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MEMORANDUM

ATTENTION Senate
FROM Jeff Derksen,
Chair of Senate Graduate Studies
Committee (SGSC)
RE: New Course Proposals

DATE November 14, 2019


For information:

Acting under delegated authority at its meeting of November 5, 2019, SGSC approved the following new courses, effective **Summer 2020**:

Faculty of Applied SciencesSchool of Computing Science

- 1) New course: CMPT 780 Computer Security and Ethics
- 2) New course: CMPT 782 Cybersecurity Lab 1
- 3) New course: CMPT 783 Cybersecurity Lab 2
- 4) New course: CMPT 784 Cyber Risk Assessment and Management
- 5) New course: CMPT 785 Secure Software Design
- 6) New course: CMPT 786 Cloud and Network Security
- 7) New course: CMPT 787 Ethical Hacking
- 8) New course: CMPT 788 Information Privacy
- 9) New course: CMPT 789 Applied Cryptography
- 10) New course: CMPT 629 Graduate Project
- 11) New course: CMPT 729: Introduction to Reinforcement Learning

Faculty of EnvironmentUrban Studies

- 12) New course: URB 691: International Field Studies

MEMORANDUM

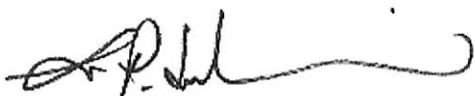
Attention Dr. Jeff Derksen Date Sept 30, 2019
Dean, Graduate Studies

From Dr. Parvaneh Saeedi psaeedi@sfu.ca
Faculty of Applied Science, Graduate Studies Committee

Re: FAS-CMPT's new Professional Master's Program

The faculty of Applied Sciences Graduate Studies Committee would request ^{Like to approval} for ~~calendar change~~ for the ~~Cybersecurity specialization and~~ the attached new courses, effective summer 2020.

Regards,
Parvaneh Saeedi



New Graduate Course Proposal

Course Subject (eg. PSYC) CMPT	Number (eg. 810) 780	Units (eg. 4) 3
Course title (max. 100 characters) Computer Security and Ethics		
Short title (for enrollment/transcript - max. 30 characters) Computer Security and Ethics		
Course description for SFU Calendar (course descriptions should be brief and should never begin with phrases such as "This course will..." or "The purpose of this course is..." If the grading basis is satisfactory/unsatisfactory include this in the description) Cybersecurity involves technology, people, information, and processes to enable assured operations in the existence of vulnerabilities, and adversaries who exploit them. Students will gain insight into the importance and landscape of cybersecurity, understand its career paths, and learn about cyber risk management, network and cloud security, system and software security, and cyber ethics and law.		
Rationale for introduction of this course This course is essential to familiarize students enrolled into the new Cybersecurity Specialization of the Master of Science in Computer Science Program with fundamental topics in cybersecurity.		
Term of initial offering (eg. Fall 2019) Summer 2020	Course delivery (eg. 3 hrs/week for 13 weeks) 3 hrs/week for 13 weeks	
Frequency of offerings/year once per year	Estimated enrollment per offering 50	
Equivalent courses (courses that replicates the content of this course to such an extent that students should not receive credit for both courses) None		
Prerequisite and/or Corequisite		
Criminal record check required? <input type="checkbox"/> Yes if yes is selected, add this as prerequisite		Additional course fees? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Campus where course will be taught <input checked="" type="checkbox"/> Burnaby <input type="checkbox"/> Surrey <input type="checkbox"/> Vancouver <input type="checkbox"/> Great Northern Way <input type="checkbox"/> Off campus		
Course Components * <input type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Independent <input type="checkbox"/> Capstone <input type="checkbox"/> _____		
Grading Basis <input checked="" type="checkbox"/> Letter grades <input type="checkbox"/> Satisfactory/ Unsatisfactory <input type="checkbox"/> In Progress / Complete		
Repeat for credit? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Total repeats allowed? _____	Repeat within a term? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Required course? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Final exam required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Capstone course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Combined with a undergrad course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, identify which undergraduate course and the additional course requirements for graduate students:		

* See important definitions on the curriculum website.

RESOURCES

If additional resources are required to offer this course, provide information on the source(s) of those additional resources.

Faculty member(s) who will normally teach this course Uwe Glässer, Ouldooz Baghban Karimi
Additional faculty members, space, and/or specialized equipment required in order to offer this course

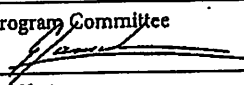
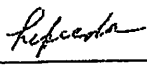
CONTACT PERSON

Academic Unit / Program School of Computing Science	Name (typically, Graduate Program Chair) Uwe Glässer	Email glaesser@cs.sfu.ca
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ACADEMIC UNIT APPROVAL

A course outline must be included.

Non-departmentalized faculties need not sign

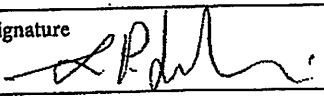
Graduate Program Committee 	Signature Ghassan Hamarneh	Date 2019-Aug-08
Department Chair Mohamed Hefeeda	Signature 	Date 2019-Aug-20

FACULTY APPROVAL

The course form and outline must be sent by FGSC to the chairs of each FGSC (fgsc-list@sfu.ca) to check for an overlap in content

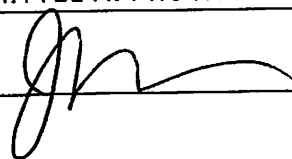
Overlap check done? YES

This approval indicates that all the necessary course content and overlap concerns have been resolved. The Faculty/Academic Unit commits to providing the necessary resources.

Faculty Graduate Studies Committee Parroneh Saeedi	Signature 	Date Aug 20, 2019
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A library review will be conducted. If additional funds are necessary, DGS will contact the academic unit prior to SGSC.

SENATE GRADUATE STUDIES COMMITTEE APPROVAL

Senate Graduate Studies Committee Jeff Derksen	Signature 	Date NOV 14 2019
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ADMINISTRATIVE SECTION (for DGS office only) Library Check: AUG 29 2019 Course Attribute: _____ Course Attribute Value: _____ Instruction Mode: _____ Attendance Type: _____	If different from regular units: Academic Progress Units: _____ Financial Aid Progress Units: _____
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Course Outline - CMPT 780 – Computer Security and Ethics

Information

Subject	CMPT
Catalog Number	780
Section	D100
Title	Computer Security and Ethics
Instructor(s)	Uwe Glässer, Ouldooz Baghban Karimi
Campus	Burnaby Mountain Campus

Calendar Objective/Description

Cybersecurity involves technology, people, information, and processes to enable assured operations in the existence of vulnerabilities, and adversaries who exploit them. Students will gain insight into the importance and landscape of cybersecurity, understand its career paths, and learn about cyber risk management, network and cloud security, system and software security, and cyber ethics and law.

Topics

- Principles of cybersecurity: cybersecurity objectives, cybersecurity roles, information security vs. cybersecurity, confidentiality, integrity, and availability, authentication and nonrepudiation
- Risks and vulnerabilities: basics of risk management, threat modeling, types of attacks
- Incident response: incident categories, incident response, incident recovery
- System and software security: Unix security Basics, isolation, OS security and authorization, execution semantics, memory safety, buffer overflows, control-flow attacks and defenses.
- Network and cloud security: review of network infrastructure and layers, landscape of network threats, Introduction to firewalls
- Ethical issues in cybersecurity: harm to privacy, harm to property, cybersecurity resource allocation, transparency and disclosure
- Ethical challenges: balancing security with other values, threat/incident response, security breach/vulnerability, network monitoring and user privacy, data storage and encryption, accountability for cybersecurity, security research and testing, competing interests and obligations
- Best practices for cybersecurity ethics

Grading

The course has a midterm examination (worth 30% of the total grade), two tests (worth 20%), three graded assignments (worth 15%) and a term project organized as group project with a project report and presentation in class (worth 30%). There will also be two reading assignments and several tutorials. Class participation accounts for 5% of the total grade.

Recommended Books

- Computer Security: A Hands-on Approach, Wenliang Du, Wenliang Du, 2019.
- Threat Modeling: Designing for Security, Adam Shostack, Wiley, 2014.
- Computer Systems: A Programmer's Perspective Volume 2, Randal E. Bryant and David R. O'Hallaron, Pearson, 2010.
- A Gift of Fire: Social, Legal, and Ethical Issues for Computing Technology, Sara Baase, Pearson, 2018.
- Douglas W. Hubbard, Richard Seiersen, How to Measure Anything in Cybersecurity Risk, John Wiley & Sons, 2016.
- The Tangled Web: A Guide to Securing Modern Web Applications by Michal Zalewski, 2011

Academic Honesty Statement

Academic honesty plays a key role in our efforts to maintain a high standard of academic excellence and integrity. Students are advised that ALL acts of intellectual dishonesty will be handled in accordance with the SFU Academic Honesty and Student Conduct Policies (<http://www.sfu.ca/policies/gazette/student.html>).

New Graduate Course Proposal

Course Subject (eg. PSYC) CMPT	Number (eg. 810) 782	Units (eg. 4) 6
Course title (max. 100 characters) Cybersecurity Lab 1		
Short title (for enrollment/transcript - max. 30 characters) Cybersecurity Lab 1		
Course description for SFU Calendar (course descriptions should be brief and should never begin with phrases such as "This course will..." or "The purpose of this course is..." If the grading basis is satisfactory/unsatisfactory include this in the description) Simulating real attacks on software systems to assess the risk associated with potential security breaches to provide students with hand-on experience necessary for a successful career path in cybersecurity field. students are trained as penetration testers to learn how to discover vulnerabilities, exploit vulnerabilities, and to determine what attackers might gain after a successful vulnerability exploitation.		
Rationale for introduction of this course This lab course is designed to provide students enrolled into the new Cybersecurity Specialization of the Master of Science in Computer Science Program with hands-on system and software security experience.		
Term of initial offering (eg. Fall 2019) Summer 2020	Course delivery (eg. 3 hrs/week for 13 weeks) 12 hrs/week for 13 weeks	
Frequency of offerings/year once per year	Estimated enrollment per offering 50	
Equivalent courses (courses that replicates the content of this course to such an extent that students should not receive credit for both courses) None		
Prerequisite and/or Corequisite		
Criminal record check required? <input type="checkbox"/> Yes if yes is selected, add this as prerequisite		Additional course fees? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Campus where course will be taught <input checked="" type="checkbox"/> Burnaby <input type="checkbox"/> Surrey <input type="checkbox"/> Vancouver <input type="checkbox"/> Great Northern Way <input type="checkbox"/> Off campus		
Course Components * <input type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Independent <input type="checkbox"/> Capstone <input type="checkbox"/> _____		
Grading Basis <input checked="" type="checkbox"/> Letter grades <input type="checkbox"/> Satisfactory/ Unsatisfactory <input type="checkbox"/> In Progress / Complete		
Repeat for credit? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Total repeats allowed? _____	Repeat within a term? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Required course? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Final exam required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Capstone course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Combined with a undergrad course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, identify which undergraduate course and the additional course requirements for graduate students:		

* See important definitions on the curriculum website.

RESOURCES

If additional resources are required to offer this course, provide information on the source(s) of those additional resources.

Faculty member(s) who will normally teach this course Limited-term faculty member such as university research associate
Additional faculty members, space, and/or specialized equipment required in order to offer this course

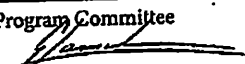

CONTACT PERSON

Academic Unit / Program School of Computing Science	Name (typically, Graduate Program Chair) Uwe Glässer	Email glaesser@cs.sfu.ca
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ACADEMIC UNIT APPROVAL

A course outline must be included.

Non-departmentalized faculties need not sign

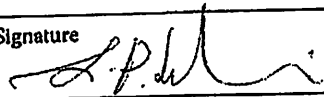
Graduate Program Committee 	Signature Ghassan Hamarneh	Date 2019-Aug-08
Department Chair Mohamed Hefeeda	Signature 	Date 2019-Aug-20

FACULTY APPROVAL

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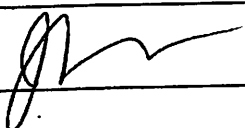
Overlap check done? YES

This approval indicates that all the necessary course content and overlap concerns have been resolved. The Faculty/Academic Unit commits to providing the necessary resources.

Faculty Graduate Studies Committee Parvaneh Saeedi	Signature 	Date Aug 20, 2019
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A library review will be conducted. If additional funds are necessary, DGS will contact the academic unit prior to SGSC.

SENATE GRADUATE STUDIES COMMITTEE APPROVAL

Senate Graduate Studies Committee Jeff Derksen	Signature 	Date NOV 14 2019
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ADMINISTRATIVE SECTION (for DGS office only) Library Check: AUG 29 2019 Course Attribute: _____ Course Attribute Value: _____ Instruction Mode: _____ Attendance Type: _____	If different from regular units: Academic Progress Units: _____ Financial Aid Progress Units: _____
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Course Outline - CMPT 782 – Cybersecurity Lab 1

Information

Subject	CMPT
Catalog Number	782
Section	D100
Title	Cybersecurity Lab 1
Instructor(s)	Limited Term Faculty Members
Campus	Burnaby Mountain Campus

Calendar Objective/Description

Simulating real attacks on software systems to assess the risk associated with potential security breaches will provide students with hands-on experience necessary for a successful career path in the cybersecurity field. Students are trained as penetration testers to learn how to discover vulnerabilities, exploit vulnerabilities, and determine what attackers might gain after a successful vulnerability exploitation.

Topics

- Security assessment via penetration testing: cyber threat intelligence, open source intelligence, gathering target information, vulnerability assessment, vulnerability exploitation, and post exploitation
- Cloud computing security: cloud computing architecture, security concerns and legal aspects, secure cloud architectural aspects, data security in cloud computing, key strategies and best practices in cloud computing, and evaluating cloud security
- Web Security: browser attacks, web attacks targeting users, web attacks using user or website data

Grading

12 assignments (100%)

Recommended Books

- Charles P. Pfleeger, Shari Lawrence Pfleeger, Jonathan Margulies. Security in Computing. Prentice Hall, 2015.
- Vic (J.R.) Winkler, Securing the Cloud: Cloud Computer Security Techniques and Tactics, Syngress, 2011.
- William Stallings and Lawrie Brown. Computer Security: Principles and Practice, 3rd Edition. Prentice Hall, 2018.
- Computer Security: A Hands-on Approach, Wenliang Du, Wenliang Du, 2019.

Academic Honesty Statement

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New Graduate Course Proposal

Course Subject (eg. PSYC) CMPT	Number (eg. 810) 783	Units (eg. 4) 6
Course title (max. 100 characters) Cybersecurity Lab 2		
Short title (for enrollment/transcript - max. 30 characters) Cybersecurity Lab 2		
Course description for SFU Calendar (course descriptions should be brief and should never begin with phrases such as "This course will..." or "The purpose of this course is..." If the grading basis is satisfactory/unsatisfactory include this in the description) Students will learn the fundamental principles of system and network security by studying attacks on computer systems, network and cloud infrastructure and how to prevent and detect them. The focus is on hands-on experiences. Students will be able to explain and reproduce former and recent system attacks, build network defensive systems, and design computer systems that are immune to these attacks.		
Rationale for introduction of this course The proposed lab course provides students with hands-on experience with computer network security threats and defensive mechanisms.		
Term of initial offering (eg. Fall 2019) Summer 2020	Course delivery (eg. 3 hrs/week for 13 weeks) 6 hrs/week for 13 weeks	
Frequency of offerings/year once per year	Estimated enrollment per offering 50	
Equivalent courses (courses that replicates the content of this course to such an extent that students should not receive credit for both courses) None		
Prerequisite and/or Corequisite		
Criminal record check required? <input type="checkbox"/> Yes if yes is selected, add this as prerequisite		Additional course fees? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Campus where course will be taught <input checked="" type="checkbox"/> Burnaby <input type="checkbox"/> Surrey <input type="checkbox"/> Vancouver <input type="checkbox"/> Great Northern Way <input type="checkbox"/> Off campus		
Course Components * <input type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Independent <input type="checkbox"/> Capstone <input type="checkbox"/> _____		
Grading Basis <input checked="" type="checkbox"/> Letter grades <input type="checkbox"/> Satisfactory/ Unsatisfactory <input type="checkbox"/> In Progress / Complete		
Repeat for credit? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Total repeats allowed? _____	Repeat within a term? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Required course? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Final exam required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Capstone course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Combined with a undergrad course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, identify which undergraduate course and the additional course requirements for graduate students:		

* See important definitions on the curriculum website.

RESOURCES

If additional resources are required to offer this course, provide information on the source(s) of those additional resources.

Faculty member(s) who will normally teach this course Limited-term faculty member such as university research associate
Additional faculty members, space, and/or specialized equipment required in order to offer this course

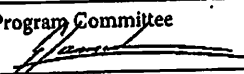

CONTACT PERSON

Academic Unit / Program School of Computing Science	Name (typically, Graduate Program Chair) Uwe Glässer	Email glaesser@cs.sfu.ca
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ACADEMIC UNIT APPROVAL

A course outline must be included.

Non-departmentalized faculties need not sign

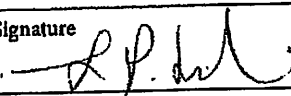
Graduate Program Committee 	Signature Ghassan Hamarneh	Date 2019-Aug-08
Department Chair Mohamed Hefeeda	Signature 	Date 2019-Aug-20

FACULTY APPROVAL

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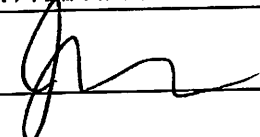
Overlap check done? YES

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Faculty Graduate Studies Committee Parvaneh Saeeedi	Signature 	Date Aug 20, 2019
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A library review will be conducted. If additional funds are necessary, DGS will contact the academic unit prior to SGSC.

SENATE GRADUATE STUDIES COMMITTEE APPROVAL

Senate Graduate Studies Committee Jeff Derksen	Signature 	Date NOV 14 2019
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ADMINISTRATIVE SECTION (for DGS office only)

Library Check: AUG 14 2019
 Course Attribute: _____
 Course Attribute Value: _____
 Instruction Mode: _____
 Attendance Type: _____

If different from regular units:
 Academic Progress Units: _____
 Financial Aid Progress Units: _____

Course Outline - CMPT 783 - Cybersecurity Lab 2

Information

Subject	CMPT 783
Catalog Number	783
Section	D100
Title	Cybersecurity Lab 2
Instructor(s)	Limited Term Faculty Members
Campus	Burnaby Mountain Campus

Calendar Objective/Description

Students will learn the fundamental principles of system and network security, by studying attacks on computer systems, network and cloud infrastructure and how to prevent and detect them. The focus is on hands-on experiences. Students will be able to explain and reproduce former and recent system attacks, build network defensive systems, and design computer systems that are immune to these attacks.

Topics

- Computer System Threats: review of operating systems; arbitrary code execution; race condition; buffer overflow; buffer over-read; CPU attacks
- Network Traffic Analysis: review of network layers; network monitoring and capturing; packet sniffing and spoofing
- Network Threats: Eavesdropping; Buffer over-read attacks; Man-in-the-middle attacks; Inter-domain attacks; DoS and DDoS attacks.
- Network Security Defenses: intrusion detection systems; Firewalls; Log Analytics
- Cloud Security: Data center networks; Software-defined data centers; Micro-segmentation; Building secure clouds

Grading

Assignments: 12*6% (72%)

Final Project: 28%

Recommended Books

- Computer Security: A Hands-on Approach, Wenliang Du, Wenliang Du, 2019.
- Network Intrusion Detection, Stephen Northcutt and Judy Novak, Sams Publishing, 2002.
- Practical Packet Analysis, Chris Sanders, No Starch Press, 2017.
- Applied Network Security Monitoring: Collection, Detection, and Analysis, Chris Sanders and Jason Smith, Syngress, 2013.
- (Optional) Computer Networking: A Top-Down Approach, James Kurose and Keith Ross, Pearson, 2016.
- (Optional) The Tao of Network Security Monitoring: Beyond Intrusion Detection, Richard Bejtlich, Addison-Wesley Professional, 2004.
- (Optional) TCP/IP Illustrated, Volume 3, W. Richard Stevens, Addison-Wesley Professional, 1996.

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New Graduate Course Proposal

Course Subject (eg. PSYC) CMPT	Number (eg. 810) 784	Units (eg. 4) 3
Course title (max. 100 characters) Cyber Risk Assessment and Management		
Short title (for enrollment/transcript - max. 30 characters) Risk Assessment and Management		
Course description for SFU Calendar (course descriptions should be brief and should never begin with phrases such as "This course will..." or "The purpose of this course is..." If the grading basis is satisfactory/unsatisfactory include this in the description) Cyber risk assessment and management has become a fundamental component of business operations. Understanding risk mitigation is an essential skill for business leaders, thought leaders, analysts, as well as security and technology specialists. This course equips students with a comprehensive understanding of how to identify, manage, estimate, and prioritize cyber risks, threats and vulnerabilities.		
Rationale for introduction of this course This course is designed to enable students enrolled into the Cybersecurity Specialization of the Master of Science in Computer Science Program to explore effective cyber risk management processes.		
Term of initial offering (eg. Fall 2019) Summer 2020	Course delivery (eg. 3 hrs/week for 13 weeks) 3 hrs/week for 13 weeks	
Frequency of offerings/year once per year	Estimated enrollment per offering 25	
Equivalent courses (courses that replicates the content of this course to such an extent that students should not receive credit for both courses) None		
Prerequisite and/or Corequisite		
Criminal record check required? <input type="checkbox"/> Yes if yes is selected, add this as prerequisite		Additional course fees? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Campus where course will be taught <input checked="" type="checkbox"/> Burnaby <input type="checkbox"/> Surrey <input type="checkbox"/> Vancouver <input type="checkbox"/> Great Northern Way <input type="checkbox"/> Off campus		
Course Components * <input type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Independent <input type="checkbox"/> Capstone <input type="checkbox"/> _____		
Grading Basis <input checked="" type="checkbox"/> Letter grades <input type="checkbox"/> Satisfactory/ Unsatisfactory <input type="checkbox"/> In Progress / Complete		
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Combined with a undergrad course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, identify which undergraduate course and the additional course requirements for graduate students:		

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RESOURCES

If additional resources are required to offer this course, provide information on the source(s) of those additional resources.

Faculty member(s) who will normally teach this course

Uwe Glässer, Janice Regan

Additional faculty members, space, and/or specialized equipment required in order to offer this course

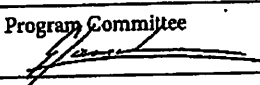

CONTACT PERSON

Academic Unit / Program School of Computing Science	Name (typically, Graduate Program Chair) Uwe Glässer	Email glaesser@cs.sfu.ca
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ACADEMIC UNIT APPROVAL

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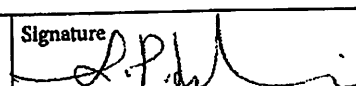
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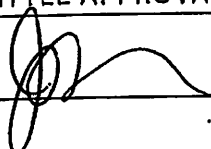
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Faculty Graduate Studies Committee Parvaneh Saeedi	Signature 	Date Aug 20, 2019
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SENATE GRADUATE STUDIES COMMITTEE APPROVAL

Senate Graduate Studies Committee Jeff Derksen	Signature 	Date NOV 14 2019
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ADMINISTRATIVE SECTION (for DGS office only)

Library Check: AUG 29 2019
Course Attribute: _____
Course Attribute Value: _____
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If different from regular units:
Academic Progress Units: _____
Financial Aid Progress Units: _____

Course Outline - CMPT 784 – Cyber Risk Assessment and Management

Information

Subject	CMPT
Catalog Number	784
Section	D100
Title	Cyber Risk Assessment and Management
Instructor(s)	Uwe Glässer, Janice Regan
Campus	Burnaby Mountain Campus

Calendar Objective/Description

Cyber risk assessment and management has become a fundamental component of business operations. Understanding risk mitigation is an essential skill for business leaders, thought leaders, analysts, as well as security and technology specialists. This course equips students with a comprehensive understanding of how to identify, manage, estimate, and prioritize cyber risks, threats and vulnerabilities.

Topics

- Fundamentals of cyber risk management, introducing risk identification, risk assessment, risk analysis, risk evaluation, and risk mitigation
- Risk management in practice, different measures for assessing risk levels, how to deal with uncertainty, and high-consequence risks with low likelihood
- Cybersecurity planning topics including strategic planning, operational and tactical management, incident response, disaster recovery, and business continuity

Grading

3 assignments (45%); one exam (20%); one final project (35%).

Recommended Books

- Douglas W. Hubbard, Richard Seiersen, How to Measure Anything in Cybersecurity Risk, John Wiley & Sons, 2016.
- Atle Refsdal, Bjørnar Solhaug, Ketil Stolen, Cyber-Risk Management, Springer, 2015.

Academic Honesty Statement

Academic honesty plays a key role in our efforts to maintain a high standard of academic excellence and integrity. Students are advised that ALL acts of intellectual dishonesty will be handled in accordance with the SFU Academic Honesty and Student Conduct Policies (<http://www.sfu.ca/policies/gazette/student.html>).

New Graduate Course Proposal

Course Subject (eg. PSYC) CMPT	Number (eg. 810) 785	Units (eg. 4) 3
Course title (max. 100 characters) Secure Software Design		
Short title (for enrollment/transcript - max. 30 characters) Secure Software Design		
Course description for SFU Calendar (course descriptions should be brief and should never begin with phrases such as "This course will..." or "The purpose of this course is..." If the grading basis is satisfactory/unsatisfactory include this in the description) The security of software depends on how well the requirements match the needs that the software is to address, how well the software is designed, implemented, tested, and deployed and maintained. This is an advanced course on the rigorous development and use of software that reliably preserves the security properties of the information and systems it protects.		
Rationale for introduction of this course This course makes students enrolled into the new Cybersecurity Specialization of the Master of Science in Computer Science Program familiar with important aspects of secure software design.		
Term of initial offering (eg. Fall 2019) Summer 2020	Course delivery (eg. 3 hrs/week for 13 weeks) 3 hrs/week for 13 weeks	
Frequency of offerings/year once per year	Estimated enrollment per offering 25	
Equivalent courses (courses that replicates the content of this course to such an extent that students should not receive credit for both courses) None		
Prerequisite and/or Corequisite		
Criminal record check required? <input type="checkbox"/> Yes <input type="checkbox"/> No if yes is selected, add this as prerequisite		Additional course fees? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Campus where course will be taught <input checked="" type="checkbox"/> Burnaby <input type="checkbox"/> Surrey <input type="checkbox"/> Vancouver <input type="checkbox"/> Great Northern Way <input type="checkbox"/> Off campus		
Course Components * <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Lab <input type="checkbox"/> Independent <input type="checkbox"/> Capstone <input type="checkbox"/> _____		
Grading Basis <input checked="" type="checkbox"/> Letter grades <input type="checkbox"/> Satisfactory/ Unsatisfactory <input type="checkbox"/> In Progress / Complete		
Repeat for credit? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Total repeats allowed? _____	Repeat within a term? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Required course? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Final exam required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Capstone course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Combined with a undergrad course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, identify which undergraduate course and the additional course requirements for graduate students:		

* See important definitions on the curriculum website.

RESOURCES

If additional resources are required to offer this course, provide information on the source(s) of those additional resources.

Faculty member(s) who will normally teach this course William Sumner, Robert D. Cameron
Additional faculty members, space, and/or specialized equipment required in order to offer this course


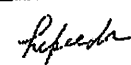
CONTACT PERSON

Academic Unit / Program School of Computing Science	Name (typically, Graduate Program Chair) Uwe Glässer	Email glaesser@cs.sfu.ca
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ACADEMIC UNIT APPROVAL

A course outline must be included.

Non-departmentalized faculties need not sign

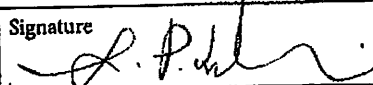
Graduate Program Committee 	Signature Ghassan Hamarneh	Date 2019-Aug-08
Department Chair Mohamed Hefeeda	Signature 	Date 2019-Aug-20

FACULTY APPROVAL

The course form and outline must be sent by FGSC to the chairs of each FGSC (fgsc-list@sfu.ca) to check for an overlap in content

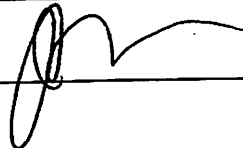
Overlap check done? YES

This approval indicates that all the necessary course content and overlap concerns have been resolved. The Faculty/Academic Unit commits to providing the necessary resources.

Faculty Graduate Studies Committee Pariwansh Sapre	Signature 	Date Aug 20, 2019
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A library review will be conducted. If additional funds are necessary, DGS will contact the academic unit prior to SGSC.

SENATE GRADUATE STUDIES COMMITTEE APPROVAL

Senate Graduate Studies Committee Jeff Derksen	Signature 	Date NOV 14 2019
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ADMINISTRATIVE SECTION (for DGS office only)

Library Check: **AUG 29 2019**

Course Attribute: _____

Course Attribute Value: _____

Instruction Mode: _____

Attendance Type: _____

If different from regular units:
 Academic Progress Units: _____
 Financial Aid Progress Units: _____

Course Outline - CMPT 785 – Secure Software Design

Information

Subject	CMPT
Catalog Number	785
Section	D100
Title	Secure Software Design
Instructor(s)	William Sumner, Robert D. Cameron
Campus	Burnaby Mountain Campus

Calendar Objective/Description

The security of software depends on how well the requirements match the needs that the software is to address, how well the software is designed, implemented, tested, and deployed and maintained. This is an advanced course on the rigorous development and use of software that reliably preserves the security properties of the information and systems it protects.

Topics

- Fundamental Principles including least privilege, fail-safe defaults, layering, abstraction, modularity, linkage, and design for iteration
- Design: derivation of security requirements, specification, development lifecycle
- Implementation
- Analysis and Testing
- Deployment, Maintenance, and Documentation

Grading

Assignments (50%), midterm exam (25%), final project (25%)

Recommended Books

- Secure and Resilient Software, Mark Merkow and Lakshmikanth Raghavan, CRC Press, 2010.
- Software Security Engineering: A Guide for Project Managers, Julia H. Allen, Sean J. Barnum, Robert J. Ellison, Gary McGraw, Nancy R. Mead, Pearson Education, 2008.
- Building Secure Software: How to Avoid Security Problems the Right Way, John Viega, Gary McGraw, Addison-wesley, 2001.

Academic Honesty Statement

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New Graduate Course Proposal

Course Subject (eg. PSYC) CMPT	Number (eg. 810) 786	Units (eg. 4) 3
Course title (max. 100 characters) Cloud and Network Security		
Short title (for enrollment/transcript - max. 30 characters) Cloud and Network Security		
Course description for SFU Calendar (course descriptions should be brief and should never begin with phrases such as "This course will..." or "The purpose of this course is..." If the grading basis is satisfactory/unsatisfactory include this in the description) The course covers network attacks as well as techniques to defend against them. This includes protocol-specific attacks (e.g., TCP/IP and BGP) and generic attacks (e.g., Denial of Service); infrastructure topics such as centralized control, SDN, virtualization, NFV, intrusion detection; and new technologies related to containers, IoT, access, 5G.		
Rationale for introduction of this course This course is essential for students who want to expand their knowledge and experience with cloud and network security.		
Term of initial offering (eg. Fall 2019) Summer 2020	Course delivery (eg. 3 hrs/week for 13 weeks) 3 hrs/week for 13 weeks	
Frequency of offerings/year once per year	Estimated enrollment per offering 25	
Equivalent courses (courses that replicates the content of this course to such an extent that students should not receive credit for both courses) None		
Prerequisite and/or Corequisite		
Criminal record check required? <input type="checkbox"/> Yes <input type="checkbox"/> No if yes is selected, add this as prerequisite		Additional course fees? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Campus where course will be taught <input checked="" type="checkbox"/> Burnaby <input type="checkbox"/> Surrey <input type="checkbox"/> Vancouver <input type="checkbox"/> Great Northern Way <input type="checkbox"/> Off campus		
Course Components * <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Lab <input type="checkbox"/> Independent <input type="checkbox"/> Capstone <input type="checkbox"/> _____		
Grading Basis <input checked="" type="checkbox"/> Letter grades <input type="checkbox"/> Satisfactory/ Unsatisfactory <input type="checkbox"/> In Progress / Complete		
Repeat for credit? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Total repeats allowed? _____	Repeat within a term? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Required course? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Final exam required? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Capstone course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Combined with a undergrad course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, identify which undergraduate course and the additional course requirements for graduate students:		

* See important definitions on the curriculum website.

RESOURCES

If additional resources are required to offer this course, provide information on the source(s) of those additional resources.

Faculty member(s) who will normally teach this course Ouidooz Baghban Karimi, Mohamed Hefeeda
Additional faculty members, space, and/or specialized equipment required in order to offer this course

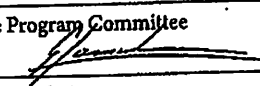
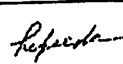
CONTACT PERSON

Academic Unit / Program School of Computing Science	Name (typically, Graduate Program Chair) Uwe Glässer	Email glaesser@cs.sfu.ca
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ACADEMIC UNIT APPROVAL

A course outline must be included.

Non-departmentalized faculties need not sign

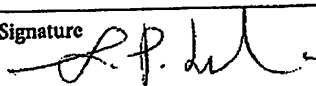
Graduate Program Committee 	Signature Ghassan Hamarneh	Date 2019-Aug-08
Department Chair Mohamed Hefeeda	Signature 	Date 2019-Aug-20

FACULTY APPROVAL

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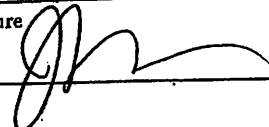
Overlap check done? YES

This approval indicates that all the necessary course content and overlap concerns have been resolved. The Faculty/Academic Unit commits to providing the necessary resources.

Faculty Graduate Studies Committee Parvaneh Saeedi	Signature 	Date Aug 20, 2019
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A library review will be conducted. If additional funds are necessary, DGS will contact the academic unit prior to SGSC.

SENATE GRADUATE STUDIES COMMITTEE APPROVAL

Senate Graduate Studies Committee Jeff Derksen	Signature 	Date NOV 14 2019
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ADMINISTRATIVE SECTION (for DGS office only) Library Check: AUG 29 2019 Course Attribute: _____ Course Attribute Value: _____ Instruction Mode: _____ Attendance Type: _____	If different from regular units: Academic Progress Units: _____ Financial Aid Progress Units: _____
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Course Outline - CMPT 786 - Cloud and Network Security

Information

Subject	CMPT
Catalog Number	786
Section	D100
Title	Computer Network Security
Instructor(s)	Ouldooz Baghban Karimi, Mohamed Hefeeda
Campus	Burnaby Mountain Campus

Calendar Objective/Description

The course covers network attacks as well as techniques to defend against them. This includes protocol-specific attacks (e.g., TCP/IP and BGP) and generic attacks (e.g., Denial of Service); infrastructure topics such as centralized control, SDN, virtualization, NFV, intrusion detection; and new technologies related to containers, IoT, access, 5G.

Topics

- Brief review of network infrastructure, layers and applications, software-defined networking
- Network security and attacks: SDN security, network function virtualization (NFV), ACL and firewalls, intrusion detection systems, virtual private networks, public key infrastructure
- Cloud security: Micro-segmentation, container security
- Special topics: blockchain security, network forensics

Grading

Assignments: 4 * 6% (24%)

Mid-term: 10%

Final Exam: 26%

Final Project: 40%

Recommended Books

- Computer Networking: A Top-Down Approach, James Kurose and Keith Ross, Pearson, 2016.
- Computer Security: A Hands-on Approach, Wenliang Du, 2019.
- Security Engineering: A Guide to Building Dependable Distributed Systems, Ross Anderson, Second Edition, Wiley, 2008. (Third Edition Expected in Early 2020)

Academic Honesty Statement

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New Graduate Course Proposal

Course Subject (eg. PSYC) CMPT	Number (eg. 810) 787	Units (eg. 4) 3
Course title (max. 100 characters) Ethical Hacking		
Short title (for enrollment/transcript - max. 30 characters) Ethical Hacking		
Course description for SFU Calendar (course descriptions should be brief and should never begin with phrases such as "This course will..." or "The purpose of this course is..." If the grading basis is satisfactory/unsatisfactory include this in the description) Development of the structured knowledge base of penetration testing to validate security measures and identify vulnerabilities and providing solutions for tightening system and network security and protecting data from unauthorized access. Provides an understanding of how vulnerable systems can be compromised as a means to motivate how to strengthen the defense.		
Rationale for introduction of this course This course provides students enrolled into the new Cybersecurity Specialization of the Master of Science in Computer Science Program with hands-on experiences in ethical hacking.		
Term of initial offering (eg. Fall 2019) Summer 2020	Course delivery (eg. 3 hrs/week for 13 weeks) 3 hrs/week for 13 weeks	
Frequency of offerings/year once per year	Estimated enrollment per offering 25	
Equivalent courses (courses that replicates the content of this course to such an extent that students should not receive credit for both courses) None		
Prerequisite and/or Corequisite		
Criminal record check required? <input type="checkbox"/> Yes <input type="checkbox"/> No if yes is selected, add this as prerequisite		Additional course fees? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Campus where course will be taught <input checked="" type="checkbox"/> Burnaby <input type="checkbox"/> Surrey <input type="checkbox"/> Vancouver <input type="checkbox"/> Great Northern Way <input type="checkbox"/> Off campus		
Course Components * <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Lab <input type="checkbox"/> Independent <input type="checkbox"/> Capstone <input type="checkbox"/> _____		
Grading Basis <input checked="" type="checkbox"/> Letter grades <input type="checkbox"/> Satisfactory/ Unsatisfactory <input type="checkbox"/> In Progress / Complete		
Repeat for credit? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Total repeats allowed? _____	Repeat within a term? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Required course? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Final exam required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Capstone course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Combined with a undergrad course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, identify which undergraduate course and the additional course requirements for graduate students:		

* See important definitions on the curriculum website.

RESOURCES

If additional resources are required to offer this course, provide information on the source(s) of those additional resources.

Faculty member(s) who will normally teach this course Brad Bart, Greg Baker
Additional faculty members, space, and/or specialized equipment required in order to offer this course

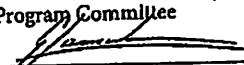
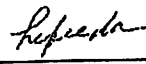
CONTACT PERSON

Academic Unit / Program School of Computing Science	Name (typically, Graduate Program Chair) Uwe Glässer	Email glaesser@cs.sfu.ca
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ACADEMIC UNIT APPROVAL

A course outline must be included.

Non-departmentalized faculties need not sign

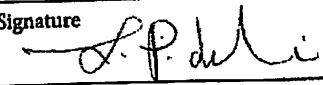
Graduate Program Committee 	Signature Ghassan Hamarneh	Date 2019-Aug-08
Department Chair Mohamed Hefeeda	Signature 	Date 2019-Aug-20

FACULTY APPROVAL

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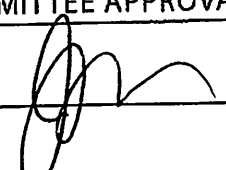
Overlap check done? YES

This approval indicates that all the necessary course content and overlap concerns have been resolved. The Faculty/Academic Unit commits to providing the necessary resources.

Faculty Graduate Studies Committee Parvaneh Saeedi	Signature 	Date Aug 20, 2019
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A library review will be conducted. If additional funds are necessary, DGS will contact the academic unit prior to SGSC.

SENATE GRADUATE STUDIES COMMITTEE APPROVAL

Senate Graduate Studies Committee Jeff Derksen	Signature 	Date NOV 14 2019
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ADMINISTRATIVE SECTION (for DGS office only) Library Check: AUG 29 2019 Course Attribute: _____ Course Attribute Value: _____ Instruction Mode: _____ Attendance Type: _____	If different from regular units: Academic Progress Units: _____ Financial Aid Progress Units: _____
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Course Outline - CMPT 787 – Ethical Hacking

Information

Subject	CMPT
Catalog Number	787
Section	D100
Title	Ethical Hacking
Instructor(s)	Brad Bart, Greg Baker
Campus	Burnaby Mountain Campus

Calendar Objective/Description

Development of the structured knowledge base of penetration testing to validate security measures and identify vulnerabilities and providing solutions for tightening system and network security and protecting data from unauthorized access. This course provides an understanding of how vulnerable systems can be compromised as a means to motivate how to strengthen the defense.

Topics

- Ethical hacking basics: laws and guidelines
- Investigate reconnaissance: information gathering for ethical hacking
- Hacking through the network
- Attacking a computer system: Windows system hacking and Linux hacking
- Wireless network hacking
- Web-based hacking
- Social engineering and physical security
- Trojans, backdoors, viruses, and worm attacks

Grading

6 assignments (60%), final project (40%)

Recommended Books

- Gray Hat Hacking The Ethical Hackers Handbook, Daniel Regalado, Shon Harris, Allen Harper, Chris Eagle, Jonathan Ness, Branko Spasojevic, Ryan Linn, Stephen Sims, McGraw-Hill Education, 2015.
- Weidman, Georgia. Penetration testing: a hands-on introduction to hacking. No Starch Press, 2014.
- Computer Security: A Hands-on Approach, Wenliang Du, Wenliang Du, 2019.

Academic Honesty Statement

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New Graduate Course Proposal

Course Subject (eg. PSYC) CMPT	Number (eg. 810) 788	Units (eg. 4) 6
Course title (max. 100 characters) Information Privacy		
Short title (for enrollment/transcript - max. 30 characters) Information Privacy		
Course description for SFU Calendar (course descriptions should be brief and should never begin with phrases such as "This course will..." or "The purpose of this course is..." If the grading basis is satisfactory/unsatisfactory include this in the description) Technological innovation in how individuals, organizations, and governments collect and share personal information have raised serious concerns. Data breaches have grown in frequency over the past decade, exposing us to identity theft, financial fraud and intellectual property theft. Introduces fundamental privacy concepts in a broad sense with emphasis on challenging and emerging research topics in privacy.		
Rationale for introduction of this course This course provides students enrolled into the new Cybersecurity Specialization of the Master of Science in Computer Science Program with fundamental aspect of information privacy.		
Term of initial offering (eg. Fall 2019) Summer 2020	Course delivery (eg. 3 hrs/week for 13 weeks) 3 hrs/week for 13 weeks	
Frequency of offerings/year once per year	Estimated enrollment per offering 25	
Equivalent courses (courses that replicates the content of this course to such an extent that students should not receive credit for both courses) None		
Prerequisite and/or Corequisite		
Criminal record check required? <input type="checkbox"/> Yes if yes is selected, add this as prerequisite		Additional course fees? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Campus where course will be taught <input checked="" type="checkbox"/> Burnaby <input type="checkbox"/> Surrey <input type="checkbox"/> Vancouver <input type="checkbox"/> Great Northern Way <input type="checkbox"/> Off campus		
Course Components * <input type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Independent <input type="checkbox"/> Capstone <input type="checkbox"/> _____		
Grading Basis <input checked="" type="checkbox"/> Letter grades <input type="checkbox"/> Satisfactory/ Unsatisfactory <input type="checkbox"/> In Progress / Complete		
Repeat for credit? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Total repeats allowed? _____	Repeat within a term? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Required course? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Final exam required? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Capstone course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Combined with a undergrad course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, identify which undergraduate course and the additional course requirements for graduate students:		

* See important definitions on the curriculum website.

RESOURCES

If additional resources are required to offer this course, provide information on the source(s) of those additional resources.

Faculty member(s) who will normally teach this course Igor Shinkar, Andrei Bulatov
Additional faculty members, space, and/or specialized equipment required in order to offer this course

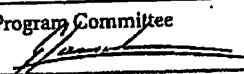

CONTACT PERSON

Academic Unit / Program School of Computing Science	Name (typically, Graduate Program Chair) Uwe Glässer	Email glaesser@cs.sfu.ca
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ACADEMIC UNIT APPROVAL

A course outline must be included.

Non-departmentalized faculties need not sign

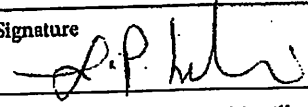
Graduate Program Committee 	Signature Ghassan Hamarneh	Date 2019-Aug-08
Department Chair Mohamed Hefeeda	Signature 	Date 2019-Aug-20

FACULTY APPROVAL

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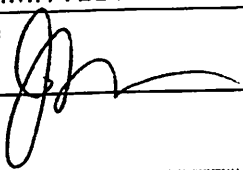
Overlap check done? YES

This approval indicates that all the necessary course content and overlap concerns have been resolved. The Faculty/Academic Unit commits to providing the necessary resources.

Faculty Graduate Studies Committee Parvaneh Saeedi	Signature 	Date Aug 20, 2014
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A library review will be conducted. If additional funds are necessary, DGS will contact the academic unit prior to SGSC.

SENATE GRADUATE STUDIES COMMITTEE APPROVAL

Senate Graduate Studies Committee Jeff Derksen	Signature 	Date NOV 14 2019
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ADMINISTRATIVE SECTION (for DGS office only) Library Check: AUG 7 9 2019 Course Attribute: _____ Course Attribute Value: _____ Instruction Mode: _____ Attendance Type: _____	If different from regular units: Academic Progress Units: _____ Financial Aid Progress Units: _____
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Course Outline - CMPT 788 – Information Privacy

Information

Subject	CMPT
Catalog Number	788
Section	D100
Title	Information Privacy
Instructor(s)	Igor Shinkar, Andrei Bulatov
Campus	Burnaby Mountain Campus

Calendar Objective/Description

Technological innovation in how individuals, organizations, and governments collect and share personal information have raised serious concerns. Data breaches have grown in frequency over the past decade, exposing us to identity theft, financial fraud and intellectual property. This course introduces fundamental privacy concepts in a broad sense with emphasis on challenging and emerging research topics in privacy.

Topics

- Contemporary issues in privacy: privacy concerns with networked technologies; anonymous communication protocols; privacy-preserving services: social networks and social data; information hiding using watermarking and steganography; secure passwords; secure digital currency; online tracking.
- Algorithmic foundations of data privacy: differential privacy; private optimization algorithms; smooth sensitivity and sampling in private data analysis; privacy and mechanism design.

Grading

3 assignments (30%), midterm exam (30%), final exam (40%)

Recommended Books

- Helen Nissenbaum, *Privacy in Context: Technology, Policy, and the Integrity of Social Life*, Stanford Law Books, 2009.
- Cynthia Dwork and Aaron Roth, *The Algorithmic Foundations of Differential Privacy*, Now Publishers Inc, 2014.

Academic Honesty Statement

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New Graduate Course Proposal

Course Subject (eg. PSYC) CMPT	Number (eg. 810) 789	Units (eg. 4) 3
Course title (max. 100 characters) Applied Cryptography		
Short title (for enrollment/transcript - max. 30 characters) Applied Cryptography		
Course description for SFU Calendar (course descriptions should be brief and should never begin with phrases such as "This course will..." or "The purpose of this course is..." If the grading basis is satisfactory/unsatisfactory include this in the description) Explores modern cryptographic and cryptoanalytics techniques in detail, and emphasizes how such mechanisms can be effectively used within larger security systems, and finding their vulnerabilities. Topics covered include cryptographic primitives, public key encryption, digital signature, message authentication codes, cryptographic protocols, and attacks.		
Rationale for introduction of this course This course is an important course for students enrolled into the new Cybersecurity Specialization of the Master of Science in Computer Science Program.		
Term of initial offering (eg. Fall 2019) Summer 2020	Course delivery (eg. 3 hrs/week for 13 weeks) 3 hrs/week for 13 weeks	
Frequency of offerings/year once a year	Estimated enrollment per offering 25	
Equivalent courses (courses that replicates the content of this course to such an extent that students should not receive credit for both courses) None		
Prerequisite and/or Corequisite		
Criminal record check required? <input type="checkbox"/> Yes if yes is selected, add this as prerequisite		Additional course fees? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Campus where course will be taught <input checked="" type="checkbox"/> Burnaby <input type="checkbox"/> Surrey <input type="checkbox"/> Vancouver <input type="checkbox"/> Great Northern Way <input type="checkbox"/> Off campus		
Course Components * <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Lab <input type="checkbox"/> Independent <input type="checkbox"/> Capstone <input type="checkbox"/>		
Grading Basis <input checked="" type="checkbox"/> Letter grades <input type="checkbox"/> Satisfactory/ Unsatisfactory <input type="checkbox"/> In Progress / Complete		
Repeat for credit? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Total repeats allowed? _____	Repeat within a term? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Required course? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Final exam required? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Capstone course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Combined with a undergrad course? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, identify which undergraduate course and the additional course requirements for graduate students:		

* See important definitions on the curriculum website.

RESOURCES

If additional resources are required to offer this course, provide information on the source(s) of those additional resources.

Faculty member(s) who will normally teach this course Andrea Bulatov, Igor Shinkar
Additional faculty members, space, and/or specialized equipment required in order to offer this course

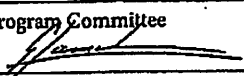
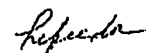
CONTACT PERSON

Academic Unit / Program School of Computing Science	Name (typically, Graduate Program Chair) Uwe Glässer	Email glaesser@cs.sfu.ca
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ACADEMIC UNIT APPROVAL

A course outline must be included.

Non-departmentalized faculties need not sign

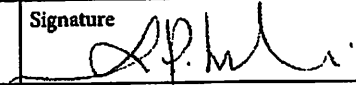
Graduate Program Committee 	Signature Ghassan Hamarneh	Date 2019-Aug-08
Department Chair Mohamed Hefeeda	Signature 	Date 2019-Aug-20

FACULTY APPROVAL

The course form and outline must be sent by FGSC to the chairs of each FGSC (fgsc-list@sfu.ca) to check for an overlap in content

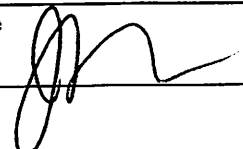
Overlap check done? YES

This approval indicates that all the necessary course content and overlap concerns have been resolved. The Faculty/Academic Unit commits to providing the necessary resources.

Faculty Graduate Studies Committee Parvaneh Saeechi	Signature 	Date Aug 20, 2019
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A library review will be conducted. If additional funds are necessary, DGS will contact the academic unit prior to SGSC.

SENATE GRADUATE STUDIES COMMITTEE APPROVAL

Senate Graduate Studies Committee Jeff Derksen	Signature 	Date NOV 14 2019
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ADMINISTRATIVE SECTION (for DGS office only)
 Library Check: **AUG 29 2019**
 Course Attribute: _____
 Course Attribute Value: _____
 Instruction Mode: _____
 Attendance Type: _____

If different from regular units:
 Academic Progress Units: _____
 Financial Aid Progress Units: _____

Course Outline - CMPT 789 – Applied Cryptography

Information

Subject	CMPT
Catalog Number	789
Section	D100
Title	Applied Cryptography
Instructor(s)	Andrei Bulatov, Igor Shinkar
Campus	Burnaby Mountain Campus

Calendar Objective/Description

Explores modern cryptographic and cryptoanalytics techniques in detail, emphasizes how such mechanisms can be effectively used within larger security systems, and how to find their vulnerabilities. Topics covered include cryptographic primitives, public key encryption, digital signature, message authentication codes, cryptographic protocols, and attacks.

- Basic concepts in cryptography including mathematical background, historical ciphers, symmetric ciphers, asymmetric ciphers
- Secret key encryption: substitution cipher, DES and AES algorithms, and encryption modes
- One-hash functions: concepts and properties, popular algorithms and applications, hash-collision attacks
- Public key cryptography: Diffie-Hellman key exchange, the RSA algorithm, programming interfaces and applications
- Public key infrastructure: attacks on public key crypto, certificates and certificate authorities, and attacks on public key infrastructure
- Secure communication protocols: application and transport layer protocols, attacks on TLS, Internet/network layer, privacy preserving protocols, data link layer

Grading

Assignments 4 × 6% (24%); Mid-term: 16%; Final Exam 35%; Final Project: 25%

Recommended Books

- Introduction to Modern Cryptography, Jonathan Katz and Yehuda Lindell, Chapman and Hall/CRC, 2014.
- Understanding Cryptography: A Textbook for Students and Practitioners, Christof Paar and Jan Pelzl, Springer, 2010.
- Applied Cryptography, Bruce Schneier, Wiley, 1996.

Academic Honesty Statement

Academic honesty plays a key role in our efforts to maintain a high standard of academic excellence and integrity. Students are advised that ALL acts of intellectual dishonesty will be handled in accordance with the SFU Academic Honesty and Student Conduct Policies (<http://www.sfu.ca/policies/gazette/student.html>).

New Graduate Course Proposal

Course Subject (eg. PSYC) CMPT	Number (eg. 810) 629	Units (eg. 4) 3
Course title (max. 100 characters) Graduate Project		
Short title (for enrollment/transcript - max. 30 characters) Graduate Project		
Course description for SFU Calendar (course descriptions should be brief and should never begin with phrases such as "This course will..." or "The purpose of this course is..." If the grading basis is satisfactory/unsatisfactory include this in the description)		
Rationale for introduction of this course If a student is unsuccessful in securing a co-op placement they will have the opportunity to complete a project instead.		
Term of initial offering (eg. Fall 2019) Summer 2020	Course delivery (eg. 3 hrs/week for 13 weeks) 40hr/13wks	
Frequency of offerings/year 3	Estimated enrollment per offering 10	
Equivalent courses (courses that replicates the content of this course to such an extent that students should not receive credit for both courses)		
Prerequisite and/or Corequisite Prerequisite: Permission of the Graduate Program Chair.		
Criminal record check required? <input type="checkbox"/> Yes <input type="checkbox"/> No if yes is selected, add this as prerequisite		Additional course fees? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Campus where course will be taught <input checked="" type="checkbox"/> Burnaby <input type="checkbox"/> Surrey <input type="checkbox"/> Vancouver <input type="checkbox"/> Great Northern Way <input checked="" type="checkbox"/> Off campus		
Course Components * <input type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Independent <input type="checkbox"/> Capstone <input type="checkbox"/> _____		
Grading Basis <input type="checkbox"/> Letter grades <input checked="" type="checkbox"/> Satisfactory/ Unsatisfactory <input type="checkbox"/> In Progress / Complete		
Repeat for credit? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Total repeats allowed? 2	Repeat within a term? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Required course? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Final exam required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Capstone course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Combined with a undergrad course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, identify which undergraduate course and the additional course requirements for graduate students:		

* See important definitions on the curriculum website.

RESOURCES

If additional resources are required to offer this course, provide information on the source(s) of those additional resources.

Faculty member(s) who will normally teach this course. Students will be supervised by the Associate, Director for the Program and/or other Professors dependent on the project requirements.
Additional faculty members, space, and/or specialized equipment required in order to offer this course NONE

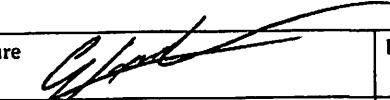
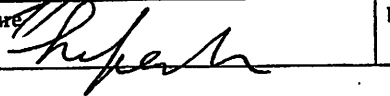
CONTACT PERSON

Academic Unit / Program Computing Science	Name (typically, Graduate Program Chair) Ghassan Hamarneh	Email hamameh@sfu.ca
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ACADEMIC UNIT APPROVAL

A course outline must be included.

Non-departmentalized faculties need not sign

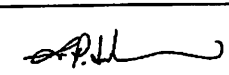
Graduate Program Committee Ghassan Hamarneh	Signature 	Date September 30, 2019
Department Chair Mohamed Hefeeda	Signature 	Date September 30, 2019

FACULTY APPROVAL

The course form and outline must be sent by FGSC to the chairs of each FGSC (fgsc-list@sfu.ca) to check for an overlap in content

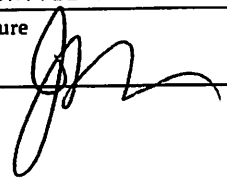
Overlap check done? YES

This approval indicates that all the necessary course content and overlap concerns have been resolved. The Faculty/Academic Unit commits to providing the necessary resources.

Faculty Graduate Studies Committee Parvaneh Saeedi	Signature 	Date October 3, 2019
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A library review will be conducted. If additional funds are necessary, DGS will contact the academic unit prior to SGSC.

SENATE GRADUATE STUDIES COMMITTEE APPROVAL

Senate Graduate Studies Committee Jeff Derksen	Signature 	Date NOV 14 2019
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ADMINISTRATIVE SECTION (for DGS office only)

Library Check: _____
 Course Attribute: _____
 Course Attribute Value: _____
 Instruction Mode: _____
 Attendance Type: _____

If different from regular units:
 Academic Progress Units: 6
 Financial Aid Progress Units: 6



MEMORANDUM

Attention Dr. Jeff Derksen
Dean, Graduate Studies

Date Oct 15, 2019

From Dr. Parvaneh Saeedi psaeedi@sfu.ca
Faculty of Applied Science, Graduate Studies Committee

Re: FAS-CMPT and ENSC

Approved by the Faculty of Applied Sciences and sent to Senate Graduate Studies Committee for review and approval, effective Summer 2020:

School of Computing Science

- ~~1. Calendar change (Cybersecurity specialization): Computer Science, MSc~~
2. New course: CMPT 729

~~School of Engineering Science~~

- ~~1. Calendar Entry Change: Engineering Science MEng, MASE, and PhD~~
- ~~2. Course changes: ENSC 701, ENSC 702, ENSC 703~~

Regards,
Parvaneh Saeedi



MEMORANDUM

Attention: Dr. Parvaneh Saeedi
Associate Dean, Applied Sciences

Date: Oct 1, 2019

From: Dr. Ghassan Hamarneh hamarneh@sfu.ca
Graduate Program Director, School of Computing Science

Re: CMPT Calendar – New Graduate Course Proposal – CMPT 729

The following is a new course proposal that has been approved by the CMPT GPC and is forwarded to the Senate Graduate Studies Committee for approval via the FAS GPC. This curriculum change should be effective for **Summer 2020**. Please include this on the next SGSC agenda.

Rationale:

There is great demand for grad courses on machine learning. Reinforcement learning is an advanced topic in machine learning that has been applied in many other fields, such as Application areas include Artificial Intelligence, Robotics, Operations Research, and Control. As AI applications advance towards decision support and autonomous agent, learning to act on an environment to improve system outcomes is becoming increasingly important.

Best Regards,

Dr. Ghassan Hamarneh
Graduate Program Director,
School of Computing Science

New Graduate Course Proposal

Course Subject (eg. PSYC) CMPT	Number (eg. 810) 729	Units (eg. 4) 3
Course title (max. 100 characters) Reinforcement Learning		
Short title (for enrollment/transcript - max. 30 characters) Reinforcement Learning		
Course description for SFU Calendar (course descriptions should be brief and should never begin with phrases such as "This course will..." or "The purpose of this course is..." If the grading basis is satisfactory/unsatisfactory include this in the description) Reinforcement learning is the branch of machine learning that studies learning to act. Agents observe, predict, and act to change their environment. Reinforcement learning has notable success in learning to play video & board games, improving robot performance, and task scheduling. Many recent successes have utilized neural nets, an approach known as deep reinforcement learning.		
Rationale for introduction of this course There is great demand for grad courses on machine learning. Reinforcement learning is an advanced topic in machine learning that has been applied in many other fields, such as Application areas include Artificial Intelligence, Robotics, Operations Research, and Control. As AI applications advance towards decision support and autonomous agent, learning to act on an environment to improve system outcomes is becoming increasingly important.		
Term of initial offering (eg. Fall 2019) Summer 2020	Course delivery (eg. 3 hrs/week for 13 weeks) 3 hrs/week for 13 weeks	
Frequency of offerings/year 1/year	Estimated enrollment per offering 60	
Equivalent courses (courses that replicates the content of this course to such an extent that students should not receive credit for both courses)		
Prerequisite and/or Corequisite		
Criminal record check required? <input type="checkbox"/> Yes <input type="checkbox"/> No if yes is selected, add this as prerequisite		Additional course fees? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Campus where course will be taught <input checked="" type="checkbox"/> Burnaby <input type="checkbox"/> Surrey <input type="checkbox"/> Vancouver <input type="checkbox"/> Great Northern Way <input type="checkbox"/> Off campus		
Course Components* <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Lab <input type="checkbox"/> Independent <input type="checkbox"/> Capstone <input type="checkbox"/> _____		
Grading Basis <input checked="" type="checkbox"/> Letter grades <input type="checkbox"/> Satisfactory/Unsatisfactory <input type="checkbox"/> In Progress / Complete		
Repeat for credit? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Total repeats allowed? 0	Repeat within a term? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Required course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Final exam required? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Capstone course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Combined with an undergrad course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, identify which undergraduate course and the additional course requirements for graduate students:		

* See important definitions on the curriculum website.

RESOURCES

If additional resources are required to offer this course, provide information on the source(s) of those additional resources.

Faculty member(s) who will normally teach this course Oliver Schulte, KangKang Yin, Mo Chen, Angel Chang
Additional faculty members, space, and/or specialized equipment required in order to offer this course

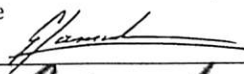

CONTACT PERSON

Academic Unit / Program CMPT	Name (typically, Graduate Program Chair) Oliver Schulte	Email oschulte@sfu.ca
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ACADEMIC UNIT APPROVAL

A course outline must be included.

Non-departmentalized faculties need not sign


Graduate Program Committee Ghassan Hamarneh	Signature 	Date 2019-Sep-21
Department Chair Mohamed Hefeeda	Signature 	Date 22 Sep 2019

FACULTY APPROVAL

The course form and outline must be sent by FGSC to the chairs of each FGSC (fgsc-list@sfu.ca) to check for an overlap in content

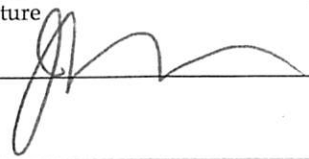
Overlap check done? YES

This approval indicates that all the necessary course content and overlap concerns have been resolved. The Faculty/Academic Unit commits to providing the necessary resources.

Faculty Graduate Studies Committee Parvaneh Saeedi	Signature 	Date October 3, 2019
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A library review will be conducted. If additional funds are necessary, DGS will contact the academic unit prior to SGSC.

SENATE GRADUATE STUDIES COMMITTEE APPROVAL

Senate Graduate Studies Committee Jeff Derksen	Signature 	Date NOV 14 2019
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ADMINISTRATIVE SECTION (for DGS office only)

Library Check: OCT 23 2019
 Course Attribute: _____
 Course Attribute Value: _____
 Instruction Mode: _____
 Attendance Type: _____

If different from regular units:
 Academic Progress Units: _____
 Financial Aid Progress Units: _____

COURSE OUTLINE

COURSE NAME

Introduction to Reinforcement Learning

CMPT 729

DESCRIPTION

Reinforcement learning is the branch of machine learning that studies learning to act. Agents not only observe and predict what happens in their environment, but also act to change their environment. Reinforcement learning has had notable success in learning to play games (board & video), improving robot performance (helicopter control, robots cooperating), and task scheduling. Many recent successes have utilized neural nets, an approach known as deep reinforcement learning. This course is an intro to the main concepts and methods of reinforcement learning.

This course is an introduction to the main concepts and methods of reinforcement learning. The course assumes a background in general machine learning, and will be difficult for students without sufficient preparation.

TOPICS

- Definition of reinforcement learning; bandit problems, Markov decision processes
- Key concepts: policies, value functions, the Bellman equation, on-policy vs. off-policy learning
- Sample applications: human-level video game playing, autonomous helicopters, job scheduling, sports analytics...
- Reinforcement learning algorithms:
 - model-based approaches and value iteration
 - model-free approaches: Monte Carlo learning, temporal difference learning
 - Deep reinforcement learning with neural nets
- The exploration-exploitation trade-off: epsilon-greedy policies, upper confidence trees
- The bias-variance trade-off
- Optional training topics: policy iteration, actor-critic architectures
- A selection of advanced topics (depending on student interest)
 - hierarchical reinforcement learning
 - behavioural cloning
 - inverse reinforcement learning
 - multi-agent reinforcement learning

GRADING

Grading will be based on participation, written assignments (5-6), and a final. Assignments will combine theoretical questions and hands-on experience with

reinforcement learning algorithms. Grading breakdown:

- * Participation 10%
- * Assignments 50%
- * Final Exam 40%

MATERIAL

* Textbook: Reinforcement Learning: An Introduction, by Richard Sutton and Andrew Barto.

This book is available for free on-line <http://incompleteideas.net/book/the-book-2nd.html>

* Lecture Notes and Video Lectures from David Silver's course (Head of RL at Deep Mind)



FACULTY OF
ARTS AND SOCIAL SCIENCES

MEMO

Office of the Dean

STREET ADDRESS
Academic Quadrangle
Room 6164

MAILING ADDRESS
8888 University Drive
Burnaby BC Canada
V5A 1S6

778-782-4967 (Tel)

sean_zwagerman@sfu.ca
www.sfu.ca/fass

ATTENTION: Jeff Derksen, Dean
Graduate & Postdoctoral Studies

FROM : Sean Zwagerman, Chair
Faculty of Arts and Social Sciences Graduate Studies Committee

RE: FASSGSC Proposals

DATE: October 16, 2019

Dear Jeff,

The following new course and calendar entry change were approved by the Faculty of Arts and Social Sciences Graduate Studies Committee at their meeting on October 3, 2019, and are forwarded to the Senate Graduate Studies Committee for approval. Please include them on the next SGSC agenda.

1. **Urban Studies Program**
 - a) The new course URB 691
2. ~~First Nations Language Program~~
 - a) ~~Calendar entry change, LFNL Graduate Certificate and MA~~

These curriculum items should be effective for Summer 2020.

Sean Zwagerman
Associate Dean, Faculty of Arts and Social Sciences



SIMON FRASER UNIVERSITY
URBAN STUDIES

FASSGSC 19-11

Urban Studies Program
2nd Floor, 515 West Hastings Street
Vancouver, British Columbia
Canada V6B 5K3

Tel: 778.782.7888
Fax: 778.782.5297

11 Sept 2019

To: Sean Zwagerman, Associate Dean
Faculty of Arts and Social Sciences

From: Meg Holden, Director
Urban Studies

New course proposal, Urban Studies 691

At its steering committee meeting on April 26th, the Urban Studies Program approved the attached proposal for a new graduate course, URB 691 International Field Studies. We request consideration of this proposed course by the FASS Graduate Studies Curriculum Committee at its next meeting.

International study opportunities are consistently in demand within our student body and we seek to regularize these opportunities to maximize predictability, visibility of our offerings, and administrative efficiency. Urban Studies has offered international field school opportunities to students via our partnership with the Prince's Foundation for the Built Environment, which sent a group to the UK with Adjunct Professor Ken Cameron in summer 2010 to learn sustainable community development approaches, and via a combined undergraduate-graduate field school in the Ruhr Valley of Germany with Meg Holden in summer 2017. The Urban Studies Program recently spearheaded the creation of a formal exchange program between SFU and Aalto University in Finland and five Urban Studies students took part in the Summer Field School on Sustainable Transportation at Aalto University in 2019, at which Prof. Anthony Perl is one of the instructors.

While the initial offering of URB 691 has been designed as a Helsinki-based course for Summer 2020 for these reasons, we have left the course description open as to geographic location in order to allow the most flexibility in the curriculum, as we intend to build this field studies course into regular CFL teaching load by Urban Studies faculty. A parallel request for approval is being sent to the Undergraduate Studies Curriculum Committee in order to permit this course to be offered as a piggy-back with upper-level undergraduate students (URB STT 497).

New course proposal form and syllabus for our initial offering of URB 691 in Summer 2020, are attached.



FACULTY OF ARTS AND SOCIAL SCIENCES

July 2, 2019

Office of the Dean

8888 University Drive
Burnaby BC Canada
V5A 1S6

TEL: 778.782.4414
FAX: 778.782.3033
www.sfu.ca/fass.html

Dear Carol,

I am writing in support of the Comparative Urban Sustainability Field School proposed by the Urban Studies Program. Dr. Meg Holden has developed an exciting curriculum in Finland, which makes excellent use of existing international partnerships. The field school supports FASS's goals, as stated in our current five-year plan, of developing curricular opportunities for international experience and global literacy, and promoting innovation in course delivery modalities. We have also recommended that Urban Studies begin to expand its course offerings to undergraduates, and this field school is an important step in that direction.

As for the financial responsibilities of the FASS Deans Office, Urban Studies is not making a budget request for the pilot offering of this field school in 2020. Dr. Holden will serve as Field School Director, attending using her research funds, and Dr. Annika Airas has agreed to attend and be paid as a sessional instructor, using a sessional stipend that Urban Studies has from teaching provided to GLS. It is understood that the field school, once established, will be offered with CFL teaching on a regular basis. Dr. Holden and I will meet following the pilot offering to discuss improvements that will need to be made going forward, and the Deans Office will reassess any budgetary implications at that time.

Both Dr. Holden and Dr. Airas have previous experience leading field schools, and I am confident that they will do an exemplary job in this instance as well.

Sincerely,

A handwritten signature in black ink, appearing to read 'Sean Zwagerman', with a long horizontal line extending to the right.

Sean Zwagerman
Associate Dean, Graduate and Postdoctoral Studies,
Faculty of Arts and Social Sciences
Associate Professor, Department of English



Approvals and Endorsements

Approval by Department Chair

The undersigned certifies to the best of his/her knowledge that the data in this application is accurate, that they understand the roles and responsibilities as outlined in the chart on page 2, and that the proposal has been duly authorized by the Department.

Meg Holden Professor and Director *Meg Holden*

Name Title Signature Date

5 June 2019

Approval by the Dean

The undersigned certifies to the best of his/her knowledge that the data in this application is accurate, that they understand the roles and responsibilities as outlined in the chart on page 2, and that the proposal has been duly authorized by the Faculty.

SEAN ZWAGERMAN ASSOC. DEAN, FASS *[Signature]* 28 OCT. 2019

Name Title Signature Date

Letters of Endorsements

Include letters of endorsement from the Chair of the Department and the Dean. These letters should indicate how the International Field School fits within both the academic and international strategies of the Department or Faculty and how this International Field School will complement and support those strategies. The letters of endorsement should also acknowledge the Faculty's responsibility for costs associated with providing a faculty member to act as Field School Director (academic load, release time, etc).

SCIA Submission - International Field School to Finland

Senate Committee On In'l Activities

Wed 2019-10-02 2:16 PM

To: Meg Holden <meg_holden@sfu.ca>;

Hello Prof. Holden,

We are pleased to inform you that the committee has approved the following proposal:

- International Field School to Finland "Comparative urban sustainability in the Nordic countries and Canada" – University of Helsinki, Urban Studies and Planning program

Please note that the proposal has been approved as a pilot field school for one year and the Committee would like to see a sustainability plan proposed after one year. Please do not hesitate to contact us if you have any questions.

We wish you success with this program.

Thank you,

Bill Hu

SCIA Secretariat
SFU International
Strand Hall 2100
Simon Fraser University
8888 University Drive
Burnaby, BC Canada V5A 1S6
778-782-9474
www.sfu.ca/senate/senate-committees/scia.html

New Graduate Course Proposal

Course Subject (eg, PSYC) URB	Number (eg, 810) 691	Units (eg, 4) 6
Course title (max. 100 characters) INTERNATIONAL FIELD STUDIES		
Short title (for enrollment/transcript - max. 30 characters) INTL FIELD STUDIES		
Course description for SFU Calendar (course descriptions should be brief and should never begin with phrases such as "This course will..." or "The purpose of this course is..." If the grading basis is satisfactory/unsatisfactory include this in the description) Fieldwork based study of a selected city, including its built form, policy initiatives and events. Emphasis is placed on experiential learning approaches, learning across cultures and contexts, team-based work and relationship building.		
Rationale for introduction of this course This course was offered once as special topics. This will permit regular offering of summer experiential learning opportunities in order to meet student demand for exposure to urban studies internationally and build international faculty partnerships into the curriculum to improve degree quality.		
Term of initial offering (eg, Fall 2019) Summer 2020	Course delivery (eg, 3 hrs/week for 13 weeks) 6 class prep + 2 weeks field intensive	
Frequency of offerings/year once / year	Estimated enrollment per offering 10	
Equivalent courses (courses that replicates the content of this course to such an extent that students should not receive credit for both courses) na		
Prerequisite and/or Corequisite na		
Criminal record check required? <input type="checkbox"/> Yes if yes is selected, add this as prerequisite		Additional course fees? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Campus where course will be taught <input type="checkbox"/> Burnaby <input type="checkbox"/> Surrey <input checked="" type="checkbox"/> Vancouver <input type="checkbox"/> Great Northern Way <input checked="" type="checkbox"/> Off campus		
Course Components* <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Seminar <input type="checkbox"/> Lab <input type="checkbox"/> Independent <input type="checkbox"/> Capstone <input checked="" type="checkbox"/> Field		
Grading Basis <input checked="" type="checkbox"/> Letter grades <input type="checkbox"/> Satisfactory/ Unsatisfactory <input type="checkbox"/> In Progress / Complete		
Repeat for credit? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Total repeats allowed? 1	Repeat within a term? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Required course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Final exam required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Capstone course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Combined with a undergrad course? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes, identify which undergraduate course and the additional course requirements for graduate students: URB 497 - extra reading and field site visit leadership for grad students		

* See important definitions on the curriculum website.

RESOURCES

If additional resources are required to offer this course, provide information on the source(s) of those additional resources.

Faculty member(s) who will normally teach this course Dr. Meg Holden
Additional faculty members, space, and/or specialized equipment required in order to offer this course term lecturer

CONTACT PERSON

Academic Unit / Program Meg Holden	Name (typically, Graduate Program Chair) Director of Urban Studies	Email mholden@sfu.ca
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ACADEMIC UNIT APPROVAL

A course outline must be included.

Non-departmentalized faculties need not sign

Graduate Program Committee Meg Holden	Signature <i>Meg Holden</i>	Date 15 April 2019
Department Chair Meg Holden	Signature <i>Meg Holden</i>	Date 15 April 2019

revised 28 Oct 2019

FACULTY APPROVAL

The course form and outline must be sent by FGSC to the chairs of each FGSC (fgsc-list@sfu.ca) to check for an overlap in content

Overlap check done? YES

This approval indicates that all the necessary course content and overlap concerns have been resolved. The Faculty/Academic Unit commits to providing the necessary resources.

Faculty Graduate Studies Committee SEAN ZWAGERMAN	Signature <i>Sean Zwagerman</i>	Date 28 Oct. 2019
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A library review will be conducted. If additional funds are necessary, DGS will contact the academic unit prior to SGSC.

SENATE GRADUATE STUDIES COMMITTEE APPROVAL

Senate Graduate Studies Committee Jeff Derksen	Signature <i>Jeff Derksen</i>	Date NOV 14 2019
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ADMINISTRATIVE SECTION (for DGS office only)
 Library Check: OCT 23 2019
 Course Attribute: _____
 Course Attribute Value: _____
 Instruction Mode: _____
 Attendance Type: _____

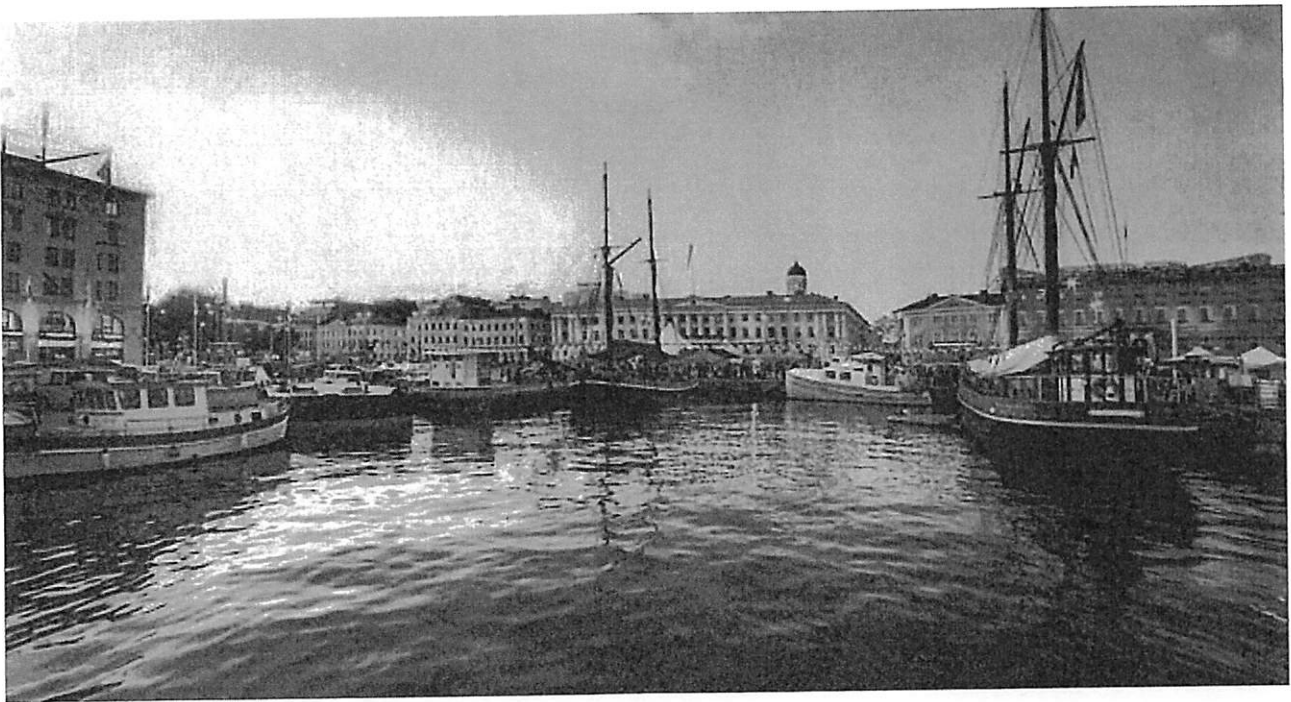
If different from regular units:
 Academic Progress Units: _____
 Financial Aid Progress Units: _____

URB 691 – URB STT 497

Syllabus is subject to change

Syllabus –
Comparative urban sustainability in the Nordic countries and Canada

Summer 2020
International Field School, Simon Fraser University



Helsinki, Finland

(Source: <https://www.gateways-international.com/wp-content/uploads/2017/03/Helsinki-660x348.png>)

This international field school, “Comparative urban sustainability in the Nordic countries and Canada,” consists of learning periods in Canada and Finland. First, preliminary sessions will be held at Simon Fraser University over the course of 6 weeks, followed by a field school in the Helsinki region of Finland for 2 weeks. The Canadian portion of the course consists of classroom meetings and a field visit in Vancouver. Students will also do readings and group work to prepare them for the time in the field. In Finland, the field school will consist of multiple site visits, tours, and classroom meetings, including visiting lectures/presentations and museum/art gallery visits. This field school draws on ongoing research cooperation between academics in the Nordic countries and at SFU, as well as on the learning outcomes of a sustainability workshop organized in cooperation with Nordic experts in Spring 2020, supported by a Teaching and Learning Development Grant Project (G0309).

The Nordic countries are often referred to as having “best practices” in the realm of urban sustainability, and this course offers an opportunity to learn about sustainability achievements, practices, and ongoing challenges. Helsinki is well-known among urban studies scholars as a site of innovative urban planning ideas and education. The overarching learning objective of this field school is to advance an understanding of urban sustainability beyond a familiar context. Students will be offered the opportunity to reflect on their own cultural backgrounds, experiences, and knowledge while contributing to a constructive and interactive intercultural learning experience.

COURSE TIME AND LOCATION

- Preliminary sessions in the Vancouver region May 11-June 22, 2020 (6 meeting times and a field tour)
- Followed by a field school in the Helsinki region from August 10-22, 2020

COURSE OVERVIEW

This field school in the Helsinki Region in Finland focuses on comparative *urban sustainability*. Nordic countries are often referred to in relation to “best practices” in the realm of urban sustainability. This circumstance often leads to Nordic terms, policies, and practices being adopted in Anglophone countries. However, while a great amount of literature focuses on Nordic urban sustainability practices and outcomes, this field school offers a “real life” opportunity to go beyond the textbook and explore those understandings on the ground. In this field school, you will experience how sustainability practices reside in the linguistic and cultural context of their origin. By bringing together native speakers and experts on such practices, you will get to experience the differences that culture and history make to sustainability understandings and outcomes, and place them in comparison with the Vancouver region.

The overarching learning objective of this field school is to advance the understanding of sustainability beyond your familiar knowledge and context. We will ask: what can we learn from new places and languages, and how can these learnings enrich our understanding of urban sustainability? This field school will draw on the learning outcomes from a workshop entitled “‘Sustainability beyond Google Translate’ - Nordic and Canadian approaches to urban sustainability” (Held in Vancouver, Spring 2020). Helsinki is known as a site of innovative urban planning education and ideas. Sustainability is a significant part of planning and policymaking at multiple scales in the Helsinki region, and offers a unique and interesting comparison to the Vancouver region, where sustainability is also a widely-discussed concept.

This field school includes lectures from visiting speakers, site visits, and interactions between locals and visitors, exploring specific themes in urban sustainability. Lecturers for this field school include academics and practicing professionals who work on such sustainability themes. Site visits will include planning departments, neighbouring cities, university campuses, an eco-urban neighbourhood, community gardens, and new master-planned developments, among others. You will have a chance to interact in university settings and in other institutional visits to libraries and museums. Led by local experts, you will have the opportunity to experience the city using public transportation (tram, metro, bus, ferry) and by walking.

The field school will encourage you to think beyond your local context, individual ideas, and cultural biases around sustainability. Through interdisciplinary discussions, we will make advanced comparisons between places and concepts, and engage with global issues in an active and practical manner. Your observations of different sites will push us to think more critically about sustainability and challenge often taken-for-granted understandings. These experiences are meant to aid you in your academic and professional life far beyond the field course.

As this is an international field school, learning will largely happen as we travel. Before we travel together, we will have preparatory class sessions in Vancouver where we will prepare for our learning experience abroad. In these sessions, we will go over some of the differences we can expect to encounter in Finland. Course readings will help contextualize the places we will visit during the field school. During the field trip we will learn through new places, people, languages and a wider cultural context.

We will be working closely with researchers and students from the Helsinki Institute of Urban and Regional Studies. This institution focuses on places, people, and politics in an international setting, and we will have visiting experts joining us in Finland. Our field school program is tailored to compare and contrast mutual understandings of urban sustainability, and we will learn through discussions and field visits. We will engage with Finnish academics and students in a variety of ways throughout the field school, including site visits and tours, lectures, campus tours, reflections and social and cultural activities.

LEARNING OBJECTIVES

- To gain a background understanding of urban trends and history in the Nordic region and Finland in particular, including from experts and locals.
- To develop and articulate an understanding of urban sustainability and urban sustainable development in international urban policy practice, development and social and cultural trends.
- To advance the understanding of sustainability as a set of values, ideas, and practices situated within particular urban contexts, including contexts that are outside of students' cultural familiarity.
- To develop competency in applying a comparative and critical framework for thinking about cities, socioeconomic and cultural conditions in terms of processes and outcomes of sustainable development.
- To experience a new city, reflect on your experience, and share these reflections with others in written and oral forms in a foreign setting.
- To encounter specific urban projects, policies, and settings in Helsinki that are on the forefront of urban sustainability action and to relate these encounters to other experiences and encounters.
- Through encounter and interaction with students, instructors and practitioners in Helsinki, to develop skills of intercultural respect, communication, and diplomacy as a visiting international student.

SIX PREPARATORY SESSIONS

- Undergraduate students will attend all sessions, while graduate students will join for the sessions 1, 4, and 6. Graduate students are responsible for all preparatory readings, including those for preparatory sessions they do not attend, and will be responsible for the presentation in prep class 6.
- Graduate student course designed for 6 credits, undergraduates 9 credits.

Preparatory session #1 – Introduction to Helsinki region

Learning objective: Students will to be able to describe the historical and geographical context of Helsinki within Finland, and Finland's position within Northern Europe.

Readings for this session:

Hannikainen, M. (2016). Helsinki - a compact green city: <https://www.kvartti.fi/en/articles/helsinki-compact-green-city>

Jaakola, A. & Vilkama, K. (2016). Helsinki's present state and development 2016, Summary of key findings:

<https://www.kvartti.fi/en/articles/helsinkis-present-state-and-development-2016>

In the first preparatory session we will take a closer look at the Helsinki region. We will go through the syllabus and outline the structure and purpose of the international field school. More practical and detailed guidance for travel will be provided in the last preparatory session “Getting ready to travel”.

This session is meant to provide an orientation that will prepare students to benefit from their time in the field. We will outline key historical moments in regards to urban development and provide context for understanding urban sustainability in the Helsinki region. We will briefly review the development of Finland as part of the kingdom of Sweden, Tsarist Russia as an autonomous Grand Duchy, and an independent republic since 1917. We will consider the location of Helsinki in southern Finland and outline differences between the region and other parts of the country such as the North. We will briefly consider Northern Finland in relation to the Indigenous Sami people, who also live in Norway, Sweden, and North-Eastern Russia. In this session, we will examine how ruling powers influenced planning in the city, and demonstrate how these historical foundations shape how urban development is being planned and practiced. We will pay specific attention to the recent urbanization and growth of the Helsinki region. By reviewing selected examples from the urban history of the Helsinki region, this session will give insight into how different historical moments have shaped social, political and economic aspects, and how these aspects play into the future development of the Helsinki region.

As part of this session, students will form teams, and each team will be assigned a specific topic that they will work with as part of their field school experience (see Sustainability perspectives later in this document). Students will set goals for their groups in preparation for a presentation they will give to class on the last session in Vancouver (#6). Groups will be introduced to some preliminary materials and readings on their key topic, to be made available through Canvas.

As part of this session, we will watch a documentary on Helsinki (Waterfront cities in the World), to be followed by a discussion of student impressions of the Helsinki region based on the assigned readings, lecture and documentary content.

Documentary: <https://www.knowledge.ca/program/waterfront-cities-world> (Helsinki)

As homework, you will choose one of the following sources as your starting point to get an introduction to Finnish cultural and artistic expressions. You will write a short reflection on stereotypes of Finns and Finland and amass evidence that 1) these stereotypes do exist; and 2) that they are not unique to Finns and Finland. This reflection will form a part of your participation grade, and will be approximately 500 words, to be posted on Canvas.

- Kaurismäki, Aki. The man without a Past. 2002

or

- Browse and find information on the works, artists and collections of the Ateneum Art Museum, the Museum of Contemporary Art Kiasma and the Sinebrychoff Art Museum.
< <http://kokoelmat.fng.fi/app?lang=en>> and/or contemporary comics on Finns/Finland:
< <http://finnishnightmares.blogspot.com/>>

Preparatory session #2 – Introduction to urban sustainable development

Learning objective: This session will contextualize and discuss “sustainable development” as an international development, planning, and policy concept, and as an ideology with global uptake, but with locally differentiated meanings. This session will allow students to discuss the cultural meaning of Finnish history related to sustainable development, and how these create local specific needs, opportunities, and contradictions.

Readings for this session:

Dessein, J., Soini, K., Fairclough, G. and Horlings, L. (2015). *Culture in, for and as sustainable development: Conclusions from the COST Action IS1007 Investigating Cultural Sustainability*. University of Jyväskylä. <<http://www.culturalsustainability.eu/conclusions.pdf>>

Du Pisani, J. A. (2006). *Sustainable development—historical roots of the concept*. *Environmental Sciences*, 3(2), 83-96.

Girault, C. (2017). *Between naturalness and urbanity, how are protected areas integrated into cities? The case of Helsinki (Finland)*. *Articulo-Journal of Urban Research*, (16).

Holden, M., Airas, A. and Larsen, M. (2019). *Social sustainability in eco-urban neighbourhoods*. In M.R. Shirazi and R. Keivani (eds) *Urban Social Sustainability: Theory, policy and practice*. London: Routledge, 149-170.

The World Commission on Environment and Development (WCED, 1987) was one of the first to introduce the concept of *sustainable development* in international dialogue (Holden, 2012: 527). Different countries have since committed to various sustainable development goals. For example, in 2015 various countries adopted the 2030 Agenda for Sustainable Development, and in 2016, the Paris Agreement on climate change entered into force, speaking to the need to limit the rise of global temperatures (see United Nations, Sustainable development goals, 2019).

Within this global context of sustainable development, the Nordic countries are often referred to in a positive way. For example, according to the Economist, the successes of Nordic countries are often recognized in the form of international rankings from “*economic competitiveness to social health to happiness*” (The Economist, 2013b). These international rankings also inform sustainable development and sustainability as a planning idea. Sustainability is also a planning and policy concept across multiple scales, and an ideology with global uptake but locally differentiated meaning. While helping to develop an understanding of the historical roots of the concept, this session will work as an orientation to the overarching theme of urban sustainability, leading us to interpret theory and discourse of sustainable development internationally, and allowing us to consider how these could differ based on context.

Preparatory session #3 – Urban sustainability beyond Google Translate

Learning objective: The purpose of this session is to advance an understanding of local Finnish concepts through linguistic differences, and showcase how these Finnish concepts are used to advance urban sustainability. Students will be able to define a subset of Finnish terms core to cultural differentiation, and explain the way in which their engagement with these terms represents a process of “translanguaging”. Further, they will be able to recognize and describe significant urban planning and sustainability conditions and achievements learned and experienced in situ in Helsinki. Students will also be able to reflect upon: their own cultural and individual history, biases about urban sustainability, Helsinki and the Nordic region, and the role their linguistic history and know-

how plays in their experiences and knowledge. Further, students will be able to contribute to a constructive and interactive intercultural and translinguistic learning experience.

Readings for this session:

Why language matters in transdisciplinary studies: <https://i2insights.org/2018/10/02/language-matters/>

Gunder, M. (2006). *Sustainability: Planning's saving grace or road to perdition?* *Journal of planning education and research*, 26(2), 208-221.

Mazak, C. M., & Carroll, K. S. (Eds.). (2016). *Translanguaging in higher education : Beyond monolingual ideologies. (Introduction, accessible online via SFU library).*

English often dominates as a language of science and technology (Mazak 2016: 6). Furthermore, global urban sustainability branding and marketing often uses buzzwords such as “green” or “eco-friendly” (see Shelton Group, <https://sheltongrp.com/insights/green-buzzwords-online-search-edition/>), but the actual meanings of these English words are rarely discussed, and when they are discussed, they are contested. Furthermore, these commonly cited urban sustainability concepts are often reflected through the cultural, ecological, and historical contexts of the places where they touch down, as well as through the experiences of those using them in such contexts.

Building on the first session, this session focuses on the various meanings of urban sustainability across languages and local contexts. These variations in meaning often go undiscussed, and as such, the deeper potential of sustainability practices can be lost. Therefore, this session will introduce the concept of *translanguaging* and place a focus on the process of *meaning making*. Rather than focusing on the differences that different languages make to expression, or the things that get “lost in translation,” this session will highlight the social, emotional and place-based connections that emerge through the dynamic use of language (Garcia, cited in Mazak 2016: 2).

We will explore how local circumstances and different languages shape understandings of urban sustainability, and consider the bilingual context of Finland (Finnish and Swedish), in particular in the Helsinki region. It will draw on the learning outcomes of a workshop entitled “‘Sustainability beyond Google Translate’ - Nordic and Canadian approaches to urban sustainability” (Held in Vancouver, Spring 2020). This session will contextualize field learning in Finland and discuss urban sustainability concepts that are difficult to translate, such as the Finnish concept/value “*säästäväisyys*”, which communicates a particular type of frugality.

Local contexts, interpretations, and language give meaning to the concepts and terms we often cite, and the purpose of this session (and later on in the field) is to learn from these differences. This session will challenge students and teaching experts to reconsider their understandings around urban sustainability, moving beyond the rote expectation that global standards and best practices can guide societal advances toward sustainable living, instead toward a more social learning-driven, process and context based understanding of the epistemic learning needed to make shifts of a social and cultural nature.

Measuring sustainability #4 (Seminar and Field Visit)

Learning objective: To advance knowledge of urban sustainability measurements, and to build an understanding of how such measurements are being used in Canada and beyond, to be compared with the Finnish context while in the field.

Readings for this session:

Faulconbridge, J. (2015). *Mobilising sustainable building assessment models: agents, strategies and local effects.* *Area*, 47(2), 116-123.

Rapoport E (2015) *Globalising sustainable urbanism: the role of international masterplanners. Area 47: 110-115.*

This session has two parts:

Part 1: Seminar

Part 2: Field tour to a LEED building in Vancouver (e.g. convention centre)

With an increasing urgency and awareness of climate change, there has been a rise in internationally acknowledged sustainability practices and measurements. For example, “green building” rating systems aim to create healthier environments, for example, by improving air quality, using less harmful products, and increasing the use of natural daylight. Green building ratings also aim to reduce waste, save energy, and decrease water consumption (see Canada Green Building Council, 2019).

While rating systems communicate ambitious goals for better and more sustainable futures, they also raise multiple concerns. One of these concerns relates to the local sensitivity of these systems. For example, Faulconbridge considers how taken-for-granted policy knowledge, communicated by international professionals, may “devalue and write-out” local approaches in favour of “generic global” approaches (Faulconbridge, 2015: 119).

This session is divided into two parts: 1) **A classroom seminar** discussing the motivations for measuring urban sustainability. In this meeting, we will discuss readings that critically evaluate mobile sustainable building assessment models such as LEED. This seminar will be followed by 2) **a field visit to a LEED building in Vancouver**. We will go on a tour of one of the LEED buildings in the City of Vancouver, led by an expert on the building in question. The broader purpose of this session is to set the context for a comparison to a Finnish case when in Helsinki.

Students are expected to take notes during this visit. These notes will be useful later in the course, when students will compare notes from green building tours in Finland and Canada and analyze similarities and differences. Students will consider how local contexts play a role in relation to global sustainability rating systems. The learning outcomes of the third preliminary session (Urban sustainability beyond Google Translate) will also help students to consider the possible differences language, translation, and translanguaging make to urban sustainability systems and related discussions.

Preparatory session #5 – Planning urban sustainability

Learning objective: To advance the understanding of the differences between Canadian and Finnish planning systems, land ownership and management.

Readings for this session:

Hall, T. (2003). *Planning and urban growth in Nordic Countries*, Routledge, 2003. ProQuest Ebook Central, <https://ebookcentral-proquest-com.proxy.lib.sfu.ca/lib/sfu-ebooks/detail.action?docID=182033> (*Chapter 3 Urban planning in Finland*).

Rannila, P. (2018). Relationality of the law: On the legal collisions in the Finnish planning and land use practices. *Journal of Planning Education and Research*.

This session introduces some key differences between Canadian and Finnish urban planning practices. Planning is closely tied to land use practices, property, and law, and this preparatory session will help contextualize urban sustainability planning in the Nordic context. Comparisons between the Canadian and Finnish urban planning

contexts are not straightforward. For example, differences in land ownership practices between Helsinki and Vancouver affect planning in multiple ways.

In this session, local researcher Trevor Wideman (SFU), whose expertise is in Canadian planning, property, and law, will compare some of the key planning differences between Finland and Canada with instructor Annika Airas. They will introduce and discuss 1) differences between historical aspects of planning practice in these countries; 2) land ownership, consultation, and participation; and 3) scales of planning jurisdiction (i.e., municipal, regional).

Trevor and Annika will introduce selected case studies and lead a group discussion with students, considering how these differences might influence approaches to planning topics during travel.

Preparatory session #6 – Getting ready to travel

In this final preparatory session, we will have group presentations on **Sustainability Perspectives**. During the field school in Finland we will delve into these different aspects of urban sustainability more deeply, but we will explore these five different themes (listed below) with each group prior to travel. Each group will have 15 minutes of presentation time in this session, and these presentations will prepare the class for the learning experience abroad. During the field school in Finland, we will revisit these presentations and their topics in the field.

The five different perspectives on urban sustainability are:

- 1) *Coastal perspectives on urban sustainability*
- 2) *Ecological perspectives on urban sustainability*
- 3) *Urban sustainability education*
- 4) *Planning and policy perspectives on urban sustainability*
- 5) *Living/local perspectives on urban sustainability*

READINGS:

Posted on Canvas.

UNDERGRADUATE EVALUATION:

Sustainability perspectives (team work)	20
Panel presentation (team work)	20
Position Paper (individual work)	10
Photo essay (individual work)	20
Blog (individual work)	10
Participation	20
<i>(active participation 10%, attendance 5%, session 1 reflection 5%)</i>	
	100%

GRADUATE EVALUATION:

Sustainability perspectives (team work)	20
Panel presentation (team work)	20
Readings and Discussion Facilitation (individual work)	10
Photo essay (individual work)	20
Blog (individual work)	10

Participation

20

(active participation 10%, attendance 5%, session 1 reflection 5%)

100%

Sustainability perspectives (team work)

This assignment is twofold, and it contains:

- 1) A presentation to the class in Canada, and
- 2) A short written summary of the presentation (to be returned right after the presentation).

You will be divided into groups based on different topics/themes in urban sustainability (listed above). Each group will present one theme. Each group will do some preliminary research, familiarizing themselves with their assigned topic and with some case examples. Each team will introduce the topic based on their research, while giving some idea to the entire group of how this aspect of sustainability might showcase itself in Finland during the field school. The 15-minute theme presentation will give a brief answer to the following questions:

- How does this theme help advance sustainability in cities?
- What are the cases/concepts that are related to this theme in this field school?
- How is this aspect of sustainability different/similar in Helsinki and Vancouver based on your preliminary work on the topic?

Your group is expected to use 5 academic and 5 non-academic references and introduce 1-3 case examples in this oral presentation. Presentations will be held in a classroom setting in Canada (session #6) prior to travel to Finland. Each group will produce a 5 page summary of their presentation (double-spaced, 12-pt font, 2.54 cm margins). Groups are expected to submit a printed copy of their summary right after the verbal presentation, at the end of the last session in Canada. These summaries will be used in the field in Finland for further consideration, discussion and revision as we travel and learn to see sustainability somewhat differently.

Panel presentation

Field school theme groups will have time to reflect on their findings during the field course, and will be expected to prepare a presentation about key findings to be shared with everyone during the concluding seminar. Finnish guests to the field school will be invited for this event. Each group will have 15 minutes for their presentation. After the presentations, we will have a panel discussion in which all groups will be expected to discuss their learnings in relation to the other groups' presentations and themes of the course. They will highlight how urban sustainability was reflected through these field school themes. Each group will be given 5-10 minutes to give a summary of how their thinking has evolved around their specific course theme. Students will be expected to answer the following questions:

- Did the field visits change your perspective on your sustainability theme? If yes, how? If not, why?
- What were you surprised to discover in the Helsinki region?
- What could the city regions (Helsinki and Vancouver) learn from one another in regards to your urban sustainability theme?

Each group will also be expected to prepare one discussion question within the theme of urban sustainability and present this question for discussion among all participants. These questions will be addressed after each group has had the chance to present their findings.

Readings and Discussion Facilitation (graduate students only)

Graduate students will be asked to do additional readings (listed below) and individually prepare to lead one discussion in the field while in the Helsinki region (timing TBD). Graduate students will be given a theme to work with (e.g., smart cities, master-planned waterfronts, smart growth). Students will write 250 word reflections on each reading, summarising key points, and will prepare 4 questions to guide the class's experience of a given site based on their given theme.

Students will draft summaries and questions prior to travel, and receive feedback and guidance for facilitating these discussions in the field. As part of leading the discussion, grad students will prepare local travel tips for the site in question, will introduce some examples from the readings and will ask prepared questions as a conversation starter.

Readings include:

1) Haase, D., Kabisch, S., Haase, A., Andersson, E., Banzhaf, E., Baró, F., ... & Krellenberg, K. (2017). Greening cities—To be socially inclusive? About the alleged paradox of society and ecology in cities. *Habitat International*, 64, 41-48.

This reading considers the possibilities and limits of greening initiatives in European cities, and will serve as a guide in contextualizing Helsinki's greening efforts.

2) Ameer, L. (2016). A Bildungsroman for a waterfront development: Literary genre and the planning narratives of Jätkäsaari, Helsinki. *Journal of Urban Cultural Studies*, 3(2), 169-187.

This paper highlights the storytelling aspects of planning through a case study of a Helsinki waterfront development.

3) Glasmeier, A., & Christopherson, S. (2015). Thinking about smart cities. *Cambridge Journal Of Regions, Economy And Society*, 8(1), 3-12.

This paper takes a critical approach to smart city development and provides a platform for discussions on Helsinki plans.

4) Andersen, B., & Røe, P. G. (2017). The social context and politics of large scale urban architecture: Investigating the design of Barcode, Oslo. *European Urban and Regional Studies*, 24(3), 304-317.

This paper reflects the development of another Nordic waterfront city (Oslo), and discusses the city's goals for social sustainability and urban entrepreneurialism. The reading will provide a comparison to other Nordic cities.

5) Climate-smart Helsinki: Towards more sustainable city planning, <https://www.hel.fi/hel2/ksv/julkaisut/esitteet/esite-2017-4-en.pdf>

This City of Helsinki publication introduces recent greening and smart initiatives, which will help bridge the academic readings with practical case examples.

Position Paper (10% of the grade for undergraduate students, graduate students will not do this task)

This paper will provide students with an opportunity to do an initial exploration of their course theme. Each undergraduate student will write a 750 word paper that contains three key elements: 1) an Introduction, which describes the theme to be discussed; 2) a body that argues the student's position on that issue using references; and 3) a conclusion that restates the key points and outlines further topics to be explored in relation to the theme.

For this paper, students are expected to use 3 academic sources and 3 non-academic sources. The bibliography is not included in the word count, and the paper should be double-spaced, 12-pt font, 2.54 cm margins. In regards to photos, they should be included as an appendix, which will not be included in the page count. The paper should be submitted to Canvas prior travel to Finland.

Photo essay

During the field school, students are expected to keep a diary of their learning on urban sustainability. Questions that will guide the journaling will be, for example; What did I see/experience that stands out? How does it link to urban sustainability, readings in the course, or talks and chats during the course? How is it different from/similar to the Canadian context?

After the trip students will be expected to return to their written journal and reflect on what they wrote during travel by highlighting 3-5 photos from the trip and connecting them with their writing into a photo essay. Students may directly quote from journal entries or reflect further what on what you wrote during the field school. Photos are meant to guide your writing on urban sustainability and will illustrate your *key learning outcomes from the field school*. Photos can be students' own, but do not necessarily have to be. Photos can illustrate moments that help students reflect on their time in Finland, and guide their thinking and organizing of their final photo essay. This essay should be 10 pages in length (or 2500 words; bibliography not included), double-spaced, 12-pt font, 2.54 cm margins. Photos must be included as an appendix, which will not be included in the page count. The essay should be submitted to the Canvas site after travel. More guidance will be given on Canvas.

Blog

In this field school, students will also publish one blog post during travel. This post should be around 500 words, and preferably it should include one or two photos. The blog post can be on any subject related to the field school but should focus on an urban sustainability theme. Keep in mind the aspects that make a blog post engaging and readable, such as a beginning-middle-and-end structure, a personal tone, providing examples and illustration through images and hotlinks, short sentences and paragraphs, and including a few questions for further consideration (students do not have to be expressing a fully formed conclusion in a blog post, but can also raise questions).

Participation

Because this is a field school, expectations around participation, as well as the grading, are different than what students may have encountered before. Participation in this field school requires patience and flexibility (schedules and things may change "on the fly"), curiosity to learn new things, carefulness, awareness and respect for others, and punctuality, among other things. We will all make the field school experience successful based on our active participation and dedication to learning together. Furthermore, the written reflection on stereotypes (session #1) forms 5% of the participation grade, meaning that most of the grade is based on active attendance in preliminary sessions and in the field.

Selected readings and materials (reading list will expand around the following topics):

Helsinki living:

Helsinki, Historical Perspectives:

https://www.kvartti.fi/sites/default/files/files/issue/16_06_27_quarterly2_2016_web.pdf

Promotional video on Helsinki: <https://monocle.com/film/affairs/most-liveable-city-helsinki/>

Kolbe, L. (2006) An Eastern or a Western Capital City? The Spirit of Helsinki, *International Review of Sociology*, 16:2, 329-346.

Lilius, J. (2014) Is There Room for Families in the Inner City? Life-Stage Blenders Challenging Planning, *Housing Studies*, 29:6, 843-861

Partanen, A. *"The Nordic Theory of Everything"*. HarperCollins Publishers, New York.

Helsinki facts and figures (2018):

https://www.hel.fi/hel2/tietokeskus/julkaisut/pdf/18_12_11_tasku18_en_net.pdf

Housing in Helsinki etc.: Lönnqvist (2015):

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