The IPIS Program is seeking a qualified contract instructor for the following position:

Fall 2017

IPIS 5105 – Critical Infrastructure Risk Assessment

*Course description can be found below and a previous course outline is attached to this page.

Candidates must have a degree in a relevant field of engineering or security and preferably have work experience in the subject area of the course. Candidates must have excellent communication and presentation skills; with teaching experience to broad audiences as an asset. (Note: All positions are subject to budgetary approval.)

Applications for the above positions will be accepted until June 28th 2017.

All applications should include a draft course outline. Applicants must submit their curriculum vitae including educational background, employment history and related work experience, as well as any teaching evaluations to:

Ms. Jena Lynde-Smith
Program Administrator, IPIS Program, Carleton University
1416 Dunton Tower
1125 Colonel By Drive
K1S 5B6

Alternatively, completed applications can be submitted electronically to:
jena.lyndesmith@carleton.ca

A note to all applicants: As per Articles 16.3 and 16.4 in the CUPE 4600-2 Collective Agreement, the posted vacancies listed above are first offered to applicants meeting the incumbency criterion. A link to the current CUPE 4600-2 Collective Agreement can be found at the Employment Agreements webpage on the Carleton University Human Resources website http://carleton.ca/hr/collective-agreements/ and the CUPE 4600-2 website http://4600.cupe.ca/.)

Fall 2017

IPIS 5105 [0.5 credit]
Critical Infrastructure Risk Assessment
Risk-assessment techniques and methodologies relevant for the identification of threats. Assessment of vulnerabilities and evaluating the impact on infrastructures or systems considering the probability of such threats being realized.

IPIS 5105
Critical Infrastructure Risk Assessment

Fall 2015

Instructor: TBD
Office: TBD
Office Hours: TBD
Class Time and Location: Thursdays 18:05-20:55
E-mail: TBD

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1. Course Description

This course examines and applies the elements of Asset Protection and Security (AP&S) Risk Management in support of Critical Infrastructure Protection (CIP).

Prerequisite: Not applicable.

The following books or references are assigned texts for the course:

Norman, Thomas: Risk Analysis and Security Countermeasure Selection. CRC Press, Taylor & Francis Group (2010)

Harmonized Threat Risk Assessment (HTRA) Methodology, available at https://www.cse-cst.gc.ca/en/system/files/pdf_documents/tra-emr-1-e.pdf

Learning Outcomes

At the end of this course, students will be able:

- To describe and apply the concepts, components, terminology and metrics of AP&S risk.
- To communicate the theoretical framework behind AP&S risk, including the decomposition and analysis of the contextual business environment being protected.
- To analyze AP&S readings critically and extract salient concepts and applications.
- To argue AP&S risk issues persuasively.
- To produce effective operational and academic writing, including proper use and attribution of source material.
- To work and contribute collaboratively in small team environments.
- To apply the theory of AP&S Risk Management to a real world situation to gain practical experience in observation, analysis and assessment.
- To help protect the availability, integrity and confidentiality of sensitive information and other assets provided to you.

Expectations

Students are expected to:

- Come prepared. This includes having completed the readings, addressed the related questions, and thought about implications for AP&S risk management. You should also

be prepared to discuss AP&S concerns in current events, and may be called upon at any time to summarize salient items, as well as to tie them to theoretical discussions;
- Participate fully in preparatory breakout sessions prior to class and in project team meetings;
- Work to your own maximum potential, regardless of your previous experience in AP&S;
- Show respect for the opinions and arguments of all class participants;
- Challenge the arguments of the instructor and classmates;
- Challenge all assumptions (yours and others');
- Frame your own arguments based on the readings, doctrine, discussions, your experience, current events, etc. and then apply them in active discussion and debate of the academic and applied portions of the course;
- Speak clearly, loudly and convincingly;
- Encourage the less active students to participate; and
- Assist your classmates in any way required to maximize learning opportunities.

2. Course Structure/Class Format

This is both a seminar-based course and an applied course. Students are expected to have read the required readings and discussed face to face within their breakout groups prior to each class. Introductory lectures or guest presentations identify issues for discussion and pose key questions. Following the class lecture the class operates in seminar mode, including periodic briefings by project team members.

There will be some group work required outside of class hours as the teams conduct their individual information gathering, analysis and assessment in support of their Threat Risk Assessments (TRAs). Student project team leads (and their teams as appropriate) will meet and correspond with the instructor often as they progress at a dynamic pace of collation, analysis, assessment and coordination of findings, followed by drafting of presentations.

Students registering for this course must be prepared to work collaboratively, think critically, work diligently and engage in challenging debates about the protection of assets that contribute to mission success, mandated service delivery, or production of goods. Effective protection strategies are based on an in-depth understanding of the value of assets supporting the mission, as well as the threats and vulnerabilities that can cause risks to the availability, integrity and confidentiality of these valued assets. Countering threats and vulnerabilities through the implementation of effective controls and safeguards will result in an appropriate AP&S posture for critical infrastructures.

3. Evaluation

Class Participation (Class attendance, Readings, Break-out sessions): 10%

Students can earn participation marks for attendance, for active, relevant input to discussions, and for other high quality contributions to the class. Students will be graded on the following, which is assessed throughout the course:
- Attendance and punctuality;
- Preparation;
- Analysis;
- Argument;
- Collaboration and teamwork;

- Leadership;
- Communication; and
- Volunteering and assistance in support of the course.

Assignments:

Context Establishment and Asset at Risk Briefing Note: 15%

Each student will produce a two-page (not including references, which can be added as an annex) briefing note (BN) about an AP&S-related concern or issue currently[1] in the news. The BN will describe the information about the underlying organization that is relevant to the security risk management context establishment, including the relevant assets at risk. The aim of the BN is to help determine the risk management scope and boundaries, including the need for further risk assessment. **The BN is to be submitted in soft copy (no hard copy required) to TBD by 1630 hrs class 4.** The format for the BN will be provided separately in CULearn.

The BN will be assessed on:

- the appropriateness of the issue as AP&S-related;
- the explanation of how it maps to AP&S;
- the conciseness and focus of why the BN was written and the argument for the decision being sought;
- the reasonableness of the decision being sought;
- quality and appropriateness of supporting references; and
- grammar, style, and adherence to the BN format.

Risk Management Project (team project):

- Risk Identification Presentation: 20%
- Risk Treatment and Safeguards Selection Presentation: 20%

Part of the practical value of this course is practice in the development of actual AP&S deliverables. There is both challenge and satisfaction experienced by students as they produce presentations that are of a quality approaching that found in the AP&S industry. Assessment of participation in the production of these presentations will be based on:

- comprehensiveness of information-gathering, collation and analysis;
- effective grouping and prioritization of key findings;
- quality of observations, analysis and recommendations;
- compliance with AP&S doctrine, principles and concepts; and
- grammar, style, adherence to format.

The presentations will each be of approximately 15 to 20 minutes duration in total, followed by approximately 5 to 10 minutes for questions and discussion. The format for the Presentations will be provided separately in CULearn. Additional criteria for assessment of the presentations will include:

- selection and prioritization of highlighted observations, analysis and recommendations;
- compliance with AP&S principles and concepts;
- grammar, style, adherence to format; and
- degree to which the individual teams keep to the timings, communicate quickly, authoritatively and clearly; and

[1] For example, in the previous two to three month.

- responses to questions.
- The draft integrated PowerPoint presentations and notes on findings are to be submitted in soft copy to the instructor (roger.tremblsy@carleton.ca) before the class. The team will complete the presentations and submit the final version with notes on findings before the following class.

AP&S Risk Management Paper: 35% (outline 15%, paper 20%)

The outline should be presented in a formal structure that will be the basis for the paper. The outline should include a brief synopsis of the topic under analysis, why this topic was chosen, the research questions to be explored, the NCI(s) to which it applies, the main thesis statement (what stand you are taking), key elements of the topic that support (and refute) your argument, preliminary analysis of key policies that apply to the topic and/or NCI(s), implications of your research for CIP, and recommendations to improve CIP within your topic and/or NCI. These sections will be developed in the paper. An annotated bibliography is also required.
Outlines are to be minimum 800 words (no maximum), exclusive of the title page, footnotes, graphics, annexes and appendices, or annotated bibliography. Include word count on title page (footnotes3, bibliography, graphics and annexes are not included in the word count), and are to be double-spaced. **The outline is to be submitted in soft copy (no hard copy required) to TBD by 1630 hrs class 7.** The attachment is to be identified as follows: Last Name5320W2015_outline.doc

The outline will be assessed on the following:

- Appropriateness of the chosen topic;
- Format and structure (including cover page, main and sub-headings, etc.);
- Main theses or themes (i.e., what are the aims and objectives of the paper);
- Main areas to be addressed (should be considered in the format);
- Main arguments proposed within the areas proposed and how they tie to the main theses;
- Annotated bibliography (i.e., a list of which sources are used, including a short synopsis of each source and how it will contribute to your paper);
- Citation in the outline;
- Proposed conclusions and recommendations; and
- Grammar and style.

Papers should be between 2,250 and 2,750 words in length exclusive of the title page, footnotes, annexes and appendices, and bibliography (one grade will be deducted if over or under), and papers are to be double-spaced (include word count on title page). **The paper is to be submitted in soft copy to TBD by 1630 hrs class 10**. The attachment is to be identified as follows: LastName5320W2015_paper.doc.

The paper will be assessed on the assessment criteria for the outline plus:

- The appropriateness of the key components that are argued in the paper (including why components were excluded);
- Effectiveness of incorporation of AP&S concepts that were taught in class;
- Strength of conclusions and recommendations offered in the paper;
- Effectiveness of incorporation of relevant references, salient citations and quotations;
- Inclusion of new information from references additional to the assigned or recommended readings;
- Effectiveness of coverage of the topic; and
- Clarity of argument and writing.

Absences and missed assignments:
Only documented family and medical emergencies will be accepted as legitimate reasons for an absence. Students with appointments relating to employment or other reasons should discuss with the instructor before departure. No individual student presentation dates may be altered without approval of the instructor.

Late submission penalties:
Deadlines for submission of written work and presentations are enforced strictly, since this reflects the requirements of the AP&S industry. Failure to submit a piece of work by the stated deadline without permission results in the following penalties being applied to that piece of work:

- Failure to make the presentation on the designated day in class will result in a mark of zero.
- Late submission of written work within 24 hours = drop by one grade (e.g., B+ to a B).
- Late submission or written work within 72 hours = drop by two grades (e.g., B+ to a B-).
- Late submission of written work within 96 hours = drop by three grades (e.g., B+ to a C+).
- Work will not be accepted after 96 hours.

4. Communications

Correspondence with the Instructor:
Please use your Carleton email account for all course-related correspondence. All electronic submissions or correspondence are to be sent to TBD or through CULearn. Emails will be returned within 24 hrs.

Formatting of Work:
Papers and outlines are to be double-spaced, with the primary font no smaller than 11pt. All work is to utilize APA style for quotations, footnotes, citations and bibliographies. Select guides to APA format are linked from the course page; further guidance on APA formatting is available at the Library, and on the web. Submissions are to have a title page which includes name, course, assignment, title, date, word count (title page, figures, footnotes, bibliography, annexes are excluded from word count).

Submission of Work:
Unless otherwise stated, all work is to be submitted by email to roger.tremblay@carleton.ca
by 1630 hrs on the stated deadline. The email subject line is to include the course number and assignment being submitted. Submissions are to utilize the following example standard file naming convention:

- Surname-5320W2015_assignment name.docx1
- Surname-5320 W2015_assignment name_legend.docx

All assignments and supplementary material must follow this format (file extension will vary appropriately).

5. Plagiarism and Complementarity

The University Senate defines plagiarism as "presenting, whether intentional or not, the ideas, expression of ideas or work of others as one's own." This can include:

- reproducing or paraphrasing portions of someone else's published or unpublished material, regardless of the source, and presenting these as one's own without proper citation or reference to the original source;
- submitting a take-home examination, essay, laboratory report or other assignment written, in whole or in part, by someone else;
- using ideas or direct, verbatim quotations, or paraphrased material, concepts, or ideas without appropriate acknowledgment in any academic assignment;
- using another's data or research findings;
- failing to acknowledge sources through the use of proper citations when using another's works and/or failing to use quotation marks;
- handing in substantially the same piece of work for academic credit more than once without prior written permission of the course instructor in which the submission occurs.

Plagiarism is a serious offence which cannot be resolved directly with the course's instructor. The Associate Deans of the Faculty conduct a rigorous investigation, including an interview with the student, when an instructor suspects a piece of work has been plagiarized. Penalties are not trivial. They include a mark of zero for the plagiarized work or a final grade of "F" for the course. The Academic integrity policy can be accessed at http://www2.carleton.ca/studentaffairs/academic-integrity.

Complementarity: students are encouraged to build up expertise in areas that may cross multiple courses. It is acceptable to write assignments on related topics. However you may not simply cut and paste your work from one assignment to another, or essentially submit the same work for two or more assignments in the same or different courses. If you plan on writing on related topics in different courses, you must inform the instructors and discuss what will be acceptable in terms of overlap, and what is not. Failure to notify the faculty members will be viewed unfavourably should there be a suspicion of misconduct

6. Academic Accommodation

You may need special arrangements to meet your academic obligations during the term. For an accommodation request, the processes are as follows:

Pregnancy obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: http://www2.carleton.ca/equity/

Religious obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: http://www2.carleton.ca/equity/

Academic Accommodations for Students with Disabilities: The **Paul Menton Centre** for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already

registered with the PMC, contact your PMC coordinator to send me your ***Letter of Accommodation*** at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (*if applicable*). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request accommodations for the formally-scheduled exam (*if applicable*) at http://www2.carleton.ca/pmc/new-and-current-students/dates-and-deadlines/

You can visit the Equity Services website to view the policies and to obtain more detailed information on academic accommodation at http://www2.carleton.ca/equity/

7. cuLearn

This course uses cuLearn, Carleton's learning management system. To access your course on cuLearn go to http://carleton.ca/culearn. For help and support, go to http://carleton.ca/culearnsupport/students. Any unresolved questions can be directed to Computing and Communication Services (CCS) by phone at 613-520-3700 or via email at ccs_service_desk@carleton.ca.

8. List of Topics and Required Readings

<table>
<tr><th>Cl</th><th>Date</th><th>AP&S Risk Management Topics</th><th>Assignment Due</th></tr>
<tr><td rowspan="3">1</td><td rowspan="3">4 Sep</td><td>Course Introduction
Risk Management Concepts
Risk Management Framework (ISO 31000)
Context Establishment (Infrastructure Protection)</td><td>None</td></tr>
<tr><td colspan="2">Readings: none</td></tr>
<tr><td colspan="2">Question:
From your own experience, what are the major attributes, characteristics and/or qualities required of a Risk analyst? How are they gained?</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">14 Sep</td><td>Risk Management Process
Business Model for AP&S
Policy Suite
Risk Assessment approach, standards and related frameworks for AP&S</td><td>Team Composition</td></tr>
<tr><td colspan="2">Readings:
Framework for the Management of Risk, Treasury Board of Canada Secretariat at http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=19422
Canada. (2009) National Strategy for Critical Infrastructure. (PS4-65/2009E-PDF). Retrieved from http://www.publicsafety.gc.ca/cnt/rsrcs/pblctns/srtg-crtcl-nfrstrctr/index-eng.aspx . 12 September 2013.
Canada. (2010) Risk Management Guide for Critical Infrastructure Sectors. Retrieved from http://www.publicsafety.gc.ca/cnt/rsrcs/pblctns/rsk-mngmnt-gd/index-eng.aspx 12 September 2013.
Policy on Government Security (PGS) at http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=16578&section=text
Directive on Departmental Security Management (DDSM) at</td></tr>
</table>

		http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?section=text&id=16579 • Operational Security Standard on Physical Security http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=12329 • The North American Electric Reliability Corporation (NERC) CIP Standards at http://www.nerc.com/pa/Stand/Pages/CIPStandards.aspx	
		Questions: 1. From the National Strategy, why was it produced (from the article and from your experience)? How does a strategy compare to a policy? How do they relate to each other? Hint: think of "ability to be executed" in your discussions. 2. List the key components or principles of this strategy for protection of assets and triage them (most important, important, less important) and be prepared to justify your ranking. 3. From the Risk Management Guide, how does a guide or guidance compare to a policy? List the key components or principles of this Guide for protection of assets and triage them (most important, important, less important) and be prepared to justify your ranking. 4. What are the benefits of exercises in maintaining your AP&S or CIP program?	
3	21 Sep	Risk Analysis Methodologies (Quantitative approach): Applying the HTRA Methodology	None
		Readings: • HTRA: Intro, Exec Overview, Mgt Summary, Anx A (including all Appxs), Anx G (flag Appx G-1 – TRA Worksheet), Appx G-2, Appx G-3 at https://www.cse-cst.gc.ca/en/system/files/pdf_documents/tra-emr-1-e.pdf • Norman: Preface, Chapters 1, 2, 12, 14 (40 pp.). This is a fast read, and will be a review for some.	
		1. TRAs, BCPs and Emergency Response (ER) plans are AP&S risk management tools. Based on your experience and the readings, how in general do they contribute to AP&S risk management? How do they contribute to Enterprise Risk Management (ERM)? 2. Under what conditions or when should TRAs be conducted? What kinds of "things" can undergo a TRA? 3. What are the major skill sets required of a TRA (AP&S Risk) analyst? How are they acquired?	
4	28 Sep	Information gathering for the Threat and Risk Assessment (TRA) Identification of Asset Identification of consequences (Asset Valuation)	Individual Assignment: Context and Asset at Risk Briefing Note
		Readings: • Guide for Conducting Risk Assessments, Special Publication 800-30, the National Institute of Standards and Technology (NIST) at http://csrc.nist.gov/publications/nistpubs/800-30-rev1/sp800_30_r1.pdf • An Introduction to the Business Model for Information Security http://www.isaca.org/Knowledge-Center/BMIS/Documents/IntrotoBMIS.pdf • HTRA: at https://www.cse-cst.gc.ca/en/system/files/pdf_documents/tra-	

<table>
<tr><td></td><td></td><td colspan="2">emr-1-e.pdf
• Information Technology Security Guidance, IT Security Risk Management: A Lifecycle Approach – Overview (ITSG-33) at https://www.cse-cst.gc.ca/en/system/files/pdf_documents/itsg33-overview-apercu-eng_0.pdf</td></tr>
<tr><td></td><td></td><td colspan="2">Questions:
1. Information gathering is a key element of the risk assessment process. Based on your experience and the readings, what are the critical success factors for effective and efficient information gathering?
2. Under what conditions or when should information gathering include formal surveys and interviews? Who in the organization should be surveyed and interviewed?
3. What are the major skill sets required of a risk analyst for gathering information? How are they acquired?
4. What are key differences between the asset value and the consequence to an organization if a risk to an asset materializes?</td></tr>
<tr><td>5</td><td>5 Oct</td><td>Identification of threats
Threat Assessment
Identification of vulnerabilities
Vulnerability Assessment</td><td>Team Assignment:
TRA Subject
(Organization and primary assets)</td></tr>
<tr><td></td><td></td><td colspan="2">Readings:
• All Hazards Risk Assessment Methodology Guidelines 2012-2013 https://www.publicsafety.gc.ca/cnt/rsrcs/pblctns/ll-hzrds-ssssmnt/index-eng.aspx
• Cyber Threat Metrics, Sandia National Laboratories at http://www2.gwu.edu/~nsarchiv/NSAEBB/NSAEBB424/docs/Cyber-065.pdf
• A Vulnerability Assessment Methodology for Critical Infrastructure Facilities http://www.jmu.edu/iiia/wm_library/Vulnerability_Facility_Assessment_05-07.pdf</td></tr>
<tr><td></td><td></td><td colspan="2">Questions:
1. The identification key threat agents may require in depth research and access to classified information repository which is often not available. Based on your experience and the readings, what other choice is given to the risk analyst?
2. Under what conditions or when should the threat assessment include assumptions about the threat agent capability and intent?
3. What are the major skill sets required of a risk analyst for performing vulnerability assessment? How are they acquired?
4. What are key differences between the vulnerability assessment and security assurance level determination?</td></tr>
<tr><td>6</td><td>19 Oct</td><td>Risk Analysis
Assessment of consequences
Assessment of incident likelihood
Level of risk determination
Risk Evaluation</td><td>None</td></tr>
<tr><td></td><td></td><td colspan="2">Readings: To be posted on CULearn.</td></tr>
</table>

		Questions: To be posted on CULearn.	
	26 -30 Oct	Fall Break – No Class	None
7	2 Nov	Identification of existing Security Controls Security Controls Frameworks Compliance Assessment	Paper Outline
		Readings: • Security and Privacy Controls for Federal Information Systems and Organizations, NIST 800-53Rev4 at http://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-53r4.pdf • SANS Critical Security Control: 20 https://www.sans.org/critical-security-controls/control/20 • Making Security Measurable and Manageable, Robert A. Martin, The MITRE Corporation, Bedford, MA at http://measurablesecurity.mitre.org/about/Making_Security_Measurable_and_Manageable.pdf	
8	9 Nov	Identification of Residual Risk Risk Treatment Risk Analysis and Decision Support Tools	Team Assignment: Risk Identification Presentation
		Readings: • HTRA: at https://www.cse-cst.gc.ca/en/system/files/pdf_documents/tra-emr-1-e.pdf • Information Technology Security Guidance, IT Security Risk Management: A Lifecycle Approach – Overview (ITSG-33) at https://www.cse-cst.gc.ca/en/system/files/pdf_documents/itsg33-overview-apercu-eng_0.pdf	
9	16 Nov	Risk Communication and Consultation Risk Monitoring and Review	Team Assignment: Risk Identification Presentation
		Readings: To be posted on CULearn.	
10	22 Nov	Safeguards Selection Risk Monitoring, Assessment Tools	Major Paper
		Readings: To be posted on CULearn.	
11	30 Nov	Business Continuity Disaster Recovery Incident Management	Team Assignment: Risk Treatment and Safeguards Selection Presentations
		Readings: • Operational Security Standard (OSS) for Business Continuity Planning at http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=12324&section=text • GC Information Technology Incident Management Plan at http://www.tbs-sct.gc.ca/sim-gsi/sc-cs/docs/itimp-pgimti/itimp-pgimtitb-eng.asp	
12	7 Dec 15	Course Conclusion Review of major concepts	None

		Readings: None

Readings and Questions

Additional readings are included in the Readings and Questions list, and will be augmented periodically.