MaQTech
Training in Materials for Quantum Technologies

A COLLECTION OF COURSES

Issue 1| Fall 2024

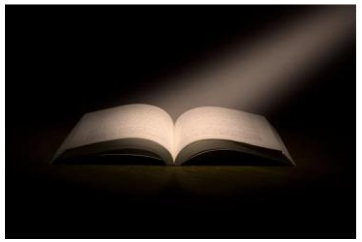
uOttawa · McGill University · Université de Sherbrooke · Polytechnique Montréal · University of Toronto · University of Waterloo · NSERC CRSNG

This brochure presents a list of in-person courses in Materials for Quantum Science and Technology, offered by the participating universities: McGill University, Polytechnique Montréal, Université de Sherbrooke, University of Toronto, University of Waterloo, and University of Ottawa.

The courses are organized alphabetically by university and course title for easy reference.

By selecting a course, you can view its description, the targeted students along with enrollment and credit transfer instructions.

We hope this brochure provides you with a valuable opportunity to expand your studies.



MaQTech
Training in Materials for Quantum Technologies

A COLLECTION OF COURSES

Institution	Course
McGill University	Introduction to Computational Materials Design – MIME 473
McGill University	Semiconductor Nanostructures and Nanophotonic Devices - ECSE 519
McGill University	Seminar in Advanced Materials - CHEM 634
Polytechnique Montréal	Quantum Optics - PHS8230E
Polytechnique Montréal	Science et génie des matériaux - PHS 2114
Université de Sherbrooke	Circuits supraconducteurs quantiques - GEI877
Université de Sherbrooke	The International Summer School on Computational Quantum Materials
Université de Sherbrooke	Matière condensée topologique - PHY807
Université de Sherbrooke	Modélisation de la matière et calcul quantique - PHY745
Université de Sherbrooke	Méthodes expérimentales en physique du solide - PHY760

Institution	Course
Université de Sherbrooke	Photonique et optique quantique - PHY777
Université de Sherbrooke	Physique de la matière condensée avancée - PHY730
Université de Sherbrooke	Techniques de caractérisation des matériaux II - PHY710
University of Ottawa	Quantum Materials, Nanostructures and Devices - PHY 5391
University of Ottawa	Quantum Science and Technology - PHY 5390
University of Toronto	Quantum Materials: From atoms to Crystals - PHY358H1
University of Waterloo	Laboratory on Control of Quantum Technology - QIC 860
University of Waterloo	Laboratory on Low Temperature Quantum Technology and Nanofabrication - QIC 862
University of Waterloo	Laboratory on Photonic Quantum Technology - QIC 861
University of Waterloo	USEQIP Program

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McGill University| Introduction to Computational Materials Design - MIME 473

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Course Description	How to enroll	How to get credits
Mining & Materials Engineering : Introduction to modelling and simulation techniques in materials engineering: quantum mechanics and atomistic simulation (i.e. Monte-Carlo and Molecular Dynamics). These modelling and simulations methods provide new and efficient tools to examine and predict various physical and mechanical properties of materials, enabling bottom-up design of materials and structures starting from quantum and atomistic level. These computational tools play an increasingly important role in modern materials engineering. Fundamental theories behind materials modelling and hands-on training on various modelling software. Target: Graduate Students https://www.mcgill.ca/study/2024-2025/courses/mime-473	For a student in Quebec: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement from the course instructor at McGill 3) Fill out the Quebec Inter-University Transfer Agreement (IUT) or Autorisation d'études hors établissement (AEHE) Form (i.e., https://www.bci-qc.ca/en/students/aehe/) 4) Get the approval (signature) from McGill and your home institution 5) Get an access to McGill MyCourses website and register for the course (i.e., https://mycourses2.mcgill.ca/d2l/loginh/) Note: you must continue to pay fees to your home institution for the term(s) during the course takes place (no fee to be paid at McGill) For a student in Ontario: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement from the course instructor at McGill 3) Fill out the Canadian university graduate transfer agreement (CUGTA) form available at your home institution (contact your administration or the professor who supports you). 4) Get the approval (signature) from McGill and your home institution 5) Get an access to McGill MyCourses website and register for the course (i.e., https://mycourses2.mcgill.ca/d2l/loginh/) Note: you must pay the tuition fees for the course at McGill.	1) Get a transcript from McGill with your grade (credits). Note: if there is no agreement between McGill and your home institution, you must arrange for them to be sent by McGill to your home institution, at your own expense 2) Provide the transcript to your home institution and require to transfer the obtained credits to your home institution' program (contact your administration or the professor who supports you)

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McGill University| Semiconductor Nanostructures and Nanophotonic Devices - ECSE 519

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Course Description	How to enroll	How to get credits
Electrical Engineering : Physics, design, synthesis, and fundamental properties of semiconductor nanostructures, quantum dots, nanowires, and nanotubes. Nanoscale confinement of radiation, properties of microcavities, whispering gallery modes, photonic crystals, strong vs. weak coupling, and Purcell effect. Quantum dot lasers, nanowire LEDs, and photonic crystal lasers. Nonclassical light sources. Solar cells and thermoelectric devices. Target: Graduate Students https://www.mcgill.ca/study/2024-2025/courses/ecse-519	For a student in Quebec: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement from the course instructor at McGill 3) Fill out the Quebec Inter-University Transfer Agreement (IUT) or Autorisation d'études hors établissement (AEHE) Form (i.e., https://www.bci-qc.ca/en/students/aehe/) 4) Get the approval (signature) from McGill and your home institution 5) Get an access to McGill MyCourses website and register for the course (i.e., https://mycourses2.mcgill.ca/d2l/loginh/) Note: you must continue to pay fees to your home institution for the term(s) during the course takes place (no fee to be paid at McGill) For a student in Ontario: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement fom the course instructor at McGill 3) Fill out the Canadian university graduate transfer agreement (CUGTA) form available at your home institution (contact your administration or the professor who supports you). 4) Get the approval (signature) from McGill and your home institution 5) Get an access to McGill MyCourses website and register for the course (i.e., https://mycourses2.mcgill.ca/d2l/loginh/) Note: you must pay the tuition fees for the course at McGill.	1) Get a transcript from McGill with your grade (credits). Note: if there is no agreement between McGill and your home institution, you must arrange for them to be sent by McGill to your home institution, at your own expense 2) Provide the transcript to your home institution and require to transfer the obtained credits to your home institution' program (contact your administration or the professor who supports you)

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McGill University| Seminar in Advanced Materials - CHEM 634

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Course Description	How to enroll	How to get credits
Chemistry : A series of research-level seminars about topics of current interest in advanced materials. Topics include molecular and nanoelectronics, computational approaches to materials design and property predictions, new techniques in molecular and atomic imaging, advances in materials preparation, quantum devices and quantum computing. Target: Graduate Students https://www.mcgill.ca/study/2024-2025/courses/chem-634	For a student in Quebec: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement from the course instructor at McGill 3) Fill out the Quebec Inter-University Transfer Agreement (IUT) or Autorisation d'études hors établissement (AEHE) Form (i.e., https://www.bci-qc.ca/en/students/aehe/) 4) Get the approval (signature) from McGill and your home institution 5) Get an access to McGill MyCourses website and register for the course (i.e., https://mycourses2.mcgill.ca/d2l/loginh/) Note: you must continue to pay fees to your home institution for the term(s) during the course takes place (no fee to be paid at McGill) For a student in Ontario: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement fom the course instructor at McGill 3) Fill out the Canadian university graduate transfer agreement (CUGTA) form available at your home institution (contact your administration or the professor who supports you). 4) Get the approval (signature) from McGill and your home institution 5) Get an access to McGill MyCourses website and register for the course (i.e., https://mycourses2.mcgill.ca/d2l/loginh/) Note: you must pay the tuition fees for the course at McGill.	1) Get a transcript from McGill with your grade (credits). Note: if there is no agreement between McGill and your home institution, you must arrange for them to be sent by McGill to your home institution, at your own expense 2) Provide the transcript to your home institution and require to transfer the obtained credits to your home institution' program (contact your administration or the professor who supports you)

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Polytechnique Montréal| Quantum Optics - PHS8230E

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Course Description	How to enroll	How to get credits
Classical and quantum radiation. The photon. Field quantization. Vacuum fluctuations. Number states, coherent states, compressed states. Einstein-Podolsky-Rosen paradox. Bell's inequalities. Intricate states. Teleportation and quantum cryptography. Quantum non-demolition. Light-matter interaction. Two- and three-level systems in the classical regime. Resonant fluorescence. Two-level system in the quantum regime. Single-photon and single photons, entangled photons. Spin-photon entanglement and entangled photon chains. Target: Graduate Students https://www.polymtl.ca/programmes/cours/quantum-optics	For a student in Quebec: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement from the course instructor at McGill 3) Fill out the Quebec Inter-University Transfer Agreement (IUT) or Autorisation d'études hors établissement (AEHE) Form (i.e., https://www.bci-qc.ca/en/students/aehe/) 4) Get the approval (signature) from Polytechnique Montréal and your home institution 5) Get an access to Polytechnique Montréal courses website and register for the course (i.e., https://dossieretudiant.polymtl.ca/WebEtudiant7/poly.html) Note: you must continue to pay fees to your home institution for the term(s) during the course takes place (no fee to be paid at Polytechnique Montréal) For a student in Ontario: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement fom the course instructor at Polytechnique Montréal 3) Fill out the Canadian university graduate transfer agreement (CUGTA) form available at your home institution (contact your administration or the professor who supports you). 4) Get the approval (signature) from Polytechnique Montréal and your home institution 5) Get an access to Polytechnique Montréal courses website and register for the course (i.e., https://dossieretudiant.polymtl.ca/WebEtudiant7/poly.html) Note: you must pay the tuition fees for the course at Polytechnique Montréal.	1) Get a transcript from Polytechnique Montréal with your grade (credits). Note: if there is no agreement between Polytechnique Montréal and your home institution, you must arrange for them to be sent by Polytechnique Montréal to your home institution, at your own expense 2) Provide the transcript to your home institution and require to transfer the obtained credits to your home institution' program (contact your administration or the professor who supports you)

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Polytechnique Montréal| Science et génie des matériaux - PHS 2114

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Course Description	How to enroll	How to get credits
Survol de l'utilisation des matériaux en technologies de pointe. Liaisons interatomiques : ionique, métallique, covalente, liaisons faibles. Structure des cristaux : postulats de la cristallographie, réseaux, imperfections, microstructure. Symétrie et propriétés physiques des cristaux. Matériaux non cristallins : verres, solides macromoléculaires. Thermodynamique des matériaux : solubilité, équilibres de phases, diagrammes d'équilibre, métastabilité. Liens entre microstructure et propriétés mécaniques dans les alliages à l'équilibre. Processus cinétique dans les matériaux : équilibre local, diffusion, cinétique des transformations de phase dans les systèmes unitaires et binaires. Fabrication et mise en forme des matériaux : solidification, frittage, croissance de cristaux, dépôt de couches minces. Dégradation des matériaux : corrosion, fatigue, fluage. Sélection des matériaux dans une perspective de développement durable. Recyclage des matériaux Target: Graduate Students https://www.polymtl.ca/programmes/cours/science-et-genie-des-materiaux/devel	For a student in Quebec: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement from the course instructor at McGill 3) Fill out the Quebec Inter-University Transfer Agreement (IUT) or Autorisation d'études hors établissement (AEHE) Form (i.e., https://www.bci-qc.ca/en/students/aehe/) 4) Get the approval (signature) from Polytechnique Montréal and your home institution 5) Get an access to Polytechnique Montréal courses website and register for the course (i.e., https://dossieretudiant.polymtl.ca/WebEtudiant7/poly.html) Note: you must continue to pay fees to your home institution for the term(s) during the course takes place (no fee to be paid at Polytechnique Montréal) For a student in Ontario: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement fom the course instructor at Polytechnique Montréal 3) Fill out the Canadian university graduate transfer agreement (CUGTA) form available at your home institution (contact your administration or the professor who supports you). 4) Get the approval (signature) from Polytechnique Montréal and your home institution 5) Get an access to Polytechnique Montréal courses website and register for the course (i.e., https://dossieretudiant.polymtl.ca/WebEtudiant7/poly.html) Note: you must pay the tuition fees for the course at Polytechnique Montréal.	1) Get a transcript from Polytechnique Montréal with your grade (credits). Note: if there is no agreement between Polytechnique Montréal and your home institution, you must arrange for them to be sent by Polytechnique Montréal to your home institution, at your own expense 2) Provide the transcript to your home institution and require to transfer the obtained credits to your home institution' program (contact your administration or the professor who supports you)

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Université de Sherbrooke | Circuits supraconducteurs quantiques - GEI877

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Course Description	How to enroll	How to get credits
Cible(s) de formation Analyser et caractériser un circuit micro-ondes classique. Quantifier un circuit micro-ondes et simuler son comportement quantique. Concevoir des circuits supraconducteurs pour le traitement d'information quantique et pour la mesure quantique. Contenu Supraconductivité, circuits micro-ondes linéaires, jonction Josephson, quantification de circuits, description quantique de systèmes ouverts, représentation d'un état quantique dans l'espace des phases, effet tunnel inélastique, amplificateurs opérant à la limite quantique de bruit, bits quantiques, sources et détecteurs de photons uniques. Target: Graduate Students https://www.usherbrooke.ca/admission/fiches-cours/GEI877/circuits-supraconducteurs-quantiques/	For a student in Quebec: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement fom the course instructor at uSherbrooke 3) Fill out the Quebec Inter-University Transfer Agreement (IUT) or Autorisation d'études hors établissement (AEHE) Form (i.e., https://www.bci-qc.ca/en/students/aehe/) 4) Get the approval (signature) from uSherbrooke and your home institution 5) Get an access to uSherbrooke courses website and register for the course (i.e., https://www.usherbrooke.ca/admission/) Note: you must continue to pay fees to your home institution for the term(s) during the course takes place (no fee to be paid at uSherbrooke) For a student in Ontario: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement fom the course instructor at uSherbrooke 3) Fill out the Canadian university graduate transfer agreement (CUGTA) form available at your home institution (contact your administration or the professor who supports you). 4) Get the approval (signature) from uSherbrooke and your home institution 5) Get an access to uSherbrooke courses website and register for the course (i.e., https://www.usherbrooke.ca/admission/) Note: you must pay the tuition fees for the course at uSherbrooke.	1) Get a transcript from uSherbrooke with your grade (credits). Note: if there is no agreement between uSherbrooke and your home institution, you must arrange for them to be sent by uSherbrooke to your home institution, at your own expense 2) Provide the transcript to your home institution and require to transfer the obtained credits to your home institution' program (contact your administration or the professor who supports you)

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Université de Sherbrooke | The International Summer School on Computational Quantum Materials ***2026***

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Course Description	How to enroll	How to get credits
The International Summer School on Numerical Methods for Quantum Materials is open to PhD students and young researchers. This school focuses on computational tools for models and ab-initio methods that deal with 'quantum materials' whose spectacular properties range from high-temperature superconductors to great thermoelectric materials. These properties are consequences of the non-trivial quantum nature of electrons and their interactions. The fusion of methods for strongly correlated quantum material models with ab-initio methods now allows predictions for d and f electron materials that were unimaginable until recently. A significant part of the School is dedicated to this. Target: Graduate Students https://www.usherbrooke.ca/ecoles-de-pointe/fr/physique/2024-methodes-numeriques-pour-materiaux-quantiques/	1) Follow the process at: https://www.usherbrooke.ca/ecoles-de-pointe/fr/physique/2024-methodes-numeriques-pour-materiaux-quantiques/candidature-admission-reservation-itineraire Note: There are no tuition fees for this course.	1) Get a transcript from uSherbrooke with your grade (credits). Note: if there is no agreement between uSherbrooke and your home institution, you must arrange for them to be sent by uSherbrooke to your home institution, at your own expense 2) Provide the transcript to your home institution and require to transfer the obtained credits to your home institution' program (contact your administration or the professor who supports you)

A COLLECTION OF COURSES

Université de Sherbrooke| Matière condensée topologique - PHY807

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Course Description	How to enroll	How to get credits
Cible(s) de formation Acquérir une connaissance des principaux concepts de la matière condensée topologique. Maîtriser des outils techniques de base pour comprendre la littérature scientifique et mener des recherches dans ce domaine. Contenu Théorie topologique des bandes en une, deux et trois dimensions : phase et courbure de Berry, nombre de Chern; pompe de Thouless; modèle de Su-Schrieffer-Heeger et de Kitaev; fermions de Dirac, de Majorana et de Weyl; effet Hall quantique entier et effet Hall quantique de spin; isolants de Semenoff et de Haldane/Chern et modèle de Kane-Mele dans le graphène; supraconducteurs chiraux et hélicaux en deux dimensions; états de bord et de surface; invariants Z; électrodynamique des axions; isolants topologiques cristallins; semi-métaux topologiques; métamatériaux topologiques. Target: Graduate Students https://www.usherbrooke.ca/admission/fiches-cours/PHY807/matiere-condensee-topologique/	For a student in Quebec: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement fom the course instructor at uSherbrooke 3) Fill out the Quebec Inter-University Transfer Agreement (IUT) or Autorisation d'études hors établissement (AEHE) Form (i.e., https://www.bci-qc.ca/en/students/aehe/) 4) Get the approval (signature) from uSherbrooke and your home institution 5) Get an access to uSherbrooke courses website and register for the course (i.e., https://www.usherbrooke.ca/admission/) Note: you must continue to pay fees to your home institution for the term(s) during the course takes place (no fee to be paid at uSherbrooke) For a student in Ontario: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement fom the course instructor at uSherbrooke 3) Fill out the Canadian university graduate transfer agreement (CUGTA) form available at your home institution (contact your administration or the professor who supports you). 4) Get the approval (signature) from uSherbrooke and your home institution 5) Get an access to uSherbrooke courses website and register for the course (i.e., https://www.usherbrooke.ca/admission/) Note: you must pay the tuition fees for the course at uSherbrooke.	1) Get a transcript from uSherbrooke with your grade (credits). Note: if there is no agreement between uSherbrooke and your home institution, you must arrange for them to be sent by uSherbrooke to your home institution, at your own expense 2) Provide the transcript to your home institution and require to transfer the obtained credits to your home institution' program (contact your administration or the professor who supports you)

A COLLECTION OF COURSES

Université de Sherbrooke| Modélisation de la matière et calcul quantique - PHY745

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Course Description	How to enroll	How to get credits
Cible(s) de formation Maîtriser le formalisme quantique à N corps et les systèmes modèles de spins et de qubits quantiques. Comprendre le rôle de l'intrication dans les matériaux quantiques et le calcul quantique. Implémenter des méthodes numériques pour la simulation de systèmes quantiques en interaction. Étudier les propriétés dynamiques de systèmes quantiques. Apprendre à simuler des algorithmes quantiques sur des ordinateurs classiques. Contenu Formalisme quantique à N corps : qubits et systèmes de spins quantiques, opérateurs et espaces d'Hilbert, Hamiltonien de Heisenberg, XXZ, chaines de Kitaev, décomposition de Schmidt, spectre enchevêtré et entropie, opérateur d'évolution unitaire et approximation de Suzuki-Trotter. Modélisation et simulations numériques : introduction aux méthodes de réseaux de tenseurs, techniques de décimation par blocs évolutifs, applications aux systèmes 1D. Propriétés et simulation de circuits quantiques : théorème de Gottesman-Kill et portes logiques de Clifford, croissance de l'enchevêtrement et chaos quantique, simulation d'algorithmes quantiques, échantillonnage et méthodes variationnelles. Target: Graduate Students https://www.usherbrooke.ca/admission/fiches-cours/PHY745/modelisation-de-la-matiere-et-calcul-quantique/	For a student in Quebec: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement fom the course instructor at uSherbrooke 3) Fill out the Quebec Inter-University Transfer Agreement (IUT) or Autorisation d'études hors établissement (AEHE) Form (i.e., https://www.bci-qc.ca/en/students/aehe/) 4) Get the approval (signature) from uSherbrooke and your home institution 5) Get an access to uSherbrooke courses website and register for the course (i.e., https://www.usherbrooke.ca/admission/) Note: you must continue to pay fees to your home institution for the term(s) during the course takes place (no fee to be paid at uSherbrooke) For a student in Ontario: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement from the course instructor at uSherbrooke 3) Fill out the Canadian university graduate transfer agreement (CUGTA) form available at your home institution (contact your administration or the professor who supports you). 4) Get the approval (signature) from uSherbrooke and your home institution 5) Get an access to uSherbrooke courses website and register for the course (i.e., https://www.usherbrooke.ca/admission/) Note: you must pay the tuition fees for the course at uSherbrooke.	1) Get a transcript from uSherbrooke with your grade (credits). Note: if there is no agreement between uSherbrooke and your home institution, you must arrange for them to be sent by uSherbrooke to your home institution, at your own expense 2) Provide the transcript to your home institution and require to transfer the obtained credits to your home institution' program (contact your administration or the professor who supports you)

A COLLECTION OF COURSES

Université de Sherbrooke| Méthodes expérimentales en physique du solide - PHY760

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Course Description	How to enroll	How to get credits
Cible(s) de formation S'initier aux divers outils expérimentaux utilisés couramment dans l'étude des propriétés physiques des matériaux. Contenu Diffraction : rayons X, neutrons, et électrons. Chaleur spécifique et transitions de phase. Photoémission, effet de Haas-van Alphen, effet tunnel, et effet des corrélations. Transport : résistivité, effet Hall, magnétorésistance, effet Shubnikov-de Haas, pouvoir thermoélectrique, et conductivité thermique, hyperfréquences et micro-ondes. Spectroscopie infrarouge, diffusion Raman, impulsions ultra-courtes, résonance cyclotron. Magnétisme, résonance magnétique nucléaire et résonance paramagnétique électronique. Jonctions Josephson et SQUID. Target: Graduate Students https://www.usherbrooke.ca/admission/fiches-cours/PHY760/methodes-experimentales-en-physique-du-solide/	For a student in Quebec: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement fom the course instructor at uSherbrooke 3) Fill out the Quebec Inter-University Transfer Agreement (IUT) or Autorisation d'études hors établissement (AEHE) Form (i.e., https://www.bci-qc.ca/en/students/aehe/) 4) Get the approval (signature) from uSherbrooke and your home institution 5) Get an access to uSherbrooke courses website and register for the course (i.e., https://www.usherbrooke.ca/admission/) Note: you must continue to pay fees to your home institution for the term(s) during the course takes place (no fee to be paid at uSherbrooke) For a student in Ontario: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement fom the course instructor at uSherbrooke 3) Fill out the Canadian university graduate transfer agreement (CUGTA) form available at your home institution (contact your administration or the professor who supports you). 4) Get the approval (signature) from uSherbrooke and your home institution 5) Get an access to uSherbrooke courses website and register for the course (i.e., https://www.usherbrooke.ca/admission/) Note: you must pay the tuition fees for the course at uSherbrooke.	1) Get a transcript from uSherbrooke with your grade (credits). Note: if there is no agreement between uSherbrooke and your home institution, you must arrange for them to be sent by uSherbrooke to your home institution, at your own expense 2) Provide the transcript to your home institution and require to transfer the obtained credits to your home institution' program (contact your administration or the professor who supports you)

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Université de Sherbrooke| Photonique et optique quantique - PHY777

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Course Description	How to enroll	How to get credits
Cible(s) de formation Comprendre les différents aspects de l'interaction lumière/matière ainsi que le contrôle et la mesure de systèmes quantiques (atomes et qubits supraconducteurs). Se familiariser avec divers éléments d'optique avancée, en particulier la photonique, et leurs applications dans le contexte de l'optique quantique moderne avec notamment l'optomécanique quantique. Contenu Physique des lasers et propriétés optiques des émetteurs quantiques; concept de densité locale d'états photoniques; mesures de corrélation; notions d'optique quantique chirale; effets mécaniques de la lumière; applications technologiques des systèmes optomécaniques (capteurs et transducteurs). Target: Graduate Students https://www.usherbrooke.ca/admission/fiches-cours/PHY777/photonique-et-optique-quantique/	For a student in Quebec: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement fom the course instructor at uSherbrooke 3) Fill out the Quebec Inter-University Transfer Agreement (IUT) or Autorisation d'études hors établissement (AEHE) Form (i.e., https://www.bci-qc.ca/en/students/aehe/) 4) Get the approval (signature) from uSherbrooke and your home institution 5) Get an access to uSherbrooke courses website and register for the course (i.e., https://www.usherbrooke.ca/admission/) Note: you must continue to pay fees to your home institution for the term(s) during the course takes place (no fee to be paid at uSherbrooke) For a student in Ontario: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement fom the course instructor at uSherbrooke 3) Fill out the Canadian university graduate transfer agreement (CUGTA) form available at your home institution (contact your administration or the professor who supports you). 4) Get the approval (signature) from uSherbrooke and your home institution 5) Get an access to uSherbrooke courses website and register for the course (i.e., https://www.usherbrooke.ca/admission/) Note: you must pay the tuition fees for the course at uSherbrooke.	1) Get a transcript from uSherbrooke with your grade (credits). Note: if there is no agreement between uSherbrooke and your home institution, you must arrange for them to be sent by uSherbrooke to your home institution, at your own expense 2) Provide the transcript to your home institution and require to transfer the obtained credits to your home institution' program (contact your administration or the professor who supports you)

A COLLECTION COURSES

Université de Sherbrooke| Physique de la matière condensée avancée - PHY730

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Course Description	How to enroll	How to get credits
Cible(s) de formation Comprendre les concepts fondamentaux et le formalisme théorique permettant de décrire le comportement physique des solides cristallins et être capable d'utiliser ces notions pour résoudre des problèmes complexes. Contenu Propriétés thermodynamiques du gaz d'électrons libres; propriétés et méthodes de calcul de la structure de bande d'un cristal; théorie quantique des modes de vibration des cristaux; théorie semi-classique du transport dans les métaux et semi-conducteurs (conductivités thermique et électriques); interaction lumière-matière et théorie de la diffusion des neutrons par les cristaux; gaz d'électrons en interaction (écrantage et théorie des liquides de Fermi). Target: Graduate Students https://www.usherbrooke.ca/admission/fiches-cours/PHY730/physique-de-la-matiere-condensee-avancee/	For a student in Quebec: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement from the course instructor at uSherbrooke 3) Fill out the Quebec Inter-University Transfer Agreement (IUT) or Autorisation d'études hors établissement (AEHE) Form (i.e., https://www.bci-qc.ca/en/students/aehe/) 4) Get the approval (signature) from uSherbrooke and your home institution 5) Get an access to uSherbrooke courses website and register for the course (i.e., https://www.usherbrooke.ca/admission/) Note: you must continue to pay fees to your home institution for the term(s) during the course takes place (no fee to be paid at uSherbrooke) For a student in Ontario: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement from the course instructor at uSherbrooke 3) Fill out the Canadian university graduate transfer agreement (CUGTA) form available at your home institution (contact your administration or the professor who supports you). 4) Get the approval (signature) from uSherbrooke and your home institution 5) Get an access to uSherbrooke courses website and register for the course (i.e., https://www.usherbrooke.ca/admission/) Note: you must pay the tuition fees for the course at uSherbrooke.	1) Get a transcript from uSherbrooke with your grade (credits). Note: if there is no agreement between uSherbrooke and your home institution, you must arrange for them to be sent by uSherbrooke to your home institution, at your own expense 2) Provide the transcript to your home institution and require to transfer the obtained credits to your home institution' program (contact your administration or the professor who supports you)

A COLLECTION COURSES

Université de Sherbrooke| Techniques de caractérisation des matériaux II - PHY710

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Course Description	How to enroll	How to get credits
Cible(s) de formation S'initier aux diverses techniques modernes de micro- et nanocaractérisation des matériaux. Apprendre à utiliser et à maîtriser quelques-uns des outils de caractérisation de pointe. Contenu Microscopie électronique à haute résolution, cathodoluminescence, microscopie par force atomique et microscopie tunnel (AFM, STM). Microscopie optique en champ proche, microscopie optique confocale, micro-Raman. Target: Graduate Students https://www.usherbrooke.ca/admission/fiches-cours/PHY710/techniques-de-caracterisation-des-materiaux-ii/	For a student in Quebec: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement from the course instructor at uSherbrooke 3) Fill out the Quebec Inter-University Transfer Agreement (IUT) or Autorisation d'études hors établissement (AEHE) Form (i.e., https://www.bci-qc.ca/en/students/aehe/) 4) Get the approval (signature) from uSherbrooke and your home institution 5) Get an access to uSherbrooke courses website and register for the course (i.e., https://www.usherbrooke.ca/admission/) Note: you must continue to pay fees to your home institution for the term(s) during the course takes place (no fee to be paid at uSherbrooke) For a student in Ontario: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement from the course instructor at uSherbrooke 3) Fill out the Canadian university graduate transfer agreement (CUGTA) form available at your home institution (contact your administration or the professor who supports you). 4) Get the approval (signature) from uSherbrooke and your home institution 5) Get an access to uSherbrooke courses website and register for the course (i.e., https://www.usherbrooke.ca/admission/) Note: you must pay the tuition fees for the course at uSherbrooke.	1) Get a transcript from uSherbrooke with your grade (credits). Note: if there is no agreement between uSherbrooke and your home institution, you must arrange for them to be sent by uSherbrooke to your home institution, at your own expense 2) Provide the transcript to your home institution and require to transfer the obtained credits to your home institution' program (contact your administration or the professor who supports you)

A COLLECTION OF COURSES

University of Ottawa| Quantum Materials, Nanostructures and Devices - PHY 5391

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Course Description	How to enroll	How to get credits
Electronic and optical properties of semiconductor nanostructures (quantum wells, wires and dots), topological insulators, and 2D crystals: single particle properties, many-electron description, response functions and computational tools. Applications to single electron transistors, lasers, solar cells, and Majorana quantum circuits. Target: Graduate Students https://catalogue.uottawa.ca/en/courses/phy/	For a student from Quebec: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement from the course instructor at uOttawa 3) Fill out the Canadian university graduate transfer agreement (CUGTA) form available at your home institution (contact your administration or the professor who supports you). 4) Get the approval (signature) from uOttawa and your home institution 5) Get an access to uOttawa courses website and register for the course (i.e., https://uozone2.uottawa.ca/) Note: you must pay the tuition fees for the course at uOttawa. For a student from Ontario: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement from the course instructor at uOttawa 3) Fill out the Ontario Visiting Graduate Student (OVGS) Form (i.e., https://cou.ca/wp-content/uploads/2021/10/OVGS-Student-Application-form-FN-8Apr-2024.pdf) 4) Get, from the Council of Ontario Universities, the approval (signature) by the Department Chair and Graduate Dean (or equivalent) of both your home institution and uOttawa. 5) uOttawa processes to your enrollment in the course. Note: you must continue to pay fees to your home institution for the term(s) during the course takes place (no fee to be paid at uOttawa)	1) Get a transcript from uOttawa with your grade (credits). Note: if there is no agreement between uOttawa and your home institution, you must arrange for them to be sent by uOttawa to your home institution, at your own expense 2) Provide the transcript to your home institution and require to transfer the obtained credits to your home institution' program (contact your administration or the professor who supports you)

MaQTech Training in Materials for Quantum Technologies

A COLLECTION OF COURSES

University of Ottawa| Quantum Science and Technology - PHY 5390

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Course Description	How to enroll	How to get credits
Interdisciplinary nature of the rapidly advancing field of quantum science and technology. The wide-range of topics include: foundations of quantum mechanics and quantum information, quantum materials, quantum communication, quantum sensing and metrology, quantum computing and simulations. Target: Graduate Students https://catalogue.uottawa.ca/en/courses/phy/	For a student from Quebec: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement from the course instructor at uOttawa 3) Fill out the Canadian university graduate transfer agreement (CUGTA) form available at your home institution (contact your administration or the professor who supports you). 4) Get the approval (signature) from uOttawa and your home institution 5) Get an access to uOttawa courses website and register for the course (i.e., https://uozone2.uottawa.ca/) Note: you must pay the tuition fees for the course at uOttawa. For a student from Ontario: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement from the course instructor at uOttawa 3) Fill out the Ontario Visiting Graduate Student (OVGS) Form (i.e., https://cou.ca/wp-content/uploads/2021/10/OVGS-Student-Application-form-FN-8Apr-2024.pdf) 4) Get, from the Council of Ontario Universities, the approval (signature) by the Department Chair and Graduate Dean (or equivalent) of both your home institution and uOttawa. 5) uOttawa processes to your enrollment in the course. Note: you must continue to pay fees to your home institution for the term(s) during the course takes place (no fee to be paid at uOttawa)	1) Get a transcript from uOttawa with your grade (credits). Note: if there is no agreement between uOttawa and your home institution, you must arrange for them to be sent by uOttawa to your home institution, at your own expense 2) Provide the transcript to your home institution and require to transfer the obtained credits to your home institution' program (contact your administration or the professor who supports you)

MaQTech Training in Materials for Quantum Technologies

A COLLECTION OF COURSES

University of Toronto| Quantum Materials: From atoms to Crystals - PHY358H1

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Course Description	How to enroll	How to get credits
This course covers the most important iconic quantum systems, from the hydrogen atom through to solid state systems, focusing on how quantum mechanics is applied and determines physical properties of atoms, molecules, and crystals. It begins with the hydrogen atom, including orbital and spin angular momentum, spin-orbit coupling, and effects of the magnetic field, and then extends to systems of two identical particles: bosons vs. fermions and the helium atom with two electrons. Other topics include spin singlets and triplets, entanglement, perturbation theory, the effects of electron-electron interactions and diatomic molecules. For crystals, the course covers Fermi gases, Fermi surfaces, crystal structure, the reciprocal lattice, the nearly-free electron model, energy bands, and topology using low-dimensional models. Target: Undergraduate Students https://www.physics.utoronto.ca/undergraduate/undergraduate-courses/atoms-molecules-and-solids/	1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement from the course instructor at uToronto 3) Get an access to uToronto courses website and register for the course (i.e., (i.e., https://www.acorn.utoronto.ca/) Note: you must pay the tuition fees for the course at uToronto.	1) Get a transcript from uToronto with your grade (credits). Note: if there is no agreement between uToronto and your home institution, you must arrange for them to be sent by uToronto to your home institution, at your own expense 2) Provide the transcript to your home institution and require to transfer the obtained credits to your home institution' program (contact your administration or the professor who supports you)

MaQTech Training in Materials for Quantum Technologies

A COLLECTION OF COURSES

University of Waterloo| Laboratory on Control of Quantum Technology - QIC 860

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Course Description	How to enroll	How to get credits
Experiments to control and characterize quantum systems. Target: Graduate Students https://uwflow.com/course/qic860	For a student from Quebec: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement from the course instructor at uWaterloo 3) Fill out the Canadian university graduate transfer agreement (CUGTA) form available at your home institution (contact your administration or the professor who supports you). 4) Get the approval (signature) from uWaterloo and your home institution 5) Get an access to uWaterloo courses website and register for the course (i.e., https://uwaterloo.ca/the-centre/quest) Note: you must pay the tuition fees for the course at uWaterloo. For a student from Ontario: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement from the course instructor at uWaterloo 3) Fill out the Ontario Visiting Graduate Student (OVGS) Form (i.e., https://cou.ca/wp-content/uploads/2021/10/OVGS-Student-Application-form-FN-8Apr-2024.pdf) 4) Get, from the Council of Ontario Universities, the approval (signature) by the Department Chair and Graduate Dean (or equivalent) of both your home institution and uWaterloo. 5) uWaterloo processes to your enrollment in the course. Note: you must continue to pay fees to your home institution for the term(s) during the course takes place (no fee to be paid at uWaterloo)	1) Get a transcript from uWaterloo with your grade (credits). Note: if there is no agreement between uWaterloo and your home institution, you must arrange for them to be sent by uWaterloo to your home institution, at your own expense 2) Provide the transcript to your home institution and require to transfer the obtained credits to your home institution' program (contact your administration or the professor who supports you)

A COLLECTION OF COURSES

University of Waterloo| Laboratory on Low Temperature Quantum Technology and Nanofabrication - QIC 862

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Course Description	How to enroll	How to get credits
Methods in low temperature physics as applied to quantum technology and an introduction to fabrication techniques. Target: Graduate Students https://uwflow.com/course/qic862	For a student from Quebec: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement from the course instructor at uWaterloo 3) Fill out the Canadian university graduate transfer agreement (CUGTA) form available at your home institution (contact your administration or the professor who supports you). 4) Get the approval (signature) from uWaterloo and your home institution 5) Get an access to uWaterloo courses website and register for the course (i.e., https://uwaterloo.ca/the-centre/quest) Note: you must pay the tuition fees for the course at uWaterloo. For a student from Ontario: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement from the course instructor at uWaterloo 3) Fill out the Ontario Visiting Graduate Student (OVGS) Form (i.e., https://cou.ca/wp-content/uploads/2021/10/OVGS-Student-Application-form-FN-8Apr-2024.pdf) 4) Get, from the Council of Ontario Universities, the approval (signature) by the Department Chair and Graduate Dean (or equivalent) of both your home institution and uWaterloo. 5) uWaterloo processes to your enrollment in the course. Note: you must continue to pay fees to your home institution for the term(s) during the course takes place (no fee to be paid at uWaterloo)	1) Get a transcript from uWaterloo with your grade (credits). Note: if there is no agreement between uWaterloo and your home institution, you must arrange for them to be sent by uWaterloo to your home institution, at your own expense 2) Provide the transcript to your home institution and require to transfer the obtained credits to your home institution' program (contact your administration or the professor who supports you)

A COLLECTION OF COURSES

University of Waterloo| Laboratory on Photonic Quantum Technology - QIC 861

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Course Description	How to enroll	How to get credits
Selected advanced experiments in photonics-based quantum technology. Target: Graduate Students https://uwflow.com/course/qic861	For a student from Quebec: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement from the course instructor at uWaterloo 3) Fill out the Canadian university graduate transfer agreement (CUGTA) form available at your home institution (contact your administration or the professor who supports you). 4) Get the approval (signature) from uWaterloo and your home institution 5) Get an access to uWaterloo courses website and register for the course (i.e., https://uwaterloo.ca/the-centre/quest) Note: you must pay the tuition fees for the course at uWaterloo. For a student from Ontario: 1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement from the course instructor at uWaterloo 3) Fill out the Ontario Visiting Graduate Student (OVGS) Form (i.e., https://cou.ca/wp-content/uploads/2021/10/OVGS-Student-Application-form-FN-8Apr-2024.pdf) 4) Get, from the Council of Ontario Universities, the approval (signature) by the Department Chair and Graduate Dean (or equivalent) of both your home institution and uWaterloo. 5) uWaterloo processes to your enrollment in the course. Note: you must continue to pay fees to your home institution for the term(s) during the course takes place (no fee to be paid at uWaterloo)	1) Get a transcript from uWaterloo with your grade (credits). Note: if there is no agreement between uWaterloo and your home institution, you must arrange for them to be sent by uWaterloo to your home institution, at your own expense 2) Provide the transcript to your home institution and require to transfer the obtained credits to your home institution' program (contact your administration or the professor who supports you)

MaQTech Training in Materials for Quantum Technologies

A COLLECTION OF COURSES

University of Waterloo| USEQIP Program

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Course Description	How to enroll	How to get credits
The Undergraduate School on Experimental Quantum Information Processing (USEQIP) is a two-week program on the theoretical and experimental study of quantum information aimed primarily at students one year away from completing their undergraduate studies. The school offers courses in: Quantum information processing, Implementations of quantum information processing, Experimental exploration. Target: Undergraduate Students https://uwaterloo.ca/institute-for-quantum-computing/outreach/useqip	1) Obtain a written agreement from your home institution (contact your administration or the professor who supports you) 2) Obtain a written agreement from the course instructor at uWaterloo 3) Get an access to uWaterloo courses website and register for the course (i.e., https://uwaterloo.ca/the-centre/quest) Note: you must pay the tuition fees for the course at uWaterloo.	1) Get a transcript from uWaterloo with your grade (credits). Note: if there is no agreement between uWaterloo and your home institution, you must arrange for them to be sent by uWaterloo to your home institution, at your own expense 2) Provide the transcript to your home institution and require to transfer the obtained credits to your home institution' program (contact your administration or the professor who supports you)