CARLETON UNIVERSITY
Department of Civil & Environmental Engineering

Introduction to Infrastructure Management

CIVE 5404F/IPIS 5102F Graduate Course Outline 2014
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Synopsis

This course covers all aspects of infrastructure management (IM). Students will gain an understanding of infrastructure management and how it relates to facility and asset management; the challenges facing infrastructure managers; tools used for effective IM; and the concept of total quality management (TQM) as it applies to IM. Economic analysis of maintenance, rehabilitation and reconstruction projects and the use of life cycle cost analysis in decision-making will be studied. Finally, the development and use of IM systems in both the public and private sectors will be presented.

Course Objectives

- Gain an understanding of infrastructure management and challenges facing infrastructure managers.
- Learn about effective infrastructure management tools used for inventory, investigation, condition assessment, and performance evaluation.
- Use economic analysis tool of life cycle cost analysis for decision-making regarding renewal plans.
- Implement the five aspects of infrastructure management (Inventory, investigation, condition assessment, performance evaluation, and renewal plans) on real project.

Course Content

Topic	Description
1	Introduction, challenges of IM and IM systems
2	Overview of planning, needs assessment and performance indicators & decision support systems
3	Decision support systems - data and creation/use of databases
4	Monitoring & evaluating infrastructure, modeling
5	Quality Management in Design, Construction and O&M
6	Life Cycle Cost Analysis
7	Programming & Prioritization
8	LEED (Leadership in Environmental Design & Engineering)
9	Infrastructure management systems and the future of IM

Recommended References

Course reference material

Dell'Isola, A. and Kirk, S. 2003. *Life Cycle Costing for Facilities*. Reed Construction Data, Kingston, MA.

Goodman, A.S., and Makarand, H. 2006. *Infrastructure Planning Handbook*. ASCE Press and McGraw Hill

Hudson, W.R., Haas, R., and Uddin, W. 1997. *Infrastructure Management.* McGraw-Hill Press, New York.

Vanier, D.J.; Rahman, S. 2004. *MIIP Report:Survey on Municipal Infrastructure Assets* NRC Press, Client Report B-5123.2

Vanier, D.J.; Rahman, S. 2004. *MIIP Report:Primer on Municipal Infrastructure Asset Management.* NRC Press, Client Report B-5123.3

ASCE: Journal of Construction Engineering and Management

Journal of Infrastructure Systems

Journal of Performance of Constructed Facilities

Journal of Management in Engineering

Websites:

www.infraguide.ca
www.infrastructure.gc.ca
www.fcm.ca

Grading and Weighting

Grading and determination of course standing will be in accordance with the Academic Regulations of the University. The grade components and the weight of each are as follows:

First assignments	15%
Second Assignment	10%
Participation in class	5%
Group Project I	25%
Group Project II	45%

Plagiarism WILL NOT be tolerated and will be dealt with according to University regulations (Graduate Calendar p 66). If a student has any concerns about how to properly reference material he/she should see the instructor prior to handing in the paper or assignment.

Assignments

The first assignment is about an infrastructure project for which the student is required to prepare an overall evaluation in a maximum of three (3) pages. The second assignment is about life cycle cost analysis of construction/rehabilitation plans. The due dates will be announce on the assignment sheet.

Group Project I

Groups of 4 students research four aspects of the five-aspect approach of infrastructure management including inventory, investigation, condition assessment, performance evaluation, and renewal plan (one phase for each student). Groups prepare and present 20-minute seminars.

Group Project II

Each group selects a real infrastructure project of your choosing and implements at least four aspects of the five-aspect approach of infrastructure management including inventory, investigation, condition assessment, performance evaluation, and renewal plan. Each group submits a report and presents a 20-minute seminar. The report should be about 40 pages and will be marked for technical content and presentation according to the following marking scheme:

Technical Content –75% Presentation– 25%

Overview of case
Why selected
Relevance to IM
Outcome(s)
Analysis
Conclusions
Appendices

Spelling
Grammar
Style & flow of ideas
Uses of figures, tables, etc
References (either Harvard system or CSCE system acceptable)

Due date: Last class

Note: As a part of the work in project II, Students will have to go outside to inspect real infrastructure projects. Thus, utmost precautions must be exercised to protect yourself from surrounding dangers.

Administration

Request for Academic Accommodation for Students with Disabilities

Students with disabilities requiring academic accommodations are required to contact a coordinator at the Paul Menton Center (see also carleton.ca/equity) to complete the necessary *letters of accommodation*. The student must them make an appointment to discuss his/her needs with the instructor at least two weeks prior to the first class or itv test. This is to ensure sufficient time is available to make the necessary accommodations arrangements.

Request for Academic Accommodation for Religious Obligations

Students requesting academic accommodation on the basis of religious obligation should make a formal, written request to the instructor for alternate dates and means of satisfying academic requirements. Such a request should be made in the first two weeks of class, but no later than two weeks prior to the compulsory event.