DAMG 7250: Big Data Architecture and Governance
Fall 2025

Course Information
Course Title: **Big Data Architecture and Portfolio Governance**
Course Number:DAMG7250 – BOS 01, online 02
Term and Year: Fall 2025
Credit Hour: 4SH
CRN: 17602 & 17603
Course Format: *Boston In-person:(F 1:35pm-4:55pm Hurting Hall 310) + (W 600pm-9:30pm Online)*

Instructor Information
Full Name: Kam Heydari
Email Address: k.heydari@northeaster.edu
Office Hours: Monday 6:30PM

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, Big Data Architecture and Governance and Adv Data Management & Governance.

Teaching Assistant Information
Full Name: TBD
Email Address:TBD
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 increasingly capitalizing on the opportunities presented by big data and social media. This trend has created a growing demand for purposeful, strategic approaches to data and analytics. In today's data-driven landscape, where organizations prioritize informed, analytics-based decision-making, students will learn how to design, manage, and execute data-driven projects. They will also develop a foundational understanding of Big Data technologies and architectural frameworks.

Course Learning Outcomes

1. **Mastering Data-Driven Project Management:**
   Students will critically evaluate and manage data-driven initiatives by identifying strategic opportunities, formulating project frameworks, and overseeing execution to advance organizational goals and data capabilities.
2. **Demonstrating Proficiency in Big Data Technologies and Architectures:**
   Students will demonstrate advanced proficiency in big data technologies and architectural design. They will analyze and apply big data paradigms, lifecycle methodologies, and architectural patterns to solve complex data challenges.
3. **Advancing Data Governance and Security Practices:**
   Students will design and implement robust data governance strategies to ensure data quality, compliance, and security within large-scale data ecosystems. They will develop and manage data glossaries, deploy metadata frameworks, and address emerging security and ethical concerns in big data environments.

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 input for your project. Our time will be divided between lectures, labs, and discussions.

Course Schedule/Topics Covered.

Week	Date	In Class Topic	Assignment Due
1	09/03 09/05	**Introduction** - Overview of the course syllabus, tools, and expectations - Q&A - Each Student will introduce themselves and talk about background, experience, and expectation.	
2	09/10 09/12	- 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	Instructions for this assignment will be provided in this week's lecture, and the template will be attached to the assignment. → We will use AI to assist with the assignments
3	09/17 09/19	**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.	**Assignment Due in week 4** **Use AI to:** → Gather information on assigned companies → Define SWOT Analysis → Identifying 2 data related issues for the assigned company.
4	09/24 09/26	**Lecture #3** - Risk - Portfolio Planning - Project Planning - Associated project information, Mandates, Impact, Resource planning, Impact, Cost, Risk - Student Presentation/Discussion of issues/projects – 5 minutes per student	**Assignment Due Week 5** – → Define a vision diagram for each of your projects. **Reading:** BI Tools 🖉 QUIZ 1: Test Prep week 6 *Velero: Access to Velero ETP will be provided to all students.*
5	10/01 10/03	**Lecture #4** **Introduction to Data Governance** - Data Governance & Metadata - Building Data Glossary - Deploying Metadata - Velero Metadata Demo - Data Governance Principles - Students will present a Vision Diagram for their projects - 5 minutes per student. - Students will create their projects in the tool.	**Assignment Due Week 6** – Students should prepare to complete the following information for their projects: → ROI → Resource Requirements → Solution Impact → Related SWOT → Cost Prep → Project Risks

Week	Date	In Class Topic	Assignment Due
			Assignment Due Week 8 – → Write Data governance principle for your selected organization
6	10/08 10/10	🗒 **Lecture #5** ○ Technology Evaluation Process ○ Functional & Non-Functional Requirements ✏ **Quiz 1:** BI Tools	**Reading:** Big data Framework → **QUIZ 2**: Test Prep week 8 **Assignment Due Week 7:** → Students will be loading their company information into the Velero product.
7	10/15 10/17	⌨ Student Presentation of their "Individual" Assignment from week 5. → 5-7 minutes per student	**Reading:** BD Databases → **Quiz 3**: Test prep week 9 **Assignment Due Week 8:** → Project selection analysis. Select a project to proceed to the next delivery!
8	10/22 10/24	🗒 **Lecture #6** 🗒 Lambda Architecture 🗒 Distributed file system ○ How it works ○ Storing master data ○ Vertical partitioning ✏ **Quiz 2:** Big data Frameworks	**Reading:** BD Languages & Tools → **Quiz 4**: Test prep week 10
9	10/29 10/31	🗒 **Lecture #7** ▪ *A Comprehensive Guide to Modern Database Systems* ▪ *Understanding NoSQL, NewSQL, Multi-Model, and In-Memory Databases* 🗒 **Lab:** Activating Selected Projects ✏ **Quiz 3:** Big data Databases 👤 Class Discussion Student Handbook-related topics	**Reading: BD** Management Tools → **Quiz 5**: Test prep week 11 **Assignment Due Class 11:** Individual Project – Project Functional & Non-Functional Requirements
10	11/05 11/07	🗒 **Lecture #8** ○ **Big Data Architecture Review** ▪ Architecture Layers ▪ Architecture Process ▪ Data Collection Challenges ▪ Scalability	→ **Assignment Due Class 12:** Big Data Platforms **Assignment Due Class 15:** Individual Project – Project Architecture

Week	Date	In Class Topic	Assignment Due
		▪ Structure vs non-structure data 🖊 **Quiz 4**: Languages & Tools 👤 Class Discussion Student Handbook-related topics	
11	11/12 11/14	🎬 **Lecture #9** ▪ Big Data Resource Management and Security 🎬 **Quiz 4**: Languages & Tools 🎬	Student Presentation Big Data Management Tools
12	11/19 11/21	📋 **Lecture #10** ▪ Data Characteristics and Challenges ▪ Technology Direction - Big Data & IoT 📋 Present Big Data Platforms assignment – 5-10 Minutes based on the class size.	Student Presentation Big Data Platforms
13	11/26 11/28	📋 **Lecture #11 –** 📋 **Review Big Data Architecure**	
14	12/03 12/05	📋 **Review big data architecture contents**	
15	12/10 12/12	📋 **Final Project Due two days prior to the final day.**	

Assignment Grading
- Attendance & Participation – 10 % (only for students with 100% attendance – missing a class = 5% deduction)
- Individual Assignments:
    - Assignment 1 – 2.5%
    - Assignment 2 – 5%
    - Assignment 3 – 5%
    - Assignment 4 – 10%
    - Assignment 5 – 5%
    - Assignment 6 – 5%
    - Assignment 7 – 10%
    - Final Term – 15%
- Quizzes:
    - Quiz 1 /BI – 5%
    - Quiz 2/ Frameworks – 7.5%
    - Quiz 3 / Databases – 7.5%
    - Quiz 4 /Language & Tools – 5%
    - Quiz 5 / Mgmt. & Monitoring – 5%
    - Assignment 6/ Service Providers – 2.5%

Grading Scale

Percentage Range	Letter Grade	Grade Point Equivalent
95.0–100.0%	A	4.000
90.0–94.9%	A-	3.667
87.0–89.9%	B+	3.333
84.0–86.9%	B	3.000
80.0–83.9%	B-	2.667
77.0–79.9%	C+	2.333
74.0–76.9%	C	2.000
70.0–73.9%	C-	1.667
69.9% and Below	F	0.000

Incomplete Grades

An incomplete grade may be reported by the instructor when a student has failed to complete a major component of a required course, such as homework, a quiz or final examination, a term paper, or a laboratory project. Students may make up an incomplete grade by satisfying the requirements of the instructor. Be aware that instructors' policies on the granting of incomplete grades may vary and that the final decision on an incomplete grade is up to the instructor. **Instructors may deny requests for an incomplete grade.** If the missing assignment(s) have not been submitted to the instructor within 30 days from the end of the term in which the course was offered, or the agreed upon due date, the grade

entered will reflect the student's grade in the course for the work completed and the missing assignments receiving no credit toward the final grade.

Attendance/Late Work Policy
Attendance Policy

In each term, students enrolled in on-ground sections are expected to be on campus and attending class beginning with the first day of classes. Students in online sections are expected to log in and participate in class beginning with the first day of classes.

Students who join a class after the first day of class during the university fall semester, or who are approved for late registration by the instructor and the Graduate School of Engineering, are responsible for all coursework missed prior to enrolling. In the interest of students' success, the college does not support the arrival of students to class after September 3rd. **Enrolled students who do not attend class during the first week of a semester risk being dropped from the course.**

In cases where an enrolled student cannot arrive to campus by the first day of class due to circumstances beyond their control, it is the student's responsibility to contact the instructor for approval and notify the Graduate School of Engineering.

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 'F' for that course. Course instructors are not expected to make accommodations and students are expected to inform their instructors of any absences in advance of the class. 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 and accommodations in accordance with the University's academic and global entry expectations. Students may be asked to share communications about class absences with their Academic Advisor. 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-gradadvising@northeastern.edu) to learn more about the Medical Leave of Absence. 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.

Course Evaluations
Student feedback on their learning experience is valuable and helps improve future courses. We encourage all students to complete the course evaluation surveys when they become available.

Surveys are distributed at both the midterm mark and the end of the term via email and are completely anonymous and confidential. Any questions about the surveys can be directed to mgen-programs@coe.northeastern.edu

MGEN Student Feedback

Students who would like to provide the MGEN unit with <u>anonymous</u> 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

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.

The following is a broad overview, but not an all-encompassing definition, of what constitutes a violation of academic integrity:

*Cheating***:** The University defines cheating as using or attempting to use unauthorized materials, information, or study aids in any academic exercise. When completing any academic assignment, a student shall rely on their own mastery of the subject.

*Fabrication***:** The University defines fabrication as falsification, misrepresentation, or invention of any information, data, or citation in an academic exercise.

*Plagiarism***:** The University defines plagiarism as using as one's own the words, ideas, data, code, or other original academic material of another without providing proper citation or attribution. Plagiarism can apply to any assignment, either final or drafted copies, and it can occur either accidentally or deliberately. Claiming that one has "forgotten" to document ideas or material taken from another source does not exempt one from plagiarizing.

Unauthorized Collaboration: The University defines unauthorized collaboration as instances when students submit individual academic works that are substantially similar to one another. While several students may have the same source material, any analysis, interpretation, or reporting of data required by an assignment must be each individual's independent work unless the instructor has explicitly granted permission for group work.

Participation in Academically Dishonest Activities: The University defines participation in academically dishonest activities as any action taken by a student with the intention of gaining an unfair advantage over other students.

Facilitating Academic Dishonesty: The University defines facilitating academic dishonesty as intentionally or knowingly helping or contributing to the violation of any provision of this policy.

Please visit https://osccr.sites.northeastern.edu/academic-integrity-policy/ to access the full academic integrity policy.

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/Disability Access Services (DAS)
Northeastern University and the Disability Access Services (DAS) 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, students must provide appropriate documentation as provided by the DAS office.

If the course is conducted in an on-ground (in-person) format, students are expected to attend class physically as scheduled. Professors are **not required to provide virtual attendance links** unless a student has documented accommodation approved by the **Disability Access Services (DAS) office** and their **Academic Advisor**. If a student requires accommodation for remote participation, they must submit a formal request through the **Disability Office** and coordinate with their **Academic Advisor** prior to the course start date.

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

Office of Global Services
As an F-1, J-1, or Study Permit student, you must meet certain obligations in order to maintain lawful nonimmigrant status. Maintaining status is necessary in order to retain eligibility for the benefits of F-1 or J-1 status, such as employment authorization and program extension, and can be crucial to a successful application for a change or adjustment of nonimmigrant status in the future. Failure to maintain your nonimmigrant status can result in serious problems with immigration and *could lead to deportation from the U.S. or Canada.*

Students must maintain on-ground presence throughout the academic term. At Northeastern, there are four different defined instructional methods: Traditional, Hybrid, Live Cast, and Online. Traditional, Hybrid, and Live Cast courses meet the Visas' on-ground presence requirements. **Online courses do not meet the Visas' on-ground presence requirements.**

Students enrolled in Summer courses should adhere to <u>OGS guidelines on maintaining status during the Summer term</u>.

For more information please visit, <u>https://international.northeastern.edu/ogs/current-students/understanding-visa-requirements/guidelines-on-maintaining-status/</u>

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 <u>https://library.northeastern.edu</u>
Network Campus Library Services: <u>Northeastern University Library Global Campus Portals</u>

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

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

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

Outreach, Engagement, Belonging

Northeastern University is committed to fostering a community of belonging, which is essential to the advancement of Northeastern University's mission of teaching and research. Our university is stronger as a result of the varied backgrounds, experiences, and perspectives that all members of our global community bring to the pursuit of knowledge. Embracing this pluralism is not the work of one office, department, or academic unit. It is a shared responsibility that spans disciplines and boundaries. By harnessing the power of our differences, we will continue to light the path to bold new ideas and life-changing discoveries.

It is my intention that students from all backgrounds and perspectives will be well served by this course, and that the diverse experiences that students bring to this class will be viewed as an asset. I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, socioeconomic background, family education level, ability – and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming and belonging environment for every other member of the class. Your suggestions are encouraged and appreciated.

Please visit <u>Belonging at Northeastern – Northeastern Provost</u> for complete information.

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.

The Office for University Equity and Compliance (OUEC) leads Northeastern University's efforts in maintaining compliance with all federal, state, and provincial civil rights laws and prohibits discrimination within any of its programs, activities, and services. Please visit https://ouec.northeastern.edu/ for more information and for the link to file a report.