New York University Tandon School of Engineering  
Department of Civil and Urban Engineering  
CE 8283 Risk Analysis  
Spring 2018  
Professor Andrew J. Bates, PhD

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Course Pre-requisites: Undergraduate degree in related major as approved by Department Head

Course Description: This course investigates the ever-rising importance of risk analysis in engineering and project management. Topics include: risk assessment, analysis, management and communication. Students are exposed to the complexity of real-world corporate and public problems through case investigations.

Additional Information:

The Society for Risk Analysis (http://www.sra.org/index.php) defines risk as the potential for realization of unwanted, adverse consequences to human life, health, property, or the environment; estimation of risk is usually based on the expected value of the conditional probability of the event occurring times the consequence of the event given that it has occurred.

They also define risk analysis as a detailed examination including risk assessment, risk evaluation, and risk management alternatives, performed to understand the nature of unwanted, negative consequences to human life, health, property, or the environment; an analytical process to provide information regarding undesirable events; the process of quantification of the probabilities and expected consequences for identified risks.

Course Prerequisites: undergraduate level Statistics course. If you have not, this will be a very difficult course for you to understand and your likelihood of excelling is low. An understanding of Engineering Economics or Compound Interest equations. There is a significant portion of independent engineering economics / compound interest work.

Course Objectives:

1) Learn…focus on learning and not “getting a grade.”
2) Understand basic risk and probability concepts.
3) Model problems from a variety of engineering and management science methods using computer software.
4) Determine probability distributions of variables from data or model dependencies.
5) Perform basic cost and schedule risk analysis.
6) Apply risk analysis techniques to engineering situations.
Course Structure:
Primarily lecture and Online Discussion / Exercises & Tutorials / Presentations

Readings

Textbooks:
- Risk Analysis in Engineering: Techniques, Tools, and Trends
  Mohammad Modarres
- Schaum’s Engineering Economics
  Jose’ Sepulveda, William Souder, Byron Gottfried

Additional References:
- The Cartoon Guide to Statistics
  Larry Gonick & Woollcott Smith
- Making Hard Decisions (Previous course textbook)
  Robert T. Clemen & Terence Reilly
  Duxbury—Thomson Learning ©2001
  ISBN: 0-534-42199-7
- Probability and Risk Analysis: An Introduction for Engineers
  Igor Rychlik and Jesper Ryden
  Springer
  ISBN: 3-540-24223-6

Required Computer Software: Available in CE Computer Lab RH217
- Mandatory—Primavera Risk Analyzer (free download)
- Optional—Decision Tools Suite (Student purchase)
  http://www.palisade.com/academic/

Recommended Reading:
- “Against the Gods: The Remarkable Story of Risk” Peter Bernstein
  The Wall Street Journal – daily
- “To Engineer is Human, The Role of Failure in Successful Design” Henry Petroski
- “Why Buildings Fall Down” Matthys Levy and Mario Salvadori
- “Why Buildings Stand Up” Matthys Levy and Mario Salvadori

Course requirements:
Course Assessment Plan: The total points for this course are divided roughly according to the percentages below:

- Homework ≈20%
- Eng Econ Exam ≈20%
- Final Essay ≈20%
- Final Project ≈40%

Your grade will be determined by the total accumulation of points divided by the total points possible. I will use the following grades distribution: A, B+, B, C+, C and F (see the Registrar’s letter regarding grade policy).
As your instructor, there are several things that you can expect from me:

− I will be on time & prepared for every class
− The course will be relevant, practical & usable
− I will not return homework assignments
− I will post all solutions
− I will not “give” or negotiate any grades – you will earn your grade

I expect from you this semester:

− I expect you to become co-owners, along with me, of the learning process
− Active participation in class (on line) discussions is required
− Be prepared – Complete all reading assignments prior to class
  ♦ You can expect to spend at least 8-9 hours each week outside of class
− Come to class...on time and prepared
− Attempt all homework assignments – points reduced for incomplete submittal
− Turn in assignments on-time – points reduced by 50% for late submittal -- Why? I post the homework solutions on the NYU Classes webpage electronically following the submission due date

Homework Policy and Procedures

− Do not use any material from students that have previously taken this course
− Individual Effort – Cite when you get help from someone else
  “I copied problem 1.5 from Steve.”
  “Ty showed me how to do the 2nd step in problem 3.4.”
  “Professor Bates explained how to do problem 2.6.”
  ♦ No ‘penalty’ for getting help! – Actually, I expect you to get help!
  ♦ It is more important to attempt each problem, than it is getting the correct answer
  ♦ This is a “paperless” class (almost)
  ♦ Use computer as much as possible – Word, Excel, PowerPoint, @Risk, etc.
  ♦ Solutions will be on the NYU Classes web page
  ♦ Remember, the #1 objective is to LEARN

NYU-Tandon Syllabus Addendum:

My Poly / Polytechnic Community / Policies & Rules / NYU-Poly Syllabus Addendum