



## CIVE 789 Advanced Topics in Civil Engineering – Risk Management Principles and Tools Fall 2026

### Instructors

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### Course Dates and Times

**Lectures:** Fall 2026, days and times TBD

**Location:** TBD, In Person

### Final Assessment

The **final assessment** will follow the University of Alberta timetable for final assessments and will be comprehensive of the materials covered throughout the course.

## Grading

The grading will be done according to the regulations of the University of Alberta

(<http://www.registraroffice.ualberta.ca/Assessment-and-Grading.aspx>).

Assignment #1 (Individual):	5%
Assignment #2a (Team):	10%
Assignment #2b (Team):	15%
Assignment #3 (Team):	10%
Term Paper Presentation (Team):	10%
Final assessment (Team Term Paper):	50%

## Required Text

1. CIV E 789 A Handbook for Becoming a Leader in Safety and Risk Management (provided as a pdf on eclass)

## Additional References (optional)

1. Risk Management Tools for Safety Professionals, Lyon B.K. and G. Popov, 2018 (available from the American Society of Safety Professionals).

## Assignments

Assignments can be submitted through eClass and must be submitted by the due date posted.

## Final Assessment

Students will apply several risk assessment tools to review and critique a loss incident relevant to their graduate studies research work in order to determine applicable RME failings/weaknesses, along with recommendations to eliminate latent causes. The critique will be presented to others in the class, with presentation to be 20 to 30 min in length each, depending on the number of students in the class.

## Student Conduct

According to University Regulations, you are informed that:

Policy about course outlines can be found in Section 23.4(2) of the University Calendar

The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Faculty of Engineering Code of Student Behaviour (posted on eclass) and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.

## Course Info

Additional course information, updates for assignments and other course related communications will be through eclass announcements and/or emails.

### **Learning Outcomes:**

At the end of this course, the student should be able to:

- 1) Explain the purpose and differences between technical safety and occupational safety
- 2) Explain hazard identification and risk assessment procedures and use various methods for hazard identification, risk analysis, risk evaluation, and risk treatment
- 3) Appraise the safety culture of an organization and obtain skills to positively influence the safety culture of an organization towards improving or sustaining safety performance
- 4) Evaluate the benefits and elements of a Risk Management System
- 5) Apply several leadership tools to evaluate workplace conditions and practices and recommend management system improvements
- 6) Describe the different aspects of Inherently Safer Design and Design Safety Reviews
- 7) Appraise numerous risk management tools (Risk Criteria, Risk Matrices, Fault Tree Analysis, Root Cause Analysis, Event Tree Analysis, Bowtie Analysis, What-If Analysis, Semi-Quantitative Risk Assessment, Failure Modes and Effects Analysis)
- 8) Evaluate leading/lagging indicators and recognize the value of leading indicators for safety
- 9) Communicate risks effectively to stakeholders and differentiate between different types of and contexts for communication of risk assessments
- 10) Undertake an incident investigation and perform a root cause or fault tree analysis and bowtie analysis on an industrial loss incident of the student's choosing
- 11) Analyze risk management failures in a number of case studies, such as Boeing 737 Max, Lac Megantic, Hyatt Regency Walkway, Calgary Floods, BP Deepwater Horizon, Mount Polley, etc.
- 12) Develop and present a term paper analyzing a loss incident with respect to RME weaknesses and provide recommendations in order to prevent recurrence of loss incidents