A) Course Title:
ENGG406 Engineering Safety and Risk Management – Methodologies and Tools (ESRM-MT)

B) Welcome to Engineering Safety and Risk Management - Methodologies and Tools:
"As future engineering and business leaders, you will be confronted with a myriad of risks. Your job will be to manage those risks — all of them. If you focus just on financial risk, at best you will limit your success, at worst you will fail miserably. Apply the principles learned in this course and you will be prepared to make risk decisions competently; ignore these principles not only at your own peril but at the peril of the lives and well-being of your co-workers, neighbours, friends, family, and your community."

Adapted from "Vision 2020 Process Safety: The Journey Continues", Center For Chemical Process Safety, An AIChE Technology Alliance, April 2013.

C) Course Description:
ENGG406 explores the methodologies and tools widely practiced in industry. Basic concepts and topics include: risk and consequences of loss incidents; risk review methodologies and tools including hazard and operability (HAZOP), failure modes and effects analysis (FMEA), fire and explosion indices (F&EI), chemical exposure index (CEI), layers of protection analysis (LOPA); hazard identification, risk analysis, risk assessment, loss prevention and control; process safety management; specific occupational health & safety code compliance requirements for professional engineers. Case studies and industrial tour(s) demonstrate the application of specialized tools and methodologies in complex industrial operations across all engineering disciplines. Seminars and team projects develop competencies and proficiencies in applying these specialized tools and methodologies towards proactive risk management. Requires payment of additional student instructional support fees. Refer to the Fees Payment Guide in the University Regulations and Information for Students section of the Calendar.

D) Learning Objectives of this Course:
- To give the students a broad understanding of Engineering Safety and Risk Management and how it is applied using the pro-active risk assessment work process, and a detailed understanding of many tools and methodologies used in Risk Analysis and Risk Assessment, particularly concerning process safety management.
- To show the value of this discipline to industry in today's business environment, as well as demonstrate the importance of this expertise to the students' careers.
- To provide students with knowledge, tools and informed perspectives that will shape their attitudes, set the foundation for establishing a sound set of positive values beneficial to organizations, and give the students a real life view of this subject.
- To learn and work in a team environment. A culture of class discussion is fostered!

E) ENGG406 is specifically about:
- The risk management work process with emphasis on:
  - Assessing process safety risks inherent in any operation or activity and
  - Determining appropriate risk reduction solutions.
- The pro-active risk assessment work process as applied towards process safety.
- Instruction on hazard / risk identification and analysis / assessment tools and methodologies especially as related to industries in chemical, petrochemical, and select mining processes.

F) Assessment of Academic Achievement:

Assignment #1	5%
Assignment #2	None
Quizzes	2.5%
Mid-Term	15%
Team Project	37.5% (progress report = 5%; final technical report = 20%; team self-evaluation = 2.5%; documented presentation = 5%%; live presentation before an industry panel = 5%)
Final Exam	40%
Total:	100%
Penalty	*5% for each seminar NOT attended.*