Northeastern University
College of Engineering

Multidisciplinary Graduate Engineering
Course Syllabus

Course Information
Big Data Architecture and Governance
DAMG7250 - 01
Spring 2024
4 Credit Hour
Location
TBD

Instructor Information
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Technical/Course Materials Requirements

All Class materials will be provided.

Course Description/Prerequisite

Businesses are exploiting the opportunities that big data and social media offer and due to this need, there is a necessity for a more purposeful approach to data and analytics.
In this new data-driven world where organizations are taking a purposeful approach to data and analytics students will learn how to design, manage, and execute data-driven projects and understand Big Data technology and architecture.

Student Learning/Course Outcomes (SLOs)

This graduate-level course on creating and managing a data-driven enterprise will be geared toward current IT technical professionals, data scientists, technical project managers, and aspiring IT professionals and managers who want to understand the complex nature of creating and managing data-driven projects to support the new and legacy data environments.

We will do a deep dive into what it means to identify, create, and manage data-driven projects and create a higher level of data capability for the organization.

Through lectures, discussion, and lab work in this course, you will understand how important data is to the organization. We will understand the analysis that is required to identify high value data-driven projects and make appropriate recommendations for the target state of an organization utilizing big data technology ecosystems. This analysis will be used as input to create a comprehensive roadmap to achieve the target state and will include:

- Current and future uses for data
- Consumption methods for data
- Related Big Data Technologies
- Big Data Architecture
- Data Governance overview
- Standards & Guidelines
- Information delivery requirements
- Data quality requirements
- Planning and execution of a data-driven projects
- Commonality and difference between big data and traditional data projects
- Data project – from data capture to data consumption

We will be using student handbooks, handouts, and articles to teach the class. All these materials will be provided.

The class will be taught interactively, seeking discussion from the students. We will be using a portfolio management tool from Velero Technology called Velero Enterprise Transparency (Velero ETP). A metadata management and governance tool called Velero Metadata will be demonstrated during the lecture. The in-class labs will be used to help you gain an understanding of available tools and to create the inputs to your project. We will divide our time between lectures, labs, and discussions.

Course Pre-requisite/s

We will discuss enterprise architecture and project management 101; although Enterprise Architecture and Project Management classes will be helpful, they are not prerequisites.

for this class. We will focus on the term project which involves the development of a current state & future state architectural assessment and roadmap for a corporate enterprise. For course detailed pre-requisite please refer to the Northeaster course requirements. It is important to meet NEU pre-requisite for this course.

Attendance Policy

During each unit, students are required to complete assigned readings, engage in class discussions or other learning activities, and submit written assignments. It is important to note that there may be a one-week grace period for active participation in ongoing class conversations and learning activities.

However, if a student's participation is delayed beyond one week, they must notify the faculty in advance, and their grades will be adjusted accordingly.

Participation in class discussions is highly valued and will contribute to 10% of the total grade. **Students who miss two or more classes will not receive any points toward their grades**. The

dynamic of class discussion creates significant value for the course, and it is essential for all students to actively participate in these discussions.

Late Work Policy

Students must submit assignments by the deadline in the time zone noted in the syllabus.

Students must communicate with the faculty before the deadline if they anticipate work will be submitted late. Late submission (<3 hours) will result in a 10% reduction in the grade. Work submitted later than 3 hours will not be graded.

Work submitted late without prior communication and authorization from faculty will not be graded.

Grading/Evaluation Standards

Grade Scale

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

Grade Breakdown:

Individual Project: This assignment will test your overall knowledge of Big Data Architecture, Data Governance, and organization skills. This will be worth 50% of your total grade.
Team Projects & Class Assignments: You will be given 8 to 10 weeks to complete your team assignments pending the nature of the assignment. This will be worth 40% of your total grade.
Class Discussion and attendance: 10% of your grade will be allocated to your class participation and attendance.
Course Schedule - The course schedule is subject to change based on the class size.

Class #	Topic / Learning Objectives	Readings / Assignments	Comments
Class 1	◴ **Introduction** - Overview of the course syllabus, tools, and expectations ◴ Q&A ◴ Each Student will introduce themselves and talk about background, experience, and expectation.	Virtual Class	
Class 2	◴ Recap from Class 1 ◴ **Lecture #1** o Enterprise & Data Architecture o Introduction to Business and Technology Alignment (BTA) Framework	**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.	

Class #	Topic / Learning Objectives	Readings / Assignments	Comments
	○ Data Architecture Life Cycle ○ Big Data Paradigm and basic attributes	→ Company background & SWOT analysis	
Class 3	🗒 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.	
Class 4	🕐 **Lecture #3** ○ Risk ○ Project Planning ○ 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.	**Assignment Due Class 5** – 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.***	*A student handbook will be provided for each topic. This handbook will be used for class presentations and the final project.*
Class 5	🕐 **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.	
Class 6	🗒 **Lecture #5** ○ Technology Evaluation Process	→ **Group Reading:** Bigdata Frameworks due **Class 8**	

Class #	Topic / Learning Objectives	Readings / Assignments	Comments
	○ Functional & Non-Functional Requirements Present Bigdata database assignment – 10-15 Minutes based on the class size		
Class 7	Student Presentation of their "Individual" Assignment from class 5. 10 minutes per student	→ **Group Reading:** BI tools due Class 9 → **Assignment Due Class 8:** Project selection analysis. Select a project to proceed to the next deliverable!	
Class 8	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	
Class 9	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	
Class 10	**Lecture #6** Lambda Architecture Distributed file system ○ How it works ○ Storing master data ○ Vertical partitioning Present Languages & Tools assignment – 5-10 Minutes based on the class size. Class Discussion Student Handbook-related topics	→ **Assignment Due Class 12:** Big Data Platforms	

Class #	Topic / Learning Objectives	Readings / Assignments	Comments
Class 11	**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	
Class 12	**Lecture #8** Big Data Architecture Review Present Big Data Platforms assignment – 5-10 Minutes based on the class size.		
Class 13	**Lecture #9 –** Big Data Resource Management and Security		
Class 14	**Lecture #10** – Big Data Database review o NOSQL/Schema-Freed Database o Database Types o Database Usage o Database Security o Database Challenges o Selection Streaming		
Class 15	**Individual Project due**		

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.

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 http://www.northeastern.edu/drc/getting-started-with-the-drc/.

Library Services

The Northeastern University Library is 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 Education specific resources, visit http://subjectguides.lib.neu.edu/edresearch.

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, and transgender students, faculty, and staff.

In case of an emergency, please call 911.

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