

UNIVERSITY OF TORONTO
FACULTY OF APPLIED SCIENCE AND ENGINEERING
ELITE Master's Program

APS1031H1F2020 Infrastructure Planning

Course Outline

Introduction

This course is a practical guide to building an Infrastructure Development Plan (IDP). We work from first principles so that what you learn can be applied to any jurisdiction in the world. Our focus is the first part of the IDP, which involves translating the vision of future capability and economy into infrastructure development requirements and strategy.

Infrastructure enables economic and social development; it enables the health of the population. It defines the world we live in and creates the world that our children will inherit. It is more than what we build, and includes what we harness of the natural world and how we decide to use it. It is necessarily multidisciplinary and is the essence of what engineering was at its very inception. However, this also means that it cannot be neatly contained in any one discipline or specialisation. In the truest meaning of the phrase, it is *engineering in society, for society*.

This is not a procedural course. You will be taught the foundational concepts and principles of infrastructure planning and set a real IDP project over the semester. Ordinarily, you would be working with a real client in real time. However, the lack of reliability in scheduling access to clients, as we continue to deal with the pandemic, means that we will focus on a past project that is scheduled for implementation in 2021. We can compare your project conclusions and recommendations with the adopted solution. These projects are selected to develop your understanding of infrastructure planning and how to adapt it to the socioeconomic circumstances in which you produce each aspect of IDP Part 1 – the Development Strategy. We will explore capability-based planning, risk evaluation, futuring, the *vitae* system of systems, the role of infrastructure and the concept of through-life value. We will also look at financing and contracting options with a focus on risk allocation. You will decide the pace and balance of the course.

This course is especially useful for those considering a career in infrastructure development, policy, international development, infrastructure project finance and planning.

Course Designation

APS1031 Infrastructure Planning, starts 14 September 2020. The course lectures and discussion will run on Mondays from 14:00 to 17:00. If we can gather in person, all the better. However, we are currently planning for on-line teaching and tutorials. It is a foundation course of the CRCI; <http://www.crci.utoronto.ca/education/academic/infrastructure-courses>.

Contact:

Prof. Alec Hay will be available by appointment throughout the semester. Contact should be made by email.

Evaluation

There are two assignments, each representing 10% of the total course marks. These are about fundamental concepts of infrastructure that you will consider and propose how they are best applied in a rapidly changing risk context.

One project, representing 45% of the total course marks. This is a practical survey and research project that requires a first principles approach and critical assessment of the available information. Marks will be awarded separately for the project report (60%), decision brief (20%) and presentation (20%).

There will be an individual multiple-choice examination, mid-term, of 30 questions in 30 minutes. This represents 15% of the total course marks. The examination will be closed book.

There is also an individual two-hour open book written examination comprising two (2) questions that you can select from a possible five (5). The exam represents 20% of the total course marks.

Materials

There is **one** required text for this course “Sustainable Infrastructure: Principles into Practice” by C Ainger & R Fenner. This contains a lot of valuable information that you will likely wish to refer back to over your careers, if you have anything to do with infrastructure in the future. I recommend that you borrow/rent “Doing it Differently” by D Blockley and P Godfrey and “GRASP” by JJ McLaughlin, M Ocock, A Oldfield & B Trebes. These are all available at very competitive prices and buy-back options through the UofT Bookstore. There are other useful readings that will be referenced during the course on Quercus. You may also be interested in “Designing Healthy Cities” by J Aicher, “Rethinking Masterplanning: Creating Quality Places” by H Al-Waer & B ILLsley, and “Financing Infrastructure Projects” by T Merna & FF Al-Thani.

Address course questions and (correspondence) course work submissions to me at alec.hay@utoronto.ca