

Carleton University
Civil and Environmental Engineering Department
IPIS 5501 Transportation & Aviation Security
Graduate Course

Offered by:

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Class 6:05 pm - 8:55 pm (Monday)
Mackenzie Building 4332, Jan 06, 2016 - Apr 08, 2016

Introduction:

Safety and security of transportation systems are becoming important part of the global safety and security of societies and nations. The tragic events that took place on September 11, 2001 in addition to subsequent events such as the London Subway bombing, Madrid Train bombing, Moscow Subway bombings; exposed the vulnerability of the most advanced protective systems of any nation on earth. The Security and Safety of any population represent the highest concerns of democratic societies today. As an integral part of a well planned strategy, engineers, managers and policy makers must understand the main issues and factors concerning the concept of safety. Clearly, transportation systems such as highway system, aviation system and railway system play major role in the economic and social development of people and nations. Therefore, the course deals with: (1) definition of safety and security, (2) determination of the main factors affecting security, and (3) understanding and predicting the influence of the determined factors on the economic and social benefits of the enhanced safety and security of transportation systems and infrastructure.

The course shall be very useful to graduate students, professional engineers and security personnel. In addition, practitioners in governmental organizations and private sector will be interested to upgrade their knowledge and improve their skills in such an important engineering topic. Students will be asked to prepare and complete a field study, which can be a project or a term paper reflecting their understanding of the materials of the course. Also, the course will include procedures to contact the instructor directly by e-mail and establish a two-way one-on-one dialogue.

Course Contents

1. Introduction

- 1.1 Concepts of Safety and Security
- 1.2 Definitions
- 1.3 Importance of Security and Safety
- 1.4 Types of Security

2 Transportation Systems and Infrastructures

- 2.1 Importance of Transportation
- 2.2 Transportation Systems and Infrastructures

- 2.2.1 Highways
- 2.2.2 Airports and Aviation
- 2.2.3 Railways (including subways and elevated monorails)
- 2.2.4 Maritime (ports and harbours)
- 2.2.5 Pipelines (oil and gas)
- 2.3 Safety and Security in Transportation and Factors Affecting Transportation Safety

3 Ground Transportation and Security

- 3.1 Characteristics and Factors Governing Ground Transportation Systems
- 3.2 Trucking: Background, Facilities, regulation, technology (TDG)
- 3.3 Mass Transit: Background, Facilities, regulation, technology
- 3.4 Railway and Subway: Background, Facilities, regulation, technology (TDG)
- 3.5 Pipeline: Background, Facilities, regulation, technology

4 Airport and Maritime Systems and Security

- 4.1 Characteristics and Factors Governing Airport and Aviation Systems
- 4.2 Airports: Background, Facilities, regulation, technology
- 4.3 Maritime: Background, Facilities, regulation, technology
- 4.4 Aviation: Background, Facilities, regulation, technology
- 4.5 Passengers and Cargo
- 4.5 History of Airports Safety and Security before and after 9/11

5 Threats: Natural and Man-made

- 5.1 Introduction and Historical background
- 5.2 Natural Threats
- 5.3 Man-Made Threats
- 5.4 Future Developments

6 Security Categories

- 6.1 Security Issues in Transportation
- 6.2 Basic Personnel Security
- 6.3 Physical Security
- 6.4 Procedural Security
- 6.5 Technological Aids
- 6.6 New Technologies

7 Transportation Security and Economy

- 7.1 Interdependence of Transportation infrastructures
- 7.2 Effect of Security on Safety
- 7.3 Economics of Safer and Secure Transportation System
- 7.4 The Road Ahead

The course will include case study where the students will be asked to deal with a realistic problem such as the London subway attacks, the Madrid railway attacks and the recent attempts to send mail containing explosives on US airplanes.

Marking scheme consists of two term papers and a project. The term papers will be completed individually while the project may be completed in groups. The following is breakdown of the marks:

1. Attendance and participation: 10%
2. Two term papers 20% each: 30%
3. Term Project: 30%
4. Final Examination: 30%

Total: 100%

Text books and references:

1. **Kathleen M. Sweet**; Transportation and Cargo Security, Threats and Solutions, Pearson Prentice Hall, 2006.
2. **Kathleen M. Sweet**; Aviation and Airport Security, Terrorism and Safety Concerns, Pearson Prentice Hall, 2004.
3. Conference and Journal publications