

**Faculty of Science Course Syllabus
Department of Chemistry
Inorganic Materials Synthesis – CHEM5105
Winter 2019**

Instructor(s): Mita Dasog mita.dasog@dal.ca Chemistry 432
Lectures: MWF 12.35 pm – 1.25 pm LSC C202
Office Hours: Thurs 1.00 – 3.00 pm (or by appointment), Room : Chemistry 432
Tutorials: NA

Course Description

This course introduces students to the synthesis of advanced functional inorganic materials for energy, optoelectronics, catalysis and other applications. Topics in the course include solid-state chemistry, sol-gel synthesis, nucleation and growth of nanoparticles, thin film fabrication, and soft lithography.

Course Prerequisites

None

Course Exclusions

CHEM 4105

Course Objectives/Learning Outcomes

Upon completion of this course, students should be able to:

- Describe various methods to synthesize inorganic materials and understand the advantages and disadvantages of each method.
- Select appropriate characterization techniques for the analysis of reaction products.
- Understand the underlying thermodynamic and kinetic principles for the synthesis of inorganic materials and for the formation of metastable products.
- Evaluate the suitability of different synthetic methods to prepare materials for specific applications.

Course Materials

There is no formal textbook for the class, but necessary course material will be provided in lecture notes. Useful resources include,

- Synthesis of Inorganic Materials, Shubert and Hüsing (2012)
- Inorganic Materials Chemistry, Weller (1994)
- Basic Solid-State Chemistry, West (1999)
- Electronic Journal Articles available through Dalhousie library

Website: Lecture notes, assignments, and other necessary information will be made available through Brightspace.

Course Assessment

Component	Weight (% of final grade)	Date
Term test #1	20%	8 February 2019 (in class)
Term test #2	20%	8 March 2019 (in class)
Term paper	15%	22 March 2019 (by 4 pm)
Presentation	5%	TBD
Final exam	40%	(Scheduled by Registrar)

- The topic of the term paper will be proposed by the student and approved by the instructor by Feb 15th 2019 and needs to be submitted by 4pm on March 22nd 2019. The term paper must summarize 3-5 recent research articles on novel synthetic method(s) to prepare micro- and nano-structured inorganic materials and how it influences functionality. The term paper must be 15-20 pages in length (double spaced) including figures and citations.
- The graduate students will present their term paper to the entire class. The presentations will be 20 minutes in length, followed by 2-3 minutes of questions.
- The midterms are scheduled as an in-class exam on the dates listed.
- Regular attendance of lectures is required to succeed in this class.

Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale

A+ (90-100)	B+ (77-79)	
A (85-89)	B (73-76)	F (<70)
A- (80-84)	B- (70-72)	

Course Policies

- If you are ill or experiencing an extreme personal emergency at the time of a midterm exam, contact me within 24 hours of missing the exam. A make-up midterm will not be offered; instead, the marks will be distributed between the final exam and the remaining assessments.
- If you cannot write the final exam as scheduled due to illness or personal emergency, you must email me to let me know before the exam starts. You must also supply a doctor's note within 48 hours of the end of the exam. The make-up exam must be written before the end of the exam period.
- In the case of a weather-related closure of the University, a DalAlert email will be sent to all students, faculty and staff. Other information can be found at www.dal.ca/storm.html.
- Use of cellular phones during lectures is strictly prohibited; phones must be turned off before the start of the lecture.

Course Content

1. Introduction to materials science
2. Characterization of solids
3. Solid-state reactions
4. Precursor and low-temperature methods
5. Solids from gas phase
6. Colloidal synthesis

University Policies and Statements

This course is governed by the academic rules and regulations set forth in the University Calendar and by Senate

Academic Integrity

At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect (The Center for Academic Integrity, Duke University, 1999). As a student, you are required to demonstrate these values in all of the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity.

Information: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Accessibility

The Advising and Access Services Centre is Dalhousie's centre of expertise for student accessibility and accommodation. The advising team works with students who request accommodation as a result of a disability, religious obligation, or any barrier related to any other characteristic protected under Human Rights legislation (Canada and Nova Scotia).

Information: https://www.dal.ca/campus_life/academic-support/accessibility.html

Student Code of Conduct

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner—perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution.

Code: https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

Diversity and Inclusion – Culture of Respect

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness

Statement: <http://www.dal.ca/cultureofrespect.html>

Recognition of Mi'kmaq Territory

Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel and support. Visit or e-mail the Indigenous Student Centre (1321 Edward St) (elders@dal.ca).

Information: https://www.dal.ca/campus_life/communities/indigenous.html

Important Dates in the Academic Year (including add/drop dates):

https://www.dal.ca/academics/important_dates.html

University Grading Practices:

https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html

Missed or Late Academic Requirements due to Student Absence (policy):

https://www.dal.ca/dept/university_secretariat/policies/academic/missed-or-late-academic-requirements-due-to-student-absence.html

Student Resources and Support**Advising**

General Advising: https://www.dal.ca/campus_life/academic-support/advising.html

Science Program Advisors: <https://www.dal.ca/faculty/science/current-students/academic-advising.html>

Indigenous Student Centre: https://www.dal.ca/campus_life/communities/indigenous.html

Black Students Advising Centre: https://www.dal.ca/campus_life/communities/black-student-advising.html

International Centre: https://www.dal.ca/campus_life/international-centre/current-students.html

Academic supports

Library: <https://libraries.dal.ca/>

Writing Centre: https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html

Studying for Success: https://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html

Copyright Office: <https://libraries.dal.ca/services/copyright-office.html>

Fair Dealing Guidelines <https://libraries.dal.ca/services/copyright-office/fair-dealing.html>

Other supports and services

Student Health & Wellness Centre: https://www.dal.ca/campus_life/health-and-wellness/services-support/student-health-and-wellness.html

Student Advocacy: <https://dsu.ca/dsas>

Ombudsperson: https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html

Scent-Free Program: <https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html>