Colorado State University GLOBAL CAMPUS

# HLS375: RISK ANALYSIS AND MITIGATION

**Credit Hours**: 3

**Contact Hours:** This is a 3-credit course, offered in accelerated format. This means that 16 weeks of material is covered in 8 weeks. The exact number of hours per week that you can expect to spend on each course will vary based upon the weekly coursework, as well as your study style and preferences. You should plan to spend 14-20 hours per week in each course reading material, interacting on the discussion boards, writing papers, completing projects, and doing research.

**Faculty Information:** Faculty contact information and office hours can be found on the faculty profile page.

## COURSE DESCRIPTION AND OUTCOMES

### Course Description:

This course provides visibility into the threat spectrum including the systematic approaches in identifying critical infrastructures and key resources as a basis for risk acceptance and mitigation. In understanding risk and vulnerability, students learn to address appropriate countermeasures in an objective, quantifiable way.

### Course Overview:

The purpose of this undergraduate course is to provide you with insight into threats and hazards to people and places (e.g., buildings and critical infrastructure facilities) and ways to mitigate those risks. It additionally explores systematic approaches in risk analysis principles, processes, and techniques. In understanding risk analysis concepts, you can apply an all-hazards approach to risk analysis and prioritization. On completion of this course, you should be able to identify threats, hazards, and mitigation strategies. You will additionally be able to conduct a risk assessment and prioritize risks.

### Course Learning Outcomes:

1. Apply risk analysis principles, processes, and techniques.
2. Analyze threats, vulnerabilities, consequences, and critical infrastructures.
3. Differentiate threats including man-made, natural, and technological and categorize impact to critical resources.
4. Analyze principles to an all-hazards approach to risk analysis and infrastructure protection.
5. Describe the purpose of the National Response Framework and illustrate its use.
6. Assess mitigation procedures using risk analysis concepts.

## PARTICIPATION & ATTENDANCE

Prompt and consistent attendance in your online courses is essential for your success at CSU-Global Campus. Failure to verify your attendance within the first 7 days of this course may result in your withdrawal. If for some reason you would like to drop a course, please contact your advisor.

Online classes have deadlines, assignments, and participation requirements just like on-campus classes. Budget your time carefully and keep an open line of communication with your instructor. If you are having technical problems, problems with your assignments, or other problems that are impeding your progress, let your instructor know as soon as possible.

## Course Materials

**Required:**

Norman, T. L. (2016). *Risk analysis and security countermeasures selection* (2nd ed.). Boca Raton, FL: Taylor and Francis Group. ISBN: 9781482244199

***NOTE:*** *All non-textbook required readings and materials necessary to complete assignments, discussions, and/or supplemental or required exercises are provided within the course itself. Please read through each course module carefully.*

## Course Schedule

### Due Dates

The Academic Week at CSU-Global begins on Monday and ends the following Sunday.

- **Discussion Boards:** The original post must be completed by Thursday at 11:59 p.m. MT and Peer Responses posted by Sunday 11:59 p.m. MT. Late posts may not be awarded points.
- **Opening Exercises:** Take the opening exercise before reading each week's content to see which areas you will need to focus on. You may take these exercises as many times as you need. The opening exercises will not affect your final grade.
- **Mastery Exercises:** Students may access and retake mastery exercises through the last day of class until they achieve the scores they desire.
- **Critical Thinking:** Assignments are due Sunday at 11:59 p.m. MT.

## Weekly Reading and Assignment Details

### Module 1

**Readings**

- Chapters 1 & 2 in *Risk Analysis and Security Countermeasures Selection*
- Kasdan, D. (2016). Considering socio-cultural factors of disaster risk management. *Disaster Prevention and Management, 25*(4), 464-477.
- Martin, S. (2015). A framework to understand the relationship between social factors that reduce resilience in cities: Application to the city of Boston. *International Journal of Disaster Risk Reduction, 12*, 53-80.
- Mcdonagh, K., & Heng, Y. (2015). Managing risk, the state and political economy in historical perspective. *International Politics, 52*(4), 408-425.

**Opening Exercise (0 points)**

**Discussion (25 points)**

**Mastery Exercise (10 points)**

## Module 2

**Readings**

- Chapters 3 & 4 *Risk Analysis and Security Countermeasures Selection*
- Fischbacher-Smith, D. (2015). Through a glass darkly: Expertise, evidence, and the management of uncertainty. *Risk Management, 17*(4), 352-372.
- Rechtman, Y. (2017). Shifting the risk of cybercrime. *The CPA Journal, 87*(6), 46.
- Van Staalduinen, M., Khan, F, Gadag, V., & Reniers, G. (2017). Functional quantitative security risk analysis (QSRA) to assist in protecting critical process infrastructure. *Reliability Engineering and System Safety, 157*, 23-34.
- White, R., Burkhart, A., George, R., Boult, T., & Chow, E. (2016). Towards comparable cross-sector risk analyses: A re-examination of the Risk Analysis and Management for Critical Asset Protection (RAMCAP) methodology. *International Journal of Critical Infrastructure Protection, 14*, 28-40.

**Opening Exercise (0 points)**

**Discussion (25 points)**

**Critical Thinking: (75 points)**

Choose one of the following two assignments to complete this week. Do not do both assignments. Identify your assignment choice in the title of your submission.

**Option #1: Hazard Risk (75 points)**

Choose a natural disaster or technological hazard from the list below and use the basic skills of risk analysis to report the details and record the responses from officials responding to the incident.

- Storm surges
- Landslides
- Severe Winter Storms
- Droughts
- Extreme heat
- Avalanche
- Coastal Erosion
- Thunderstorm
- Hailstorms
- Snow Avalanches
- Land Subsidence
- Expansive Soils
- Dam Failures
- Hazardous materials
- Gas line or water main breaks

- Nuclear accidents

Briefly explain the natural disaster or technological hazard you have chosen. Choose an event in history that involved your chosen hazard or disaster. Report the details of the event and the responses taken by city, state and federal government officials.

Your essay should:

- Be 3-4 pages long,
- Cite at least three different credible sources such as peer-reviewed articles, expert blogs, and the textbook, and
- Follow the *CSU-Global Guide to Writing and APA*.

The databases in the CSU Global library should be a good place to find credible sources.

**Option #2: Jurisdictional Selection White Paper Briefing (75 Points)**

Select a jurisdiction, meaning a unit of local government such as a county, town, or city, and search for that jurisdiction's Comprehensive Emergency Management Plan (CEMP) online.

Review and evaluate the plan based on how well it addresses risk and mitigation issues facing that jurisdiction.

Instructions to Students:

Write a two-page jurisdictional selection short essay white paper briefing on the selected jurisdiction and the jurisdictional Comprehensive Emergency Management Plan (CEMP) retrieved online. Review the CEMP and evaluate the plan based on how well it addresses risk and mitigation issues facing that jurisdiction.

In the short essay, provide several paragraphs of analysis and elaboration on the jurisdiction selected and the various components found within that jurisdiction's CEMP.

Include at least one direct quote from the CEMP retrieved in the Jurisdictional Selection Short Essay and enter as an electronic (website) quote used with an appropriate electronic source in text-direct quotation and a proper electronic source reference list citation located at the very end of the analysis briefing.

Please include both in-text citations and a reference list. Both should be in alignment with APA 6th edition citation form and style.

**Mastery Exercise (10 points)**

## Module 3

**Readings**

- Chapters 5 & 6 *Risk Analysis and Security Countermeasures Selection*
- Bergström, J. (2017). An archaeology of societal resilience. *Safety Science*.

- Jain, P., Pasman, H. J., Waldram, S., Pistikopoulos, E. N., & Mannan, M. S. (2017). Process Resilience Analysis Framework (PRAF): A systems approach for improved risk and safety management. *Journal of Loss Prevention in the Process Industries, 7*.
- Laugé, A., Hernantes, J., & Sarriegi, J. M. (2015) Critical infrastructure dependencies: A holistic, dynamic, and quantitative approach. *Internal Journal of Critical Infrastructure Protection, 8*(1), 16-23.

**Opening Exercise (0 points)**

**Discussion (25 points)**

**Mastery Exercise (10 points)**

**Critical Thinking: (95 points)**

Choose one of the following two assignments to complete this week. Do not do both assignments. Identify your assignment choice in the title of your submission.

**Option #1: Critical Infrastructure Assessment (95 points)**

Search online for an *International Case Study* example on critical infrastructure and assess its possible criticalities and consequences. Provide elaboration and analysis on the specific example that you selected this week. Be specific with the nature of the threats and vulnerabilities related to the existing infrastructure. Additionally, please provide real-world examples of what is being done to protect Canada's critical infrastructure.

Your essay should be:

- 3-4 pages long,
- Cite at least three different credible sources such as peer-reviewed articles, expert blogs, and the textbook, and
- Follow the *CSU-Global Guide to Writing and APA*.

The databases in the CSU Global library should be a good place to find credible sources.

**Option #2: Jurisdictional Comprehensive Emergency Management Plan (CEMP) White Paper Briefing (95 Points)**

Search for a local governmental Comprehensive Emergency Management Plan online for a jurisdiction of your choice. Download the CEMP PDF and review the document for issues regarding risk and mitigation. In this process of uncovering their plan's components, look for areas wherein the existing plan could use improvement. For example, does the existing plan that you are reviewing mention Electromagnetic Pulse (EMP) attack? Does the existing plan mention solar flares or other solar events? Does the plan that you are reviewing adequately address the most socially vulnerable populations in our society such as the homeless and very poor? Those are just examples of where most CEMPs can be improved. There are many others.

Instructions to Students:

Write a two (2) page short essay white paper briefing providing constructive criticism of the plan that you selected to review.

Include any glaring deficiencies in the areas of risk and mitigation or ideas for improvement in either the area of risk or the area of mitigation.

Please make an effort to demonstrate thoughtfulness and creativity in your written assignment submissions that are unmistakably indicative of high-level critical thinking skills.

Please include both in-text citations and a reference list. Both should be in alignment with APA 6th edition citation form and style.

**Portfolio Milestone (30 points)**

**Options #1 and #2: Submit a Topic (30 Points)**

This week you will submit a topic for approval

Not submitting a topic and outline in the weeks they are assigned will result in a mark down of 30 points from your overall grade on the Portfolio Project, worth 350 points total.

## Module 4

**Readings**

- Chapter 7 *Risk Analysis and Security Countermeasures Selection*
- Orencio, P., Endo, A., Taniguchi, M., & Fujii, M. (2016). Using thresholds of severity to threats to and the resilience of human systems in measuring human security. *Social Indicators Research, 129*(3), 979-999.
- Powell, J. H., Mustafee, N., Chen, A. S., & Hammond, M. (2016). System-focused risk identification and assessment for disaster preparedness: Dynamic threat analysis. *European Journal of Operational Research, 254*(2), 550-564.
- Young, D., Lopez, J., Rice, M., Ramsey, B., & McTasney, R. (2016). A framework for incorporating insurance in critical infrastructure cyber risk strategies. *International Journal of Critical Infrastructure Protection, 14*, 43-57.

**Opening Exercise (0 points)**

**Discussion (25 points)**

**Mastery Exercise (10 points)**

**Critical Thinking: (100 points)**

Choose one of the following two assignments to complete this week. Do not do both assignments. Identify your assignment choice in the title of your submission.

**Option #1: Threat Analysis (100 points)**

For this assignment, you are to assess a threat of your choice. Address the following items:

1. Identify a potential threat
2. Identify the threat's motivation, capabilities, and history

3. Choose an organization
4. Identify the organization's assets
5. What tactics might the "chosen threat" use against the organization?
6. Will such tactics be effective? Why or why not?

Your essay should:

- Be 3-4 pages long,
- Cite at least three different credible sources such as peer-reviewed articles, expert blogs, and the textbook, and
- Follow the *CSU-Global Guide to Writing and APA*.

The databases in the CSU Global library should be a good place to find credible sources.

Below are steps to effectively assesses threats which will help enhance your analysis.

1. Identify potential threat actors.
2. Identify their motivation, capabilities, and history (in other words, their level of intent, skills, weapons, and tactics and what types of targets they have chosen in the past).
3. Develop a list of the organization's assets and determine which of the weapons and tactics are most likely to be of use in attacking the organization.
   Compare that data to information about the organization's assets to be protected and determine which potential threat actors are likely to be most effective against the organization (Norman, 2009, p. 140).

**Option #2: Electromagnetic Pulse (EMP) Solar Activity or Terrorist Attack PowerPoint Presentation Scenario (100 Points)**

Develop a seven-slide minimum PowerPoint presentation providing explanation and analysis to the question "What is an electromagnetic pulse attack?" Your presentation should address this question through the lens of risk and mitigation. Your presentation should address concepts of risk and mitigation in the context of the threats from both solar activity and / or nuclear aggression on the part of other nations.

Please include a reference list slide at the end of your presentation. Follow the *CSU-Global Guide to Writing and APA*.

## Module 5

**Readings**

- Chapter 8 in *Risk Analysis and Security Countermeasures Selection*
- Argenti, F., Landucci, G., Reniers, G., & Cozzani, V. (2018). Vulnerability assessment of chemical facilities to intentional attacks based on Bayesian network. *Reliability Engineering and System Safety, 169*, 515-530.
- Malczewski, U., & Theis, A. (2017). Incorporate cybersecurity into your PSM Program. *Chemical Engineering Progress, 113*(6), 30-33.
- Naja, M., & Baytiyeh, H. (2016). Risk assessment of high schools in Lebanon for potential terrorist threat. *International Journal of Disaster Resilience in the Built Environment, 7*(5), 460-471.

**Opening Exercise (0 points)**

**Discussion (25 points)**

**Mastery Exercise (10 points)**

**Critical Thinking: (100 points)**

Choose one of the following two assignments to complete this week. Do not do both assignments. Identify your assignment choice in the title of your submission.

**Option #1: Facility Vulnerability and Countermeasures (100 points)**

Chose a facility (business, school, government, etc.) and address the following questions:

- What countermeasures are in place?
- Who (threat) or what (hazard) are the countermeasures designed to deal with?
- Considering the above information, how vulnerable is the facility?

Your essay should:

- Be 3-4 pages long,
- Cite at least three different credible sources such as peer-reviewed articles, expert blogs, and the textbook, and
- Follow the *CSU-Global Guide to Writing and APA*.

The databases in the CSU Global library should be a good place to find credible sources.

**Option #2: United States Infrastructure PowerPoint Presentation (100 Points)**

This week we are discussing the concept of vulnerability. For your assignment, please create a ten-slide PowerPoint presentation on the myriad challenges facing the nation's infrastructure.

Your PowerPoint presentation should address some of the major infrastructure challenges facing the United States today and what is being done about them. As your presentation progresses, please select one specific area of infrastructure interest to drill-down on this week. Examples of specific infrastructure challenges are the hardening of the electrical grid to guard against electromagnetic pulse attack (EMP) or the road and bridge infrastructure that needs repair. Provide specific information on the area that you drill-down on this week.

**Portfolio Milestone (30 points)**

**Options #1 and #2: Submit an Outline (30 Points)**

This week you will submit your outline for the Portfolio project.

Not submitting a topic and outline in the weeks they are assigned will result in a mark down of 30 points from your overall grade on the Portfolio Project, worth 350 points total.

## Module 6

**Readings**

- Chapter 9 in *Risk Analysis and Security Countermeasures Selection*
- Bertrand, D., & Shafer, M. (2017). Defining hazards. *Bulletin of the American Meteorological Society, 98*(4), 659-663.
- Slann, P. A. (2016). Anticipating uncertainty: The security of European critical outer space infrastructures. *Space Policy, 35*(2), 6-14.

**Opening Exercise (0 points)**

**Discussion (25 points)**

**Mastery Exercise (10 points)**

## Module 7

**Readings**

- Chapters 10 & 11 in *Risk Analysis and Security Countermeasures Selection*
- Alali, M., Almogren, A., Hassan, M. M., Rassan, I. A. L., & Bhuiyan, Z. A. (2017). Improving risk assessment model of cyber security using fuzzy logic inference system. *Computers & Security, 74*.
- Arrighi, C., Rossi, L., Trasforini, E., Rudari, R., Ferraris, L., Brugioni, M., Franceschini, S., & Castellii, F. (2018). Quantification of flood risk mitigation benefits: A building-scale damage assessment through the RASOR platform. *Journal of Environmental Management, 207*, 92-104.
- Moore, S. (2015). Closing the gaps in air cargo security. *Journal of Transportation Security, 8*(3), 115-137.

**Opening Exercise (0 points)**

**Discussion (25 points)**

**Mastery Exercise (10 points)**

## Module 8

**Readings**

- Chapters 12, 13, 14, & 15 in *Risk Analysis and Security Countermeasures Selection*
- Adame, B., & Miller, C. (2016). Vested interest: Developing scales for assessing flooding preparedness. *Disaster Prevention and Management, 25*(3), 282-297.
- Elliott, L. (2015). Human security/environmental security. *Contemporary Politics, 21*(1), 11-24.
- Reis, E., & McCarthy, J. (2015). Improving terrorism damage modeling. *62*(5), 27.

**Opening Exercise (0 points)**

**Discussion (25 points)**

**Mastery Exercise (10 points)**

**Portfolio Project (290 points)**

There are two (2) options to complete the Portfolio Project. Choose only one (1) option to complete the assignment. Identify your assignment choice in the title of your submission.

**Option #1: Risk Assessment and Mitigation Plan (290 Points)**

Create a hypothetical risk assessment and mitigation plan.

Assume the role of risk manager/security professional and include the following information in your plan:

1. Choose a hazard or threat. (It *cannot* be one that you have already analyzed in class in a previous assignment. This includes both the Critical Thinking assignments and the discussion forums).
2. Assess the criticalities and consequences of your chosen hazard or threat.
3. Choose a facility (business, school, government, etc.).

Your plan should answer the following questions:

1. What countermeasures are in place?
2. Are the countermeasures in place designed to deal with your threat or hazard?
3. How will you assess the probability of the threat or hazard occurring?
4. Considering your answers to the above questions, what mitigation strategies would you recommend to handle your hazard or threat? Why?

Your essay should:

- Be 7-9 pages long,
- Cite at least seven (7) different credible sources such as peer-reviewed articles, expert blogs, academic journals and the textbook, and
- Follow the *CSU-Global Guide to Writing and APA*.

The databases in the CSU Global library should be a good place to find credible sources. You are also encouraged (but not required) to use civil and criminal cases.

**Option #2: Electromagnetic Pulse Attack (EMP) Scenario Briefing (290 Points)**

Write a 7-page analytical briefing on the topic of EMP attack.

Address the following questions in your briefing:

1. What is an EMP attack?
2. What are the sources of EMP attacks (natural and man-made)?
3. How serious is the EMP threat to the United States?
4. What federal legislative action has taken place to address the EMP threat in terms of risk recognition and both structural and non-structural mitigation?
5. What individual state action has taken place to address the EMP threat in terms of risk recognition and both structural and non-structural mitigation?
6. What should be done to address this issue of Public Policy on the horizon, if anything and when?
7. How should the federal and state governments work together to harden the nation's electrical grid to prevent possible catastrophic issues that would result from an EMP attack?

Your essay should:

- Be 7-9 pages long,

- Cite at least seven (7) different credible sources such as peer-reviewed articles, expert blogs, academic journals and the textbook, and
- Follow the *CSU-Global Guide to Writing and APA*.

The databases in the CSU Global library should be a good place to find credible sources. You are also encouraged (but not required) to use civil and criminal cases.

## COURSE POLICIES

| Grading Scale | |
|---|---|
| A | 95.0 – 100 |
| A- | 90.0 – 94.9 |
| B+ | 86.7 – 89.9 |
| B | 83.3 – 86.6 |
| B- | 80.0 – 83.2 |
| C+ | 75.0 – 79.9 |
| C | 70.0 – 74.9 |
| D | 60.0 – 69.9 |
| F | 59.9 or below |

**Course Grading**

35% Final Portfolio Project
20% Discussion Participation
0% Opening Exercises
8% Mastery Exercises
37% Critical Thinking Assignments

## IN-CLASSROOM POLICIES

For information on late work and incomplete grade policies, please refer to our **In-Classroom Student Policies and Guidelines** or the Academic Catalog for comprehensive documentation of CSU-Global institutional policies.

**Academic Integrity**
Students must assume responsibility for maintaining honesty in all work submitted for credit and in any other work designated by the instructor of the course. Academic dishonesty includes cheating, fabrication, facilitating academic dishonesty, plagiarism, reusing /re-purposing your own work (see *CSU-Global Guide to Writing and APA Requirements* for percentage of repurposed work that can be used in an assignment), unauthorized possession of academic materials, and unauthorized collaboration. The CSU-Global Library provides information on how students can avoid plagiarism by understanding what it is and how to use the Library and Internet resources.

**Citing Sources with APA Style**
All students are expected to follow the *CSU-Global Guide to Writing and APA Requirements* when citing in APA (based on the APA Style Manual, 6th edition) for all assignments. For details on CSU-Global APA style, please review the APA resources within the CSU-Global Library under the "APA Guide & Resources" link. A link to this document should also be provided within most assignment descriptions in your course.

**Disability Services Statement**
CSU–Global is committed to providing reasonable accommodations for all persons with disabilities. Any student with a documented disability requesting academic accommodations should contact the Disability Resource Coordinator at 720-279-0650 and/or email ada@CSUGlobal.edu for additional information to coordinate reasonable accommodations for students with documented disabilities.

**Netiquette**
Respect the diversity of opinions among the instructor and classmates and engage with them in a courteous, respectful, and professional manner. All posts and classroom communication must be conducted in accordance with the student code of conduct. Think before you push the Send button. Did you say just what you meant? How will the person on the other end read the words?

Maintain an environment free of harassment, stalking, threats, abuse, insults or humiliation toward the instructor and classmates. This includes, but is not limited to, demeaning written or oral comments of an ethnic, religious, age, disability, sexist (or sexual orientation), or racist nature; and the unwanted sexual advances or intimidations by email, or on discussion boards and other postings within or connected to the online classroom. If you have concerns about something that has been said, please let your instructor know.