# CHEM 519/ATOC 519

## Advances in the chemistry of Atmosphere

Winter 2021

**Lectures**
Location: Virtual

Time: 10:05 am - 11:25 am

Days: Tuesdays and Thursdays

**Instructor**

*Professor Parisa A. Ariya*

Office: Otto Maass 421 or Burnside Hall, room 808

Email: parisa.ariya@mcgill.ca

Office hours: After lectures

**Course website**

All lecture materials will be available on myCourses (CHEM/ATOC519).

**Textbook**

Chemistry of the Upper and Lower AtmosphereB.J. Finlayson - Pitts and J.N. Pitts, Jr., Academic Press, 2000.

Atmospheric Chemistry and Physics: From Air Pollution to Climate Change, J.H. Seinfeld, S.N. Pandis, 2006.

All lectures will be provided and a number of references to the recent articles will be provided.

**Course contents**

- Introduction
- Earth's atmosphere, chemical composition and vertical structure
- Radiation balance of atmosphere: greenhouse gases, absorption and photochemistry
- Photochemistry, the oxidation potential of the atmosphere: atmospheric oxidants and homogeneous chemistry
- The formation process of cloud – chemical reactions in and on cloud particles
- Ice nucleation microphysical processes: Role of natural and emerging particles
- Snow-air physicochemical interactions: Case studies in the Arctic, urban and remote industrial sites
- Aerosols and heterogeneous chemistry
- Advances in the atmospheric chemistry technologies for observation and experimental studies
- Bioaerosols (including airborne viruses such as SARS-CoV-2)
- Airborne nanoparticles and emerging nanoparticles
- Selected topics: Chemistry of "ozone hole" and air pollution
- Atmospheric modelling
- Your research topics!

**Evaluation:**

**Midterm:** 40%

**Final research project (paper + presentation:** 60 %

- All lectures are virtual and are pre-recorded. However, you will be provided with an additional summary of that lecture by Prof. Ariya during the allocated lecture slot, which will be placed on myCourses. Students will be able to ask questions to Prof. Ariya, which will be recorded and made available on myCourses too, for students who might not be in the same time zone.
- Unless otherwise specified, no work intended for extra credit will be accepted.

## General rules and regulations

- McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see this webpage for more information: www.mcgill.ca/students/srr/honest/ ).
- In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change.
- In accordance with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.
- In accordance with McGill Academic regulation 27, in the absence of a medical certificate or analogous circumstances, any required assignment submitted after its due date and time shall be assessed a penalty of one grading unit per day late (including weekend days).
- If you have a disability, please contact the instructor to arrange a time to discuss your situation. It would be helpful if you contact the Office for Students with Disabilities at 514-398-6009 before you do this.