

Carleton University
Civil and Environmental Engineering Department

IPIS 5501 Transportation & Aviation Security
Graduate Course

Offered by:

Abd El Halim Omar Abd El Halim

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. In addition to man-made damage to infrastructure, natural disasters such as earthquakes, tsunamis, fires and sever changes in global climates are other type of threats to the safety and security of humans.

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 highways, airports, pipelines, and railways play major role in the economic and social development of people and nations. Therefore, this 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. Also, the course will introduce the students to the basics of designing protecting system to prevent sever damages to man and property.

The course shall be useful to graduate students, professional engineers, policy analysts, 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
- 2.4 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, and 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
- 4.6 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 Prevention, Protection and Recovery

- 6.1 Security Issues in Transportation
- 6.2 Basic Personnel Security
- 6.3 Procedural Security
- 6.4 Technological Aids
- 6.5 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, the ice storm, and the recent events of nuclear disaster in Japan.

Marking scheme consists of one term paper, a project and a final examination. The term paper is expected to be completed individually while the project may be completed in groups. The following is breakdown of the marks:

1. Attendance and participation: 10%
2. Term paper: 20%
3. Term Project: 40%
4. Final Examination: 30%

Where to find Professor Halim:

Office: 2486 Mackenzie Building
Phone number: (613)520-2500, Ext: 5789
E-mail: a_halim@carleton.ca or
helmy50@gmail.com

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
4. Governmental publications at 2486 Mackenzie Building daily news

Additional Notes:

1. The instructor may alter the course outline and/or the marking scheme depending on the class performance.
2. Students who perform very poorly during the term will be assigned the grade FND (Failure – No Deferred).
3. Students are reminded that plagiarism is an instructional offence as defined in Section 14 of the current undergraduate calendar. All occurrences, including, but not limited to, homework assignments will be dealt with seriously, and suitable penalties will be awarded.

4. Students with disabilities requiring academic accommodations in this course are encouraged to contact a coordinator at the Paul Menton Centre for Students with Disabilities to complete the necessary letters of accommodation. After registering with the PMC, make an appointment to meet and discuss your needs with the instructor at least two weeks prior to the first in-class test. This is necessary in order to ensure sufficient time to make the necessary arrangements.
5. Students requesting academic accommodation on the basis of religious obligation should make a formal, written request to their instructors for alternate dates and/or means of satisfying academic requirements. Such requests should be made during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist, but no later than two weeks before the compulsory event. Accommodation is to be worked out directly and on an individual basis between the student and the instructor(s) involved. Instructors will make accommodations in a way that avoids academic disadvantage to the student. Students or instructors who have questions or want to confirm accommodation eligibility of a religious event or practice may refer to the Equity Services website for a list of holy days and Carleton's Academic Accommodation policies, or may contact an Equity Services Advisor in the Equity Services Department for assistance.
6. Pregnant students requiring academic accommodations are encouraged to contact an Equity Advisor in Equity Services to complete a letter of accommodation. The student must then make an appointment to discuss his or her needs with the instructor at least two weeks prior to the first academic event in which it is anticipated the accommodation will be required.