URSY 530: Urban Systems Engineering

COURSE INFORMATION

Instructor: Konrad Siu
Email: konrad.siu@ubc.ca
Office: By appointment

Term/period: Summer 2019
Course dates: May 6th – July 26th
Class meeting times: Tuesdays and Thursdays (9:30 am – 12:00pm) with one additional full day workshop and occasional afternoon field trips.

COURSE GOALS

This course ensures familiarity with the full range of technical infrastructure systems that make up the urban environment and helps students understand the technology and management of different urban systems. It will provide a survey of systems including water, liquid waste, storm water and flood protection, solid waste, transportation, transit and power. The course will examine the interdependencies among these systems and also between the different phases of urban systems: from strategy, to concept, design, construction, operation, maintenance and renewal. The course will also consider the delivery of urban systems in a municipal environment including governance and decision-making, finance and leadership.

LEARNING OBJECTIVES

Upon completion of the course, students should be able to demonstrate general familiarity with the key major municipal infrastructure systems, the different phases of infrastructure and project delivery in an urban environment.

Specifically, students should be able to:

- Identify the major technical infrastructure systems that support social and economic activities in a community
- For each major infrastructure system, characterize and describe key components of this system, technology alternatives, delivery approaches and operation and maintenance issues
- Link the different phases of urban systems from strategy to concept, design, construction, operation, maintenance and renewal
- Illustrate the political, social, economic and environmental implications of systems and interdependencies of service delivery requirements of urban systems
- Understand how decisions are made in a municipal government, including financing of urban systems
- Apply leadership principles in the management of urban systems
COURSE SCHEDULE

For the first ten weeks starting on May 6 and ending on July 12, classes will be held on every Tuesday and Thursday mornings from 9:30 to 12 noon. There will be a number of field trips to visit various urban systems, mostly during regular classes but could also include afternoons. In addition, there will be a one-day workshop (date to be determined). At the end of the course, there will be a two-day field trip to the Resort Municipality of Whistler (tentatively Wednesday July 17 to Thursday July 18), where the students will present the results of the course project to an external panel.

ASSESSMENT SUMMARY

This course will be graded on a numeric (percentage) basis. There will be several assignments, including individual and group assignments. There will also be a final course project to be submitted at the end of the course.

Assignments will be centered on the different urban systems (e.g. transportation, wastewater) and interdependencies of systems. The assignments will be directly related to the lectures, readings and field trips. Assignments will help students develop meaningful insights into the urban systems and related issues. There will also be in-class discussions.

<table>
<thead>
<tr>
<th>Assignments</th>
<th>45%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class discussion</td>
<td>15%</td>
</tr>
<tr>
<td>Final project</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100%</td>
</tr>
</tbody>
</table>

For each assignment and final project, evaluation will be based on:

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical Merit – understanding of concepts/urban systems and demonstrate application of knowledge</td>
<td>70 pts</td>
</tr>
<tr>
<td>Overall structure and reporting</td>
<td>10 pts</td>
</tr>
<tr>
<td>Analytic and synthesis skills</td>
<td>10 pts</td>
</tr>
<tr>
<td>Research and innovation</td>
<td>10 pts</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100 pts</strong></td>
</tr>
</tbody>
</table>

Class discussion emphasizes on participation and sharing of knowledge and experience. Evaluation is based on level of preparation and participation.
## COURSE MATERIALS & REQUIREMENTS

<table>
<thead>
<tr>
<th>Topic</th>
<th>Reading Materials</th>
</tr>
</thead>
</table>
| **Introduction to Business Plan and Major Urban Systems** | City of Vancouver 2018 Corporate Plan  
City of Edmonton The Way Ahead  
City of Edmonton Infrastructure Strategy  
Canadian Infrastructure Report Card Informing the Future Key Messages  
| **Transportation**                                 | City of Vancouver 2040 Transportation Plan                                         |
| **Transit**                                        | TransLink 2018 – 2027 Investment Plan: Phase Two  
InfraGuide: Transit Best Practices |
| **Water and Liquid Waste**                         | Metro Vancouver Drinking Water Management Plan  
Metro Vancouver Integrated Liquid Waste and Resource Management |
| **Flood Protection and Stormwater Management**     | 2008 – 2031 Flood Protection Strategy City of Richmond  
InfraGuide: Stormwater Management Planning |
| **Solid Waste**                                    | City of Vancouver: Towards Zero Waste  
City of Vancouver: Solid Waste Division Summary Report 2011  
Metro Vancouver: Integrated Solid Waste and Resource Management |
| **Energy / Power**                                 | CleanBC: our nature, our power, our future  
BC Hydro Integrated Resources Plan Meeting BC’s Future Electricity Needs November 2013 |
| **Integration of Urban Systems**                   | InfraGuide: An Integrated Approach to Assessment and Evaluation of Municipal Road, Sewer and Water Networks  
InfraGuide: Coordinating Infrastructure Works  
Horse Hill Integrated Infrastructure Management Plan |
| **Decision-making Tools**                          | InfraGuide: Managing Risk  
| Governance, Finance and Leadership | City of Vancouver 2018 Budget and five-year financial plan  
InfraGuide: Planning and Defining Municipal Infrastructure  