Presentation of their "Individual" Assignment from class 5. 10 minutes per student	→ **Group Reading:** Frameworks due Class 9 → **Assignment Due Class 8:** Project selection analysis. Select a project to proceed to the next deliverable!
8	**02/28**	Present Bigdata Frameworks assignment – 10-15 Minutes based on the class size. **Lecture #5** Big Data Security Challenges	→ **Assignment Due Class 10:** Big Data Languages & Tools
9	**03/7**	Present BI tools 10-15 Minutes **Lab:** Activating Selected Projects Class Discussion Student Handbook-related topics	→ **Assignment Due Class 15:** Individual Project – Project Architecture → **Assignment Due Class 11:** Big Data Management Tools
10	**03/14**	**Lecture #6** Lambda Architecture Distributed file system ○ How it works	→ **Assignment Due Class 12:** Big Data Platforms

		○ Storing master data ○ Vertical partitioning Present Languages & Tools assignment – 5-10 Minutes based on the class size. Class Discussion Student Handbook-related topics	
11	**03/21**	**Lecture #7** Data Characteristics and Challenges Technology Direction - Big Data & IoT Present Management Tools assignment – 5-10 Minutes based on the class size.	Student Presentation Big Data Management Tools
12	**03/28**	**Lecture #8** Big Data Architecture Review Present Big Data Platforms assignment – 5-10 Minutes based on the class size.	Student Presentation Big Data Platforms
13	**04/04**	**Lecture #9 –** Big Data Resource Management and Security	
14	**04/11**	**Lecture #10** – Big Data Database review ○ NOSQL/Schema-Freed Database ○ Database Types ○ Database Usage ○ Database Security ○ Database Challenges ○ Selection	
15	**04/18**	**Final Project Due 12/18**	

Assignment Grading

- Attendance – 10 %
- Individual Assignments:
  - Assignment 1 – 2.5%
  - Assignment 2 – 2.5%
  - Assignment 3 – 5%
  - Assignment 4 – 12.5%
  - Assignment 5 – 5%
  - Final Term – 45%
- Group Assignments:
  - Assignment 1 /BI – 5%
  - Assignment 2 /Frameworks – 2.5%
  - Assignment 3/Databases – 2.5%
  - Assignment 4/Language & Tools – 2.5%
  - Assignment 5/ Mgmt & Monitoring – 2.5%
  - Assignment 6/ Service Providers – 2.5%

Grading Scale

	87-89.9% B+	77-79.9% C+	
95-100% A	84-86.9% B	74-76.9% C	
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_cTlAbH7ZRaaw0Ki

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*.