

# SYLLABUS

## CE599: Special Topics - *Project Risk Management* Spring 2016

**Location:** KAP 138

**Meetings:** Thursdays, 3:30pm-6:10pm

**Professor:** David B. Ashley                      Telephone: 213.740.0575  
KAP 241    E-mail: [dashley@usc.edu](mailto:dashley@usc.edu)

**Office Hours:** Office hours are available by appointment. The preferred day and time for appointments is Thursday morning, and this time window will be generally available. Other times may be arranged for mutual convenience. Students should contact the instructor at least two days before the desired appointment to confirm meeting times.

**TA:** N/A

**Text/Materials:** A selection of required readings will be made available on the *Blackboard* course management system. The readings will include material on decision analysis, fault-tree analysis and risk communication. Example risk management program manuals from public agencies will also be available. Students will be expected to obtain academic versions of the DecisionTool Suite™ software from Palisade Corporation (\$50, downloaded directly from the company site). An appropriate textbook has not yet been identified

**Prerequisite:** Graduate student standing required unless otherwise agreed upon by instructor. Students are expected to have a basic understanding of probability and/or statistics.

**Course Description:** *Project Risk Management* is an advanced-level, graduate course designed especially for civil, environmental and construction students. Other disciplines involved in creating the built environment (e.g., architecture, urban planning, infrastructure-related engineering disciplines) or technology-based management (e.g., business, research and development) are welcome. The focus will be on identifying and managing risks at the project level – the project could be a major architectural-engineering-construction (AEC) project, a civil-infrastructure project, or even development of a new/innovative technology. A variety of risk analysis concepts, tools and methodologies will be utilized. One major project and four exercises will be prepared and presented by student groups. A single, mid-term exam will also be given to assess each student's understanding of basic risk analysis concepts and methodologies.

Modern, engineering-driven projects are often large, complex and risky. With a special emphasis on built facilities and infrastructure projects, this course develops tools and methodologies appropriate for decision making under uncertainty. The initial project delivery strategy (i.e., role of participants, type of contracting, distribution of risks), for example,

requires the project sponsor/owner to understand and identify the risks, consider alternate contracting options, and develop contingencies. Risk identification and decision-theory tools are used to help select a best strategy and to manage risks throughout the project. The current state-of-the-practice approaches are also included.

**Course Objectives:** *Project Risk Management* is a graduate course on an advanced topic. Lectures cover both the theory and application of decision theory to project management. The overall goal of the course assignments is to promote application of the basic decision analysis tools to real project situations.

The primary course learning objectives are for the student to have:

- A broad knowledge of risk concepts, principles and terminology;
- A good comprehension of how major project risks are identified and assessed;
- An understanding of specific risk analysis methodologies and the ability to apply them in practice; and
- An up-to-date knowledge of risk management best practices in the AEC industry.

**Assignments:** Students will be responsible for preparing and submitting assignments as follows:

- Four group exercises will be used to reinforce the basic concepts, methodologies and current practices. The expected assignments may include:
  - ✧ *Influence diagram* for a major project or decision,
  - ✧ *Fault-tree* and *fishbone* analyses of a system that may fail,
  - ✧ *Risk communication* review and evaluation,
  - ✧ Review of the *CalTrans Risk Management Program* and development of a *Risk Management Plan* for an example project.
- Group term project – Students will work in small groups on a semester-long risk analysis/management project. The project will be defined and secured by the students. It should be a real (or “realistic”) project involving a major capital project (or engineering-driven business) decision involving significant uncertainty. The decision(s) should be prospective (looking forward) and represent a strategic action to be taken. Examples of reasonable decisions include building an extension to a light-rail transit line, adding floors to an existing campus building, developing a desalination facility on the coast of California, or creating a new solar-energy collection facility in the California desert. Each group will make a mid-term and a final presentation of its project, and will produce a final, professional report.
- Mid-term exam - The mid-term exam will test each student on fundamental probability and decision theory concepts, as well as his/her ability to apply those concepts to example problems.

**Presentation/Session Schedule (Proposed):**

| Week | Date | Topic  | Comments and Preparation                             |
|------|------|--|--|
| 1    | 1/14 | Course introduction, probability and decision-analysis basics                            |  |
| 2    | 1/21 | Risk analysis methodology concepts and application                                       |  |
| 3    | 1/28 | Risk analysis methodology application and extensions                                     | Exercise #1 due                                      |
| 4    | 2/4  | Other modeling approaches (including fault trees and fishbone diagrams)                  |  |
| 5    | 2/11 | Risk software ( <i>@Risk</i> )   | Exercise #2 due                                      |
| 6    | 2/18 | Risk communication   |  |
| 7    | 2/25 | <i>Mid-term Exam</i>   |  |
| 8    | 3/3  | Forensic risk management and expert witness role   | Exercise #3 due                                      |
| 9    | 3/10 | Group presentations & PMI Book of Knowledge – Risk Management                            | Mid-term, in-class presentation of group project due |
| 10   | 3/24 | Risk registers, risk charters and risk management plans                                  |  |
| 11   | 3/31 | Engineering contracts and project execution strategies                                   | Exercise #4 due                                      |
| 12   | 4/7  | Risk planning and management case studies (including the Panama Canal Expansion Program) |  |
| 13   | 4/14 | Management of risk in the AEC industry – extensions of the risk concepts                 |  |
| 14   | 4/21 | Management of risk in the AEC industry   |  |
| 15   | 4/28 | Group presentations & Course wrap-up   | Final, in-class presentation of group project due    |
|      | TBD  |  | Group project final report due                       |

**Grading:** Grade components will be weighted as follows in the computation of the final course grade:

|                                 |             |
|---------------------------------|-------------|
| Group Exercises (4 at 10% each) | 40%         |
| Group Term Project              | 50%         |
| Mid-term Quiz                   | 10%         |
| <b>TOTAL</b>                    | <b>100%</b> |

**Course Policies:**

Quizzes -- There will be **NO** final exam. Each student is expected to take the mid-term exam on the date scheduled; any deviation from this timing must be approved by the instructor in advance.

Course Project -- The term-long project is the most important deliverable for the course and must include the two scheduled in-class presentations. Each student in a group will receive the same grade based on the assessment of the final project report and two presentations. It is the responsibility of the groups to manage their own interactions and individual participation.

Class Participation and Attendance -- It is important that you are familiar with the course materials as the course evolves; regular attendance is expected. Each student is responsible for all materials and administrative instructions given during the lecture period.

Assignment and project submittals -- ALL assignment submittals will be made electronically directly in the *Blackboard* course management system. Each assignment/group project item due will have a corresponding "Assignment" in the *Blackboard* system; this is the only mechanism for accepting the submittals. The system automatically identifies items submitted late and any late items are subject to grade reductions.

Personal Problems -- If you have illness or personal problems that will affect your performance during the course of the semester, please let the instructor know as soon as possible. "After the fact" notification is unacceptable unless there are extreme circumstances.

Statement for Return of Course Assignments and Materials -- All assignments are to be submitted electronically in *Blackboard* and all "returned" materials and evaluation information will be available only through this system. The mid-term exam will be graded and then scanned into the *Blackboard* system -- no physical copies will be returned to the student.

**Statement on Academic Conduct:**

Plagiarism -- presenting someone else's ideas as your own, either verbatim or recast in your own words -- is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Section 11, *Behavior Violating University Standards* <https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* <http://equity.usc.edu> or to the *Department of Public Safety* <http://adminopsnet.usc.edu/department/department-public-safety>. This is important for the safety of the whole USC community. Another member of the university

community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage <http://sarc.usc.edu> describes reporting options and other resources.

**Statement on Support Systems:**

A number of USC's schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* [http://sait.usc.edu/academicsupport/centerprograms/dsp/home\\_index.html](http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html) provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* <http://emergency.usc.edu> will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.