

COURSE GOALS

This course delves into the details of the engineering of infrastructure asset management, as it relates to urban systems. This includes both practical and theoretical frameworks and both qualitative and quantitative methods for infrastructure asset management decision making.

The course goal is to teach the students the rudiments of infrastructure asset management as it relates to urban systems. Primary in this goal is for the students to become very conversant with engineering techniques to calculate and represent the seven “whats” of infrastructure asset management: what do you own, what is it worth, what is the condition, what is the remaining service life, what is the risk, what is the level of service and what do you fix first.

A complementary goal is to teach them how to apply this knowledge to develop an Asset Management Plan (AMP) for the owner of a diverse and extensive portfolio of infrastructure assets.

LEARNING OBJECTIVES

By the end of this course, students are able to:

- Understand engineering techniques to calculate and represent the seven “whats” of infrastructure asset management (what do you own, what is it worth, what is the condition, what is the remaining service life, what is the risk, what is the level of service and what do you fix first);
 - Apply both qualitative and quantitative methods to analyse the current state of asset management for a local municipality or equivalent organization;
 - Analyse the short comings of this organization with respect to implementing an asset management plan;
 - Work as part of a team of professionals: coordinating activities on a complex project, communicating internally with the team and externally to clients, and presenting results in clear understandable language (oral and written);
 - Provide effective, timely and constructive feedback on project milestones/deliverables to a client;
 - Communicate results effectively to a stakeholder/public audience.
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COURSE INFORMATION

This course is delivered through lectures, readings, site visits, team and individual assignments, software demonstrations and class discussions.

It focuses on a number of small group presentations and one major group project implementation and evaluation (“Asset Management Plan”) using data obtained by the students from a local municipality or equivalent organization.

The major deliverable assesses an organization’s approach to the management of a specific domain of asset management (e.g. sewers, road network, bridges). The teams (4 students) act as a consultant that evaluates the state of asset management and makes recommendations to the senior management team on the municipality or organization.

The final course project report (an Asset Management Plan) must be submitted at the end of term. A tour of sustainable communities and innovative facilities in the Whistler area is held in mid July 2018, in conjunction with presentations for URSY 530 (spring term course).

COURSE MATERIALS & REQUIREMENTS

Reading in advance of each lecture. This is critical for class discussions and application of concepts covered.

Text (not mandatory):

Uddin, Hudson and Haas (2013) Public Infrastructure Asset Management, Second Edition Hardcover – Jul 30 2013 by Waheed Uddin, W. Hudson, Ralph Haas.

<https://www.youtube.com/watch?v=LiHqJInrFy0>

<https://www.amazon.ca/Public-Infrastructure-Asset-Management-Second/dp/0071820116>

Required Readings:

A Framework for Municipal Infrastructure Management for Canadian Municipalities, Client Report B-5123.7, Vanier, D.; Newton, L.; Rahman, S., September 2006, National Research Council Canada< Ottawa, ON.

Implementation Details to Support a Generalized Framework for Municipal Infrastructure Management, Client Report B-5123.14, Vanier, D.; Newton, L.; Rahman, S., December 2009, National Research Council Canada, Ottawa, ON.

ASSESSMENT SUMMARY

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| A) Asset Management Plan | 50% |
| B) Decision Making Tool (Analytic Hierarch Process) | 10% |
| C) Contact Sheets (Guest speaker evaluations) | 10% |
| D) White Paper on Municipal Infrastructure Plans | 10% |
| E) InfraGuide Best Practices Summaries | 10% |
| F) AM Software Review | 10% |

ASSESSMENT

MAJOR PROJECT – Asset Management Plan

The “AMP” intends to simulate a real-world project deliverable: the evaluation of current state of practice and the implementation of the learned AM skill sets towards providing viable and affordable AM solutions.

The rationale is that in industry, you are expected to

- Work within and lead multi-disciplinary project teams;
- Work individually on specific topic and present your findings in clear, accurate, and indisputable terms.
- Demonstrate technical depth and broad understanding across a wide range of domains in the umbrella of infrastructure asset management;
- Deliver high quality outputs (under pressure) with real-world implications;
- Coordinate the activities of a number of speciality consultants on your team to create a coordinated, comprehensive and understandable oral and written reports.
- Successfully communicate your findings to stakeholders, decision makers, senior managers, municipal council members, or the general public.

Objectives:

- To develop an asset management plan according to the requirements of the province for a selected city focusing on one asset domain (water, sewer, roadways, bridges, facilities), while considering key interdependencies with other domains;
- To produce a viable and concrete Asset Management Plan at the completion of this course to present to senior decision makers at the selected municipality or organization.

Organization:

- Four (4) students per Team (self-selection and/or assigned teams);
- Project manager is a lead hand and team organizer;
- Teams are free to choose client and discipline, after discussion with Lecturer;
- Teams are free to choose internal responsibilities, but Project manager manages the communication, coordination, and final deliverable;
- There are 3 milestones for the AMP during course in advance of final due date: 1) interim oral presentation, 2) final oral presentation, and 3) final report submission;
- Document must be a minimum 30 pages including tables and figures, it excludes technical annexes;
- Format suggestions: font size 12, line spacing 1 - 1.5 with adequate white spacing, text justified) in PDF and DOC formats.
- The final oral presentation is critiqued and suggestions to improve the final report are provided orally before students present the final report (electronic submission).

Analytical Hierarchy Process (AHP) to select city and domain for AMP

Team effort to encourage communication skills and team work.

Decision making process to be used to select optimal project and organization for AMP investigation.

Use AHP to help selection AMP Project/Activity

- Appropriate engineering domain (not small, not complex)
- A project likely to have an appropriate activity underway
- Timing of activity
- Duration of activity

Present a Decision-making scenario

- One Grand Objective (ZG)
- At least 3 objective functions (maximize or minimize)
- At least 2 sub objectives for each Objective Function
- At least 3 alternatives
- Pair-Wise comparisons of all, using AHP (your ratings)
- Using a spreadsheet, calculate preference.
- Each member has to calculate their own decisions
- PM selects weighting of individual votes and makes final selection
- Present final results on "ONE" Page (average computer screen)

Contact Sheets and Guest Speakers

Mandatory attendance -- you must contact Sessional Lecturer, if you are unable to attend.

Contact Sheet (why called this?)

- Purpose of the CONTACT SHEET is to summarize the contents of presentations and meetings that YOU have had with individuals outside YOUR organization (aka Trip Reports).
- Serves dual purpose of collecting data for a searchable knowledge repository for others in YOUR organization.
- Walkaway Points, -- what you have learned.
- Key Words, -- provided by YOU, permit others to search a knowledge repository.
- 500-word abstract provided as searchable data.
- Due 2 weeks after presentation (normally, midnight Fridays)

White Paper on Municipal Infrastructure Plans

Relates to a recent CNAM (Canadian Network of Asset Managers) presentation

Students must join CNAM as student member (free)

One-page abstract.

It is suggested to have the topic related to their AMP.

InfraGuide Best Practice Summaries

One-page abstract

Students must give a 10-minute oral presentation on the Best Practice of their choice.

It is suggested to have the topic related to their AMP.

You have to submit your edited PPT one week after the presentation

Software Review

Select specific application web site and provide a summary of software capabilities in a specific AM domain. Select area of interest: Own, Worth, Condition, Service life, Risk, Level of service, Decision making. Select software application: Assetic, Asset Finda, IDS, IMA, Infratech Services, Softsols Group, SolutionsModex, Public Sector Digest, Power Plan, GM Blue Plan, IDS, Cartegraph, City Works, VEMAX Management, ESRI, IIMM, Applied Geologies Inc.

One page abstract and 10-minute oral presentation.

ATTENDANCE

Students are expected to attend all class sessions and participate.

CLASS SCHEDULE

There is a total of 13 classes of 2.5 hours each and three workshop of 2.5 hours each (a total of 40 hours). The course is taught in MCLD 254 over 13 weeks from January 3 to April 4 in 2018, on Wednesdays from 2PM to 430PM. Workshops take place in April or May when required or requested by students.

ACADEMIC INTEGRITY

The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work. Violations of academic integrity (i.e., misconduct) lead to the breakdown of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. For example, incidences of plagiarism or cheating may result in a mark of zero on the assignment or exam and more serious consequences may apply if the matter is referred to the President's Advisory Committee on Student Discipline. Careful records are kept in order to monitor and prevent recurrences.

A more detailed description of academic integrity, including the University's policies and procedures, may be found in the Academic Calendar at

<http://calendar.ubc.ca/vancouver/index.cfm?tree=3,54,111,0>.

Additional Recommended Readings

InfraGuide Best Practices (FCM.ca)

CNAM presentations (CNAM.ca)

International Infrastructure Management Manuals (IIMM) from IPWEA (IPWEA.org)

ISO 55000 series of publications on Asset Management (ISO.org)