



THE OHIO STATE UNIVERSITY

JOHN GLENN COLLEGE OF PUBLIC AFFAIRS

Risk & Decision Analysis

Summer 2020 Online

Public Affairs 5770 (3 Credit Hours)

Professor

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Office Hours

Thursdays 4-5PM

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Course Description:

Today, more than ever, managers are required to make decisions in turbulent and uncertain environments. Intended for advanced undergraduates and graduate students, this course will provide a comprehensive assessment of theories and tools for decision-making in the face of risk and uncertainty. It will provide a rigorous treatment of current issues and approaches in risk analysis through both qualitative and quantitative lenses. The methodological focus of the course will be on analytical approaches and modeling methodologies to improve and enhance decision-making in the face of uncertainty. While the course focuses on issues of relevance to the public and non-profit sectors, the tools, theories and approaches learned are widely applicable to other applications and sectors. This course builds upon students' prior academic preparation in case study analysis, statistics or econometrics, and data analysis using software packages.

Course Objectives:

Upon successful completion of the course, students will have gained a basic understanding of core concepts, methods and theories in risk and decision analysis. Students who successfully complete the course should be able to:

- Identify core issues and biases inherent to the decision-making process
- Formulate objectives and outcomes in analyzing risk
- Effectively chart decisions with uncertainties using tools such as decision trees
- Model uncertainty using Monte Carlo approaches and other techniques, interpret modeling results, and perform sensitivity analysis
- Critically evaluate and make arguments involving risk and uncertainty
- Apply the basic concepts learned in the class to other courses taken in the student's field(s) of study and/or their career.

Course Format:

This is an online course in the Glenn College. The class website will be provided via Ohio State University's Carmen system, at <https://carmen.osu.edu/>. Three synchronous sessions will be provided in the course; dates provided in the course schedule. Video and audio recordings of class lectures will be part of the classroom activity. The video

and audio recording is used for educational use/purposes and may be made available to all students presently enrolled in the course.

The course is designed as a series of six blocks, or units. Each block consists of approximately two weeks of materials and student deliverables that focus on a general learning theme in risk and decision analysis. These blocks are intended to integrate theory, methods, application case and software tools. In this way, students should gain the skillset to both understand the issues and concepts and also be able to develop an approach to measure, analyze or simulate the risk environment to make more informed decisions.

Each block or unit is broken down into four separate components that align with each of the four integrated items (i.e., theory, methods, case and software tool). First, each block begins with a lecture and accompanying readings that introduces the theory and provides the terminology and the conceptual framework for the learning theme of the block. Second, each block includes a primer that provides the theoretical background for the empirical tools that will be utilized in that block. These will include primers on probability theory and statistics, etc. Third, each block includes a case study analysis in which students will be guided through the application of a case that applies to the learning theme. And fourth, each block will include a lab component in which the software and analytical approach will be developed and integrated with the case and theoretical concepts developed earlier in the block. The themes of the blocks are: 1) Elements of Decisions; 2) Structuring Decisions; 3) Organizational Decision-making; 4) Expert Elicitation and Subjective Probabilities; 5) Risk Attitudes & Heuristics, and 6) Multi-attribute Models. The lessons and concepts learned will build upon each other and will extend beyond the individual theme or block in which they are introduced.

Deliverables from each of the six blocks will constitute the core evaluative portion of the course. These deliverables will be analyses written up in the form of professional policy briefs, and written to a specific client to advise them on decision-making in the given risk environment or case. These briefs will be approximately five double spaced pages each, and will require integration of theory, tools, methods and software in order to successfully inform the decision-maker. In this way, students will also gain additional exposure to, and practice with, professional writing in an applied context. Grading rubrics will be provided with each bi-weekly policy brief. Students are permitted to work with a partner on briefs, and students can also work individually if they so choose. Note, students who choose to work with partners will receive one grade for a co-authored submission.

Students will also be required to submit a Risk Case Assessment response for each case application within each module. These responses will be discussion board posts of approximately 100-300 words, to be shared with the class (or group depending on class size) and your professor and TA(s). These responses will require a depth of review of the case context readings assigned and a thoughtful assessment of the risk(s) and uncertainty involved in a given case and policy application. The intent behind these responses is for students to think critically about the risk context or case before they conduct an analysis and write a policy brief in that policy domain.

Students will also be required to submit a Debriefing response narrative at the close of each Block. These are discussion board posts of approximately 100-300 words in which students will be asked to reflect on the past module and concisely apply the materials and learning outcomes of the past block to the skillsets needed in their chosen profession, vocation or field of study.

Students will also have the opportunity to earn extra credit on a case assessment response narrative by providing a meaningful response to another student or students' posts (maximum 2 points). Oftentimes a third-party viewpoint offers insightful intellectual diversity and perspective on a given risk context that one might not consider on their own (e.g., a sociologist might offer unique insights on economic risk). Students will have two additional days (maximum) to offer a response to posted narratives—although they can offer their insights at any point—to gain extra credit.

Both the Debriefing response narrative and the Risk Case Assessment response narrative will be graded course components, with an accompanying grading rubric posted on the course website. Late response narratives will not be accepted beyond 11:59PM on the date on which they are due. Response narrative submission prior to the deadline is encouraged, to allow other students ample time to review and respond, if they should have insightful responses to post.

On the very first week of the course, students will be given a Decision Diagnostic (Day #1 Diagnostic). On the diagnostic, students will be asked to respond to three open-ended questions to assess baseline knowledge (coming into the class) of three content areas relevant to the course. These will only be shared with your professor and you will be asked to reflect on these in your final Debriefing response narrative at the end of the semester.

At the very end of the course (due on the last day) students will be asked to revisit their original day 1 diagnostic and provide in which they reflect on what they identified on that diagnostic on the first day (coming into the class) and provide updates based on what they learned over the time of the course. The Final Day Decision Diagnostic will be due by 11:59PM on the day indicated in the course schedule.

Software and PC Requirement:

The software modules of the course will require the use of the Palisades software suite (e.g., @Risk). Although the full version of the software is quite costly, a powerful trial-basis version sufficient for completing the course accompanies purchase of the course textbook.

IMPORTANT NOTE: the software only runs on a Windows PC (i.e., Mac, Windows emulators, Linux or Wine in Linux will not work). The student is responsible for creating a student account on the publisher's website, downloading the software and installing it on a computer that they have access to, and with suitable administrative rights required for installing software. Students who do not have access to the Palisades suite of software will not be able to meaningfully complete the lab assignments. Administrative rights will also be required for the sixth block lab, in which students will be writing their own code in Visual Basic for Applications (VBA) in Excel to develop their own risk analysis simulation.

Additionally, the course makes extensive use of the Palisades suite of software within MS Excel. Students will be required to have access to a working version of Excel that supports add-ins. Students will need to access the VBA development add-in that is built into Excel for the last Block of the class. Students are encouraged to verify that the Palisades suite and VBA add-ins are functional on their computer prior to starting the class. Some instructions and resources will be provided in a pre-course module on the class website to provide additional support/assistance.

Finally, students will need component hardware necessary for engaging in the synchronous sessions for video and audio (i.e., a webcam and microphone).

Course Texts:

- Clemen, Robert T. and Terence Reilly. 2014. *Making Hard Decisions: With Decision Tools*. 3rd Edition. Mason, Ohio: South-Western Cengage Learning Press. ISBN-13: 978-0-538-79757-3.
- Birnbaum, Duane and Vine, Michael. 2007. *Microsoft Excel VBA Programming for the Absolute Beginner*. 3rd, Ed. Thompson Cengage Learning Press. ISBN-13: 978-1598633948. Note: this text is used only for the sixth block in the course (i.e., end of the semester). At the date of the drafting of this syllabus, there were numerous used copies of this book available on third-party online vendor sites for approximately five dollars.

Other readings provided will be provided on the course website.

Higher Education Opportunity Act (HEOA) Statement:

Students can access textbook information via the Barnes & Noble bookstore website: www.shopOhioState.com as well as from their Buckeye Link Student Center. This information is disseminated by B&N to all area bookstores. You may buy from a store of your choice and/or shop for books (always use ISBN# for searches) on line.

Course Requirements, Grading and Evaluation:

Student course grades will be based upon performance on graded assignments. Final course grades will be based upon the following point scale:

<i>Assignment</i>	<i>Points</i>
Risk & Decision Analysis Policy Briefs (1-6)	50 pts (each) 300 pts (total)
Risk Case Assessment Response Narratives (1-5)	10 pts (each) 50 pts (total)
Debriefing Response Narratives (1-6)	5 pts (each) 30 pts (total)
Day 1 Decision Diagnostic	10 pts
Final Day Decision Diagnostic	10 pts
TOTAL	400 Points

The following letter grade scale will be applied for purposes of providing the final semester grade:

Points	Percentage	Grade	Points	Percentage	Grade
372	93	A			
360	90	A-	292	73	C
348	87	B+	280	70	C-
332	83	B	268	67	D+
320	80	B-	240	60	D
308	77	C+			E

The professor may also offer extra credit opportunities, not listed. These may include participation in a learning activity outside of class such as an experiment or another enrichment activity, or meaningful ad hoc responses to another student's response narrative as identified above.

Policy on Grading Disputes:

Your professor understands that grading errors, mistakes, and omissions can occur. To facilitate an orderly and respectful process for the settlement of grading disputes, students must notify the professor of the dispute in writing within one week of the returned assignment. The preferred method for submitting grading disputes is electronic mail (email address provided above). The written correspondence should detail the reason for the dispute.

Risk & Decision Analysis Policy Brief Submission Protocols:

Policy Briefs are due by midnight (11:59PM EST/EDT) on the due dates listed. You are to submit them electronically using Carmen assignment with your brief as an attachment (drop it in the submission file). Briefs will be accepted late, up to 1 week late, for extenuating circumstances. Late briefs will receive a 50 percent grade reduction (minus 25 points).

Class Policy on Collaboration:

As a general matter, your professor considers collaboration with anyone on a graded assignment to be a violation of the class policy on originality. As mentioned earlier, students are permitted to collaborate with a partner on Risk & Decision Analysis Policy Briefs (one partner person only, for lab assignments/briefs only). Partners who work together will submit one brief and one grade will be assigned. Please do not submit duplicate copies of the brief for each partner—simply indicate the co-authors' names clearly on the brief. Only two students may work together on a brief. You do not need to have the same partner for all briefs – and you can submit some with partners and some solo. Students who collaborate are fully responsible for any errors or omissions in the submitted work. Outside of this partnership on policy briefs, collaboration on assignments and information sharing outside of class constitutes a violation of the policy on originality.

Class Policy on Originality

Plagiarism is defined as the submission of material authored by another person but represented as the student's own work, whether that material is paraphrased or copied in verbatim or near-verbatim form. This includes the improper acknowledgment of sources in essays or papers. Culpability is not diminished when plagiarism occurs in drafts which are not the final version.

The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's [Code of Student Conduct](#), and that all students will complete all academic and scholarly assignments with fairness and honesty. Failure to follow the rules and guidelines established in the University's Code of Student Conduct may constitute "Academic Misconduct." Sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

Originality means that the student is the sole author of the work. Thoughts and ideas taken from other sources or from official content are permitted, but this must not constitute the bulk of the student's submission. This means that it is not acceptable for a student to simply submit work completed by another person or institution (such as an online paper purchasing site) and cite it as the source of the work. A student's work must be his/her own. Students are encouraged to see the OSU Code of Student Conduct, Section 3335-23-04 that defines academic misconduct further. Ignorance of the University's Code of Student Conduct is never considered an "excuse" for academic misconduct.

Cases of cheating or academic dishonesty will be promptly reported to the university committee on academic misconduct. They will be handled according to university policy:

http://studentaffairs.osu.edu/resource_csc.asp

Other sources of information on academic misconduct (integrity) to which you can refer include:

The Committee on Academic Misconduct web page: <http://oaa.osu.edu/coam.html>

Ten Suggestions for Preserving Academic Integrity: <http://oaa.osu.edu/coamtensuggestions.html>

Eight Cardinal Rules of Academic Integrity: www.northwestern.edu/uacc/8cards.html

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact your professor.

Disability:

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let your professor know immediately so that you can privately discuss options. To

establish reasonable accommodations, he may request that you register with Student Life Disability Services. After registration, make arrangements with him as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. **SLDS contact information:** slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

Glenn College Diversity Values Statement:

“The Glenn College is committed to nurturing a diverse and inclusive environment for our students, faculty, staff, and guests that celebrates the fundamental value and dignity of everyone by recognizing differences and supporting individuality. We are dedicated to creating a safe space and promoting civil discourse that acknowledges and embraces diverse perspectives on issues and challenges that affect our community.”

Syllabus Revision:

During the course of the semester, your professor will regularly review student progress and may revise the syllabus to meet class needs if necessary. This may result in due dates being extended or adjustments in course content, etc. Students will be given advance notice of any changes that are made to the course.

Course Schedule:

Week	Date	Topic	Readings	Assignments (due)
Block 1				
1	5/13-5/16	<i>Course Welcome, Syllabus and Course Structure, Expectations.</i> <i>Theory- Elements of Decisions</i> <i>Case - Housing/Homelessness Policies</i>	C&R Ch. 1-2 On Carmen	Case Narrative (Due 5/16) Policy Brief #1 & Debrief Narrative (Due 5/23)
2	5/17-5/23	<i>Primer- Statistical/probability theory for risk and decision-making</i> <i>Risk Analysis Lab 1- Statistical and Probability Theory for Decision-Making</i>	C&R Ch. 7	
Block 2				
3	5/24-5/30	<i>Theory- Structuring Decisions</i> <i>Case - Evacuation from Radiological Exposure</i>	C&R Ch. 3 On Carmen	Case Narrative (Due 5/30) Policy Brief #2 & Debrief Narrative (Due 6/6)
4	5/31-6/6	<i>Primer- Decision Trees for Risk and Decision Analysis</i> <i>Risk Analysis Lab 2- Precision Tree©</i>	C&R Ch. 4	
Block 3				
5	6/7-6/13	<i>Theory- Organizational Decision-Making</i> <i>Case - Mercury and Seafood</i>	C&R Ch. 6 On Carmen	Case Narrative (Due 6/13) Policy Brief #3 & Debrief Narrative (Due 6/20)
6	6/14-6/20	<i>Primer- Sensitivity Analysis</i> Sync Session- Tuesday 6/16 8-9:30PM <i>Risk Analysis Lab 3- Precision Tree©</i>	C&R Ch. 5	
Block 4				
7	6/21-6/27	<i>Theory- Expert Elicitation & Subjective Probabilities</i> <i>Case- Infrastructure for Emergency Response (Hurricane Katrina/Sandy)</i>	C&R Ch. 8 On Carmen	Case Narrative (Due 6/27) Policy Brief #4 & Debrief Narrative (Due 7/4)
8	6/28-7/4	<i>Primer- Probability Distributions</i> <i>Risk Analysis Lab 4- Data Analysis with @Risk©</i>	C&R Ch. 9 C&R Ch. 10	
Block 5				
9	7/5-7/11	<i>Theory- Risk Attitudes & Utility</i> <i>Case - Mercury and Seafood (revisited)</i>	C&R Ch. 14-15 On Carmen	No Case Narrative Response Due Policy Brief #5 & Debrief Narrative (Due 7/18)
10	7/12-7/18	<i>Primer- Probability Distributions and Simulation with @Risk</i> Sync Session- Tuesday 7/14 8-9:30PM <i>Risk Analysis Lab 5- Data Analysis with Probability Distributions using @Risk©</i>	C&R Ch. 11	
Block 6				
11	7/19-7/25	<i>Theory- Multi-attribute Models</i> <i>Case - Ecological Restoration</i>	C&R Ch. 16 & 17 On Carmen	Case Narrative (Due 7/25) Policy Brief #6 & Debrief Narrative (Due 7/31)
12	7/26-7/31	<i>Primer- Programming your own simulation using VBA</i> Sync Session- Tuesday 7/28 8-9:30PM <i>Risk Analysis Lab 6- Risk Analysis with Custom-made Software</i>	B&V Ch. 1-4	

Notes: There is no case response memo due for Block #5. Whereas the final due dates of assignments are typically 11:59PM on Saturday evenings (end of the calendar week), the final Block #6 materials are due on 7/31 which is a Friday evening that ends the summer academic term.