Infrastructure Protection and International Security

Program Requirements

M. Infrastructure Protection and International Security (5.0 credits)

Requirements:

1. 2.0 credits in:		2.0
IPIS 5101 [0.5]	Critical Infrastructure Protection: Issues and Strategies	
IPIS 5103 [0.5]	Infrastructure Engineering Principles	
IPIS 5105 [0.5]	Critical Infrastructure Risk Assessment	
IPIS 5106 [0.5]	Management of Critical Infrastructure	
2. 1.0 credit from:		1.0
IPIS 5104 [0.5]	Terrorism and International Security	
IPIS 5301 [0.5]	Disarmament, Arms Control and Nonproliferation	
IPIS 5302 [0.5]	Contemporary International Security	
IPIS 5303 [0.5]	Intelligence Statecraft and International Affairs	
IPIS 5304 [0.5]	Intelligence and National Security: Policies and Operations	
IPIS 5305 [0.5]	National Security Policy and Law	
IPIS 5320 [0.5]	Topics in Infrastructure Security Policy	

Or 5000-level courses from the IIA or SDP designated fields offered by the Norman Paterson School of International Affairs.

3. 1.0 credit from:		1.0
IPIS 5501 [0.5]	Transportation and Aviation Security	
IPIS 5504 [0.5]	Fundamentals of Fire Safety	
IPIS 5505 [0.5]	Natural Hazards in Canada: Risk and Impact	
IPIS 5507 [0.5]	Blast-load Effects on Structures	
IPIS 5508 [0.5]	Introduction to Explosives and Explosion Effects as they relate to Infrastructure and its Components	
IPIS 5520 [0.5]	Selected Topics in Engineering of Critical Infrastructure	

4. 1.0 credit normally comprised of courses with CIVE, INAF or IPIS course designations, but may also be chosen from related programs that have been selected in consultation with, and approved by, the MIPIS Director and Associate Director and associated faculty when necessary.	1.0

Total Credits	5.0

M.Eng. Infrastructure Protection and International Security (5.0 credits)

Requirements:

1. 1.5 credits in:	1.5

IPIS 5101 [0.5]	Critical Infrastructure Protection: Issues and Strategies
IPIS 5105 [0.5]	Critical Infrastructure Risk Assessment
IPIS 5106 [0.5]	Management of Critical Infrastructure

2. 1.0 credit from:		1.0
IPIS 5104 [0.5]	Terrorism and International Security	
IPIS 5301 [0.5]	Disarmament, Arms Control and Nonproliferation	
IPIS 5302 [0.5]	Contemporary International Security	
IPIS 5303 [0.5]	Intelligence Statecraft and International Affairs	
IPIS 5304 [0.5]	Intelligence and National Security: Policies and Operations	
IPIS 5305 [0.5]	National Security Policy and Law	
IPIS 5320 [0.5]	Topics in Infrastructure Security Policy	

Or 5000-level courses from the Intelligence and International Affairs (IIA) and Security Defence Policy (SDP) designated fields offered by the Norman Paterson School of International Affairs.

3. 1.5 credit from:		1.5
IPIS 5501 [0.5]	Transportation and Aviation Security	
IPIS 5504 [0.5]	Fundamentals of Fire Safety	
IPIS 5505 [0.5]	Natural Hazards in Canada: Risk and Impact	
IPIS 5507 [0.5]	Blast-load Effects on Structures	
IPIS 5508 [0.5]	Introduction to Explosives and Explosion Effects as they relate to Infrastructure and its Components	
IPIS 5520 [0.5]	Selected Topics in Engineering of Critical Infrastructure	

or an engineering course approved by the IPIS Director or Associate Director.

4. 1.0 credit remaining may be selected as follows:	1.0

Coursework Program Option:

- 1.0 credit from graduate courses from the Faculty of Engineering and Design that have been selected in consultation with, and approved by, the MIPIS Director and Associate Director.

Research Project Option:

1.0 credit in:

IPIS 5907 [1.0]	Research Project

Total Credits	5.0

Graduate Diploma in Infrastructure Protection and International Security (3.0 credits)

Level 2 (Concurrent)

Level 3 (Direct Entry)

Requirements:

1. 1.5 credits in:	1.5

IPIS 5101 [0.5]	Critical Infrastructure Protection: Issues and Strategies
IPIS 5105 [0.5]	Critical Infrastructure Risk Assessment
IPIS 5106 [0.5]	Management of Critical Infrastructure

2.	**1.0 credit from** electives:		1.0
	IPIS 5104 [0.5]	Terrorism and International Security	
	IPIS 5301 [0.5]	Disarmament, Arms Control and Nonproliferation	
	IPIS 5302 [0.5]	Contemporary International Security	
	IPIS 5303 [0.5]	Intelligence Statecraft and International Affairs	
	IPIS 5304 [0.5]	Intelligence and National Security: Policies and Operations	
	IPIS 5305 [0.5]	National Security Policy and Law	
	IPIS 5320 [0.5]	Topics in Infrastructure Security Policy	
	IPIS 5501 [0.5]	Transportation and Aviation Security	
	IPIS 5504 [0.5]	Fundamentals of Fire Safety	
	IPIS 5505 [0.5]	Natural Hazards in Canada: Risk and Impact	
	IPIS 5507 [0.5]	Blast-load Effects on Structures	
	IPIS 5508 [0.5]	Introduction to Explosives and Explosion Effects as they relate to Infrastructure and its Components	
	IPIS 5520 [0.5]	Selected Topics in Engineering of Critical Infrastructure	
3.	**0.5 credit in:**		0.5
	a) for students without a B.Eng. in Civil Engineering (or equivalent):		
	IPIS 5103 [0.5]	Infrastructure Engineering Principles	
	b) for students with a B.Eng. in Civil Engineering (or equivalent):		
	0.5 additional credit from electives in Item 2 above		

Total Credits	3.0

Admission Requirements

Proficiency in English is necessary to pursue graduate studies at Carleton University. All applicants whose first language is not English must satisfy this requirement as per the General Regulations.

M. Infrastructure Protection and International Security

The minimum requirement for admission into the M. I.P.I.S. is a B.A. Honours degree in a discipline related to International Affairs or a Bachelor's degree in Science or Engineering. Students will normally be expected to have a B+ average (or higher) to be considered for admission.

Students without a background in engineering or science will be required to complete IPIS 5003 [0.0] Mathematics and Engineering Primer for non-Engineers, which will be in addition to the regular degree requirements and is to be completed in the first fall term in which the student is registered. IPIS 5003 is a prerequisite for the required course in Infrastructure Engineering Principles, and for other engineering electives.

M. Eng. Infrastructure Protection and International Security

The minimum requirement for admission into the M.Eng. I.P.I.S. is a B.Eng. degree or equivalent. Students will normally be expected to have a B+ average (or higher) to be considered for admission.

Students without a background in the social sciences or policy work in the Canadian context will be required to complete IPIS 5002 [0.0] Policy Primer, which will be in addition to the regular degree requirements and is to be completed in the first fall term in which the student is registered.

Accelerated Pathway

The accelerated pathway to the Master of Infrastructure Protection and International Security and the Master of Engineering in Infrastructure Protection and International Security is a flexible and individualized plan of graduate study for students in their final year of a Carleton undergraduate degree in a related discipline.

Students in their third year of study in their undergraduate program who are interested in the accelerated pathway should consult with the Director and Associate Director in the I.P.I.S. Program to determine if the accelerated pathway is appropriate for them and to confirm their selection of courses and Honours project/thesis supervisor for their final year of undergraduate studies.

Accelerated Pathway Requirements

1. IPIS courses at the 5000-level with a grade of B+ or higher
2. Minimum overall CGPA of A-

Students may receive advanced standing with transfer of credit of up to 1.0 credit which can reduce their time to completion.

Infrastructure Protection and International Security (IPIS) Courses

IPIS 5002 [0.0 credit]
Policy Primer
Designed to provide MIPIS, MENG IPIS and Graduate Diploma in IPIS students with analytical, writing, and argument formulating strategies to apply in other courses during their studies. Includes review of policy making, government departments, writing for government, and proper citation strategies.

IPIS 5003 [0.0 credit]
Mathematics and Engineering Primer for non-Engineers
Review and application of basic mathematics, physics and engineering principles required to prepare non-engineers and other students without a previous background in mathematics for the required course in Infrastructure Engineering Principles and other engineering courses. Precludes additional credit for IPIS 5001.

IPIS 5101 [0.5 credit]
Critical Infrastructure Protection: Issues and Strategies
Examines critical infrastructure, its interdependencies, vulnerabilities, and security requirements; intentional and natural risks; policy responses to threat and vulnerability assessments; risk management approaches, prevention and protective security, emergency management and damage mitigation measures; continuity of critical operations and resilience planning.

IPIS 5103 [0.5 credit]
Infrastructure Engineering Principles
Introduction to infrastructure engineering: civil, municipal/environmental, energy, communications, and military infrastructure systems; engineering principles; design, analysis and construction techniques; lifecycle performance, maintenance and retrofit strategies; optimization, asset-management; decision-making and decision support tools.
Prerequisite(s): IPIS 5001 or equivalent approved by the IPIS Graduate Supervisor.

IPIS 5104 [0.5 credit]
Terrorism and International Security
Contemporary international terrorism in comparative perspective; religious and ideological parameters motivating terrorism; sociology of recruitment and participation; evolving structure and dynamics of terror networks; terrorism finance, operations and related activities; impact of counter-terrorism measures; examples are drawn from international and domestic terrorism.
Also listed as INAF 5244.

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 5106 [0.5 credit]
Management of Critical Infrastructure
Management of critical infrastructure (CI) and its relationship to facility and asset management; asset maintenance, rehabilitation, and restoration; tools, systems and approaches to effective CI management, integration and linkages across CI and consequent challenges to managers of critical infrastructure systems.
Precludes additional credit for CIVE 5809 (2005-2007), CIVE 5404 and IPIS 5102 (2010-2014).

IPIS 5301 [0.5 credit]
Disarmament, Arms Control and Nonproliferation
Origins, theory and practice, with a focus on so-called weapons of mass destruction and current controversies. Emphasis on treaty negotiation and implementation, including monitoring, verification, facilitation and enforcement of compliance.
Also listed as INAF 5201.

IPIS 5302 [0.5 credit]
Contemporary International Security
The evolving strategic and security environment since the end of the Cold War, encompassing both traditional and non-traditional concepts. Topics include hegemonism; the rise of new powers; terrorism; multilateralism; human security; and new security threats, including climate change.
Also listed as INAF 5202.

IPIS 5303 [0.5 credit]
Intelligence Statecraft and International Affairs
The role of intelligence in foreign and security policy after the Cold War. Evolution of intelligence as regards strategic and policy requirements, the capabilities of selected services, interactions within government and civil society. Emphasis on the structure and functions of Canada's intelligence community.
Also listed as INAF 5204.

IPIS 5304 [0.5 credit]
Intelligence and National Security: Policies and Operations
The roles and activities of intelligence services of selected countries. Their performance will be assessed in the light of historical experience, and in the context of the policy, legal and ethical constraints.
Also listed as INAF 5224.

IPIS 5305 [0.5 credit]
National Security Policy and Law
The international legal and policy implications of identifying and responding to national security threats. Topics include: intelligence gathering; verification regimes; military and counter-terrorism operations; criminal prosecution; and, balancing human rights and security concerns.
Also listed as INAF 5234.

IPIS 5320 [0.5 credit]
Topics in Infrastructure Security Policy
Courses in special topics related to infrastructure security, not covered by other graduate courses; course topics will be available prior to registration.

IPIS 5501 [0.5 credit]
Transportation and Aviation Security
Canadian Public Security Strategy and Transportation System security environment; Civil Aviation security and operations: trends, impacts, and implications of evolving policies, operations, and technologies; security vulnerabilities in the transportation system; transportation of hazardous materials; secure movements on roads, highways and railways.

IPIS 5504 [0.5 credit]
Fundamentals of Fire Safety
The fire safety system; social, economic and environmental issues; description of the fire safety regulatory system and the governing building codes and standards. This includes the global fire safety system in a facility and active fire protection systems; detection, suppression, smoke management.
Precludes additional credit for CIVE 5707 (2001-2003), CIVE 5609.

IPIS 5505 [0.5 credit]
Natural Hazards in Canada: Risk and Impact
Earthquakes and ground motion, tsunamis, landslides, liquefaction; soil properties for ground response analysis: laboratory tests, in-situ tests; dams and embankments, slope stability, seismic effects on slope stability, retaining structures.
Also listed as ERTH 5215.

IPIS 5507 [0.5 credit]
Blast-load Effects on Structures
Threats, risk analysis, vulnerability assessment; explosives: types and mechanisms; load determination; response of structural elements under blast loads, analysis and design for blast loads; blast mitigation, retrofit of structures; post-event assessment.
Also listed as CIVE 5507.
Precludes additional credit for CIVE 5707 (2007-2008).

IPIS 5508 [0.5 credit]
Introduction to Explosives and Explosion Effects as they relate to Infrastructure and its Components
Properties and effects of explosives, propellants and pyrotechnics, detonation, deflagration and consequence of confinement, commercial and military applications including areas of terrorism and entertainment, sensitivities and hazards in transport, storage and use, specialized charges, explosion effects and indicators, and bombings and accident investigations.
Precludes additional credit for IPIS 5520.

IPIS 5520 [0.5 credit]
Selected Topics in Engineering of Critical Infrastructure
Courses in special topics related to infrastructure security, not covered by other graduate courses; course topics will be available prior to registration.

IPIS 5901 [0.5 credit]
Tutorials in Infra Protection and Intl Security
To be selected in consultation with Director and/or Associate Director.

IPIS 5907 [1.0 credit]
Research Project
Students may be given permission to undertake an approved research project that will conduct a study, analysis or design project that relates to the protection and security of infrastructure under the general supervision of an engineer approved by the MIPIS Director or Graduate Supervisor.
Prerequisite(s): permission of the MIPIS Program Director or Graduate Supervisor.

IPIS 5908 [1.0 credit]
Research Paper
Students may be given permission to conduct independent research under the general guidance of a research supervisor, examining an approved policy-relevant topic that integrates the infrastructure, engineering and security elements of their program of study.
Prerequisite(s): permission of the MIPIS Program Director or Graduate Supervisor.

IPIS 5913 [0.0 credit]
Co-operative Work Term
Prerequisite(s): Full-time M. IPIS or M. Eng IPIS students who have completed a minimum of three classes (1.5 credits) in each of their first two terms, including 1.5 credits in core compulsory courses, and IPIS 5002 or IPIS 5003 as required are eligible for registration in their third term. Eligibility for registration in subsequent co-op terms requires the successful completion of all core program requirements.

Summer session: some of the courses listed in this Calendar are offered during the summer. Hours and scheduling for summer session courses will differ significantly from those reported in the fall/winter Calendar. To determine the scheduling and hours for summer session classes, consult the class schedule at central.carleton.ca

Not all courses listed are offered in a given year. For an up-to-date statement of course offerings for the current session and to determine the term of offering, consult the class schedule at central.carleton.ca