# ENGINEERING 8713: Municipal Engineering

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Cynthia Coles</th>
<th>Teaching Assistants</th>
<th>Ms. Zhiwen Zhu (Joy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-mail</td>
<td><a href="mailto:ccoles@mun.ca">ccoles@mun.ca</a></td>
<td>E-mail</td>
<td><a href="mailto:zhiwenz@mun.ca">zhiwenz@mun.ca</a></td>
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<tr>
<td>Phone</td>
<td>864-8704</td>
<td>Phone</td>
<td>864-6768</td>
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<tr>
<td>Office Location</td>
<td>EN-3004</td>
<td>Office Location</td>
<td>EN-2041</td>
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<tr>
<td>Office Hours</td>
<td>Tues., Thurs. 1:25-2:15 p.m.</td>
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<tr>
<td>Website</td>
<td><a href="http://www.engr.mun.ca/~ccoles/">http://www.engr.mun.ca/~ccoles/</a></td>
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## Communication
The best way to reach the professor is at the above MUN email address. The professor may post notices for the students on the above website.

## CALENDAR ENTRY:
Water supply system overview; water consumption estimation; groundwater and surface water sources; oxygen demand and transfer; water treatment processes; water distribution systems and design software; sewer systems and design software; wastewater treatment processes; sludge handling; decentralized and on-site wastewater treatment.

## COURSE DESCRIPTION:
In 2013 an introductory section on urban sustainability and global water will be included. Sewer systems and design software will not be taught but the students will be directed to the free, user-friendly online design software. Sludge management will only be covered if time permits. Engi 7716 is a listed pre-requisite but the professor rather suggests Engi 4617 and Engi 5713.

## PREREQUISITES:
ENGI 4617, ENGI 5713, ENGI 7716

## SCHEDULE:
- **LECTURE:** Wednesday 12:00 noon -12:50 pm  
  Friday 12:00 noon – 1:40 pm  
  Room: EN 2050  
  Room: EN 2050
- **TUTORIAL:** Monday 12:00 noon -1:50 pm  
  Room: EN 2050

## CREDIT VALUE:
3 credits

## RESOURCES:

**TEXT BOOK**
REFERENCES

- HOK, global design, architecture, engineering and planning firm, www.hok.com
• Saga City - Our communities facing climate change, [http://vimeo.com/28464164](http://vimeo.com/28464164)
• Schwartz, S.A., 2007, Trends that will affect your future...and nary a drop to drink, Explore, 3(2):95-97.
• Schwartz, S.I., 2011, Sam Schwartz Engineering, New York, USA, Canadian Institute of Planners (CIP), Keynote Address, St. John’s, 11 July 2011
MAJOR TOPICS:

- New paradigms for town planning, future cities and sustainable development, urbanization impacts, communities facing climate change, compact cities
- Global water, overview of centralized and decentralized wastewater treatment plants, satellite facilities, global warming effects on water resources, water supply and treatment overview, St. John’s regional water supply system, water usage and population forecasting (Ch. 2)
- Groundwater and surface water supplies, water quality, stratification of lakes and rivers
- Coagulation and flocculation, static mixer design, paddle flocculator design (Ch. 3)
- Sedimentation, Type I and Type II settling, settling column tests, sedimentation basin design, high rate tube settlers (Ch. 7)
- Filtration
  - Granular filtration, granular filter headloss, backwashing bed depth, rapid sand filter design, wash trough design (Ch. 8)
  - Membrane filtration, microfiltration and ultrafiltration, membrane flux, fouling and rejection, dead-end and cross-flow operation (Ch. 9)
  - Reverse osmosis and nanofiltration, monovalent and divalent ions removal, carbonate buffer system (Ch. 6 and Ch. 3)
- Disinfection, chlorine, ozone and ultraviolet disinfection (Ch. 10)
- Wastewater treatment overview, secondary treatment by suspended growth biological processes, nitrification, denitrification and phosphorus removal, facultative oxidation ponds, oxidation ditch design, sequencing batch reactor (Ch. 16)
- Municipal infrastructure costing and social costs, trenchless technology, common transportation myths

LEARNING OUTCOMES:

Upon successful completion of ENGI 8713, the student will be able to:

1. Appreciate aspects of the future planning and evolution of cities.
2. Identify environmental issues with respect to global freshwater resources and water and wastewater treatment.
3. Understand the role of ethics within the realm of municipal engineering.
4. Identify and use valid sources of information.
5. Source, read and understand academic articles related to Municipal Engineering.
6. Appreciate the value of lifelong learning as a professional, particularly with respect to ever-evolving environmental and societal issues.
7. Design components of water and wastewater treatment systems.
8. Describe the costs, social and financial, of design, maintenance and renovation of municipal infrastructure
10. Discuss groundwater and surface water supplies.
11. Communicate technical information in a clear and effective manner.

**ASSESSMENT:**

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<tr>
<th>Assessment Type</th>
<th>Weightage</th>
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<tbody>
<tr>
<td>Individual in-class presentation</td>
<td>20%</td>
<td>Friday, February 1st</td>
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<tr>
<td>Midterm 1</td>
<td>20%</td>
<td>Friday, February 22nd</td>
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<td>Midterm 2</td>
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<td>Friday, March 15th</td>
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<tr>
<td>Final exam</td>
<td>40%</td>
<td>April 10th – 19th</td>
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The two midterm exams and the final exam will be open book exams. The only electronic aids that will be permitted on the exams will be scientific calculators. Practice problems, not to be handed in, will be assigned during the term to prepare students for the exams. The exams will be largely numerical calculations but there could be a small portion related to theory. The electronic PowerPoint presentation files are to be received by the Professor and Graduate Assistant by 12:00 a.m. on February 1st. A late submission will result in a 5% deduction and every day late beyond that will incur an additional 5% deduction. Missing the first midterm exam will increase the weighting of the second midterm exam and the final exam by 10% each. Missing the second midterm exam will increase the weighting of the final exam by 20%.

**ACADEMIC INTEGRITY AND PROFESSIONAL CONDUCT:**

Students are expected to conduct themselves in all aspects of the course at the highest level of academic integrity. Any student found to commit academic misconduct will be dealt with according to the Faculty and University practices. More information is available at [www.engr.mun.ca/undergrad/academicintegrity](http://www.engr.mun.ca/undergrad/academicintegrity).


**INCLUSION AND EQUITY:**

Students who require physical or academic accommodations are encouraged to speak privately to the instructor so that appropriate arrangements can be made to ensure your full participation in the course. All conversations will remain confidential.

The university experience is enriched by the diversity of viewpoints, values, and backgrounds that each class participant possesses. In order for this course to encourage as much insightful
and comprehensive discussion among class participants as possible, there is an expectation that
dialogue will be collegial and respectful across disciplinary, cultural, and personal boundaries.

**STUDENT ASSISTANCE:** Student Affairs and Services offers help and support in a variety of
areas, both academic and personal. More information can be found at [www.mun.ca/student](http://www.mun.ca/student).

One specific resource provided to students is assistance in writing. Please contact the Writing
Centre at [http://www.mun.ca/writingcentre/about/](http://www.mun.ca/writingcentre/about/) to find out more.

**ADDITIONAL INFORMATION:**

*Office hours, as show below, are 1:25 p.m. to 2:15 p.m. on Tuesdays and Thursdays. The other best times to reach the professor in her office are Wednesdays and Fridays after class.*

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<tr>
<th>TIME</th>
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<td>12:00</td>
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*Engi 8713: Municipal Engineering  
Engi 9605: Water and Wastewater Treatment*