

You are planning/designing something that supports an important operation. It may be a data centre, supermarket, hospital, community or correctional facility. Whatever the facility, the function that it houses cannot fail because the consequences would be too great. Therefore, the way we design the facility must enable the continuity and rapid recovery of those essential functions in a catastrophe. Identifying this requirement is the essence of infrastructure resilience planning. This course is taught from first principles and requires no prior specialist knowledge. The skills that you will learn are both scalable from a school building to a national utility network and can be applied to new and existing infrastructure. We can similarly apply them to post-disaster response, reconstruction and overseas development.

Course Designation: **APS1024 Infrastructure Resilience Planning**, starting Saturday, 24 Oct 15. The course will be full days, from 09:00 to 17:00 with 30mins for lunch. A foundation course of the CRCI; <http://www.crci.utoronto.ca/education/academic/infrastructure-courses>.

Calendar:

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| 24 Oct 15 | Course introduction and administration.
We explore the purpose of infrastructure and the context in which it is used; how this context changes both operationally and in terms of wider hazard risk. We investigate the nature of resilience, how it differs from protection, and what it means for communities and essential functions. We will then discuss the drivers of resilience, how it relates to sustainable economic development, and the concept of 'equilibrium'. We then focus on the primary tools working from first principles, starting with location risk analysis, calculation plans, and mission analysis, before moving to more complex tools such as Intelligence Preparation of the Operating Environment, Demand & Dependency Management, and Resilience-Protection Investment Balance. We will look at how some of these tools are brought together to deliver specific frameworks for community or utility infrastructure resilience. We then deep dive into the theory and practice of Operational Resilience, All-Hazards and Recovery planning parameters. Issue Assignment. |
| 31 Oct 15 | Review of Assignment.
We explore the concept of Security Integration at the Strategic, Operational and Technical levels, the application of All-Hazards and the Φ_α & Φ_β trade-off and investment balance with resilience and recovery. We will look at security systems in capability terms and how technological change effects their value and efficacy.
Site Survey – assessing the operational resilience for a major international event – walk through / talk through with syndicate and open forum discussions of concept solutions.
Issue Project 1. |

- 7 Nov 15 Review Project 1 – Initial Desk Top Study.
We will continue looking into the capability requirements of various security systems, before exploring the concept, technology and practice of control systems.
We now put all of the components together to build an operational resilience concept and plan, through a combination of lecture, syndicate work and open forum discussion.
Issue Project 2.
- 14 Nov 15 Review Project 2 – Concept Development Report.
We review the process of producing a Resilience Plan and what it means for operational and site assurance, how this affects value and even debt/equity ratios for capital investment.
Examination

The Infrastructure Resilience Planning Course is assessed:

One assignment, representing 20% of the total course marks. Extract the necessary information and critically discuss. Keep asking ‘what does this mean in reality?’ to get to an impression of what is genuinely required and the effects that the stated policy and guidance have. 50% of marks are for the correct description of the respective policies and associated structures, 10% for extracting the issues that it raises and 40% for your critical analysis of what it means.

Discuss how current Canadian federal and provincial policies influence the delivery of effective national infrastructure resilience, compare and contrast with the equivalent in UK and US.

If you are corresponding, use your country of residence as the subject and compare with the other two.

Two projects, each representing 20% of the total course marks. These are both research projects that require a first principles approach and critical assessment of the available information.

1. Desk-Top Study. If incomplete, half points will be given for a clear explanation of how each of the missing factors will be answered. A practised researcher will deliver the basic DTS in less than a day. It is highly likely to take you more than this. Do not fall into the trap of trying to research everything – stick to the operation in context.

2. Concept Development Report. Working as syndicates, you will build upon your DTS to devise a concept for how the client can enhance her confidence of operational survival.

A two-hour written examination comprising 3 essays selected from 10 possible titles. The final exam represents 40% of the total course marks.

Each of the assignments, projects and the final exam will be marked out of a possible 100 marks. The marks for each will be weighted according to the overall percentage of the course marks represented by that work and the whole aggregated for the final course mark / grade.

Throughout, credit will be given for demonstrating a clear understanding of the concepts, principles and application over specific processes or formulae.

You are strongly advised to become familiar with the reading and reference . Familiarise yourselves with Handy and Cialdini. Read Flynn and study Hay, Macaulay, Lewis, Boin, Cole and Robinson – more than 60% of what you need to know is in these four books and two papers [marked in bold on the reading list]. New and second-hand copies of the books are available from the University Bookstore on the corner of St George St and College St.

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