Carleton University
Department of Civil and Environmental Engineering

CIVE5403 (CVG7158) Airport Planning - Syllabus

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Lectures: **3 hrs./week**

Office Hours: Upon appointment (via Zoom)

Description: This course covers a full range of airport planning topics from general planning principles to runway layout. It introduces the student to concepts of demand forecasting, which aircraft characteristics impact on airport design, and how the airport impacts upon, and is influenced by, its surrounding environment. We will investigate the various components of the airport, grouped by airside, terminal, and groundside facilities. We will also touch on various specialty type airports, and finish with a discussion of the assessment of airports.

Lectures:

Week	Topic
1.	**Introduction to Airport Planning:** course housekeeping, brief history of air transportation, organizations, terminology/acronyms, airport planning procedures, Canadian airport policy, airport planning as a career
2.	**Demand Forecasting**: methods of forecasting, annual and peak hour forecasts, data sources, long range forecasts, operational forecasts, Transport Canada forecasting models
3.	**Airport Site Selection and Land Use Impacts:** site selection criteria, fine tuning site selection, environmental impact studies, land use planning impacts, noise contours, pollution
4.	**Aircraft Characteristics**: aircraft trends, factors affecting aircraft development, design aircraft for facility planning and design, Aircraft Group Number
5.	**Airside Layout (Runways):** runway orientation, wind rose analysis, runway configurations, Obstacle Limitation Surfaces, runway components, Declared Distances, runway separation
6.	**Airside Layout (Taxiways & Aprons):** taxiway layout and design, holding bays, apron layout and design, ATC Tower considerations, ground-based navaids, airside capacity
7.	**Air Traffic Control (ATC) and NavAids:** air navigation services, flight rules (VFR/IFR), airspace, ATC, flight services, aviation weather, navigation aids, Performance-Based Navigation (PBN), impacts on airport planning
8.	**Passenger Terminal Building (PTB):** historic context, planning considerations, siting the terminal, PTB layouts, PTB sub-systems, pedestrian flows, and modeling
9.	**Air Cargo Terminal Building:** terminology, planning process, functions of the terminal, air cargo characteristics and shipping models, terminal concepts, and planning considerations

10.	**Ground Transportation System:** fundamentals and planning approach, groundside components, (users, transport modes, infrastructure), capacity and level of service, problem areas
11.	**General Aviation and Small Airports:** GA Master Planning, types of operations and aircraft, facility planning, heliports, water aerodromes, ice aerodromes
12.	**Health, Safety & Security in Airport Planning:** Presentation of Group Projects

TEXT (Optional)

Ashford, Norman J., Mumayiz, Saleh, and Wright, Paul H., *Airport Engineering: Planning, Design and Development of 21st Century Airports (4th Edition)*, John Wiley & Sons, New York, April 2011.

Note: This textbook is not mandatory for this course. We will be drawing on a wide variety of reference material which will be discussed throughout the course. Any mandatory readings will be provided through Brightspace.

Likewise, the references provided below were used in the preparation of material for this course and provide additional context for students interested in pursuing more information related to this topic.

REFERENCES

A. BOOKS

1. DeNeufville, Richard L. and Odoni, Amedeo R., *Airport Systems Planning Design and Management*, 2nd Edition, McGraw Hill Companies, 2013.
2. Horonjeff, Robert D. and McKelvey, Francis X., Sproule, William, *Planning and Design of Airports, 5th Edition*, McGraw Hill Companies, May, 2011.
3. Wells, Alexander T., and Young, Seth, *Airport Planning and Management*, 6th Edition, McGraw-Hill Companies, October 2011.

B. Government of Canada Reference Documents

1. Aeronautics Act (R.S., 1985, C. A-2)
2. Canadian Aviation Regulations (CAR), SOR/96-433, Part III, Subpart 2 – *Airports*, 2020
3. Transport Canada, TP 312 (5th Edition), *Aerodrome Standards & Recommended Practices*, 2015
4. Transport Canada, TP1247/E, Land Use in the Vicinity of Aerodromes, 9th Edition, 2014

C. ICAO documents

1. *Aerodrome Design Manual: Part 1 - Runways, (Doc 9157 AN/901 Part 1),* Third Edition, 2006
2. *Aerodrome Design Manual: Part 2 – Taxiways, Aprons and Holding Bays, (Doc 9157 AN/901 Part 2),* Fourth Edition, 2005
3. *Airport Planning Manual, Part 1 (Master Planning Manual), (Doc 9184-AN/902 part1), Second Edition, 1987*

4. *Airport Planning Manual, Part 2 (Land Use and Environmental Control)*, (Doc 9184 AN/902 part2), Third Edition, 2002
5. *Manual on Air Traffic Forecasting* (Doc 8991 AT/722/3), *Third Edition*, 2006

D. IATA documents

1. *Airport Development Reference Manual* (Ref No. 9044-09), *Ninth Edition*, 2004

E. ACRP documents

1. *Report 25 – Airport Passenger Terminal Planning and Design (3 volumes),* TRB, Washington, 2010
2. *Report 16 – Guidebook for Managing Small Airports,* TRB, Washington, 2009

MARKING SCHEME

Problem Sets (2 @ 10% each)	20%
Group Project	20%
Class Participation	10%
Final Exam	50%
	100%

PROBLEM SETS

Two problem sets will be assigned, one in the first half of the course, and the second after the mid-term break. Two weeks will be allotted to complete each assignment. The assignments will focus on concepts covered during the lectures and practical application of those concepts.

GROUP PROJECT

The group project is an opportunity for students to delve deeper into a specific topic that we could only skim the surface of in the lectures. And, to share their findings with the rest of the class.

Students will be randomly assigned to groups of up to five (5) team members. Over the course of the semester, each team will prepare a technical paper and presentation on a specific topic within a given theme. This year's theme is:

Health, Safety & Security in Airport Planning

Each team will present their findings in the final lecture.

CLASS PARTICIPATION

Up to ten (10) marks will be assigned for class participation which can take several different forms. Students can earn participation marks by:

- Chairing breakout sessions
- Participating in in-class polls
- Providing feedback on assigned readings in asynchronous discussion forums

LEARNING MODALITY

As of the time of preparation of this Syllabus, this course is scheduled to be delivered in-person in Room 3356 of the MacKenzie Building on the Carleton University campus from 6:05pm to 8:55pm on Wednesday evenings (starting Sept 7, 2022). However, all lecture notes / slide decks, readings, assignments, group project material, and gradings will be communicated via Brightspace. Students are encouraged to familiarize themselves with the course Brightspace website and to check it regularly for updates and announcements.

Should circumstances dictate, the course may be moved online where the instructor and students will meet via web conferencing tools (Zoom), at the same scheduled lecture dates/times. Participation in synchronous courses requires students to have reliable, high-speed internet access, a computer (ideally with a webcam), and a headset with a microphone.

SPREADSHEETS

Various lectures and assignments will be using Microsoft Excel© and students are expected to have a basic familiarity with this software. This includes being able to:

- create and copy basic formulae
- add, edit, and delete data in specific cells, rows, and columns
- format tables and data using colour, borders, shading, emphasis, etc.
- import data from external sources
- create a PDF of your work to submit online through Brightspace

ACADEMIC INTEGRITY

The University Senate defines plagiarism as "presenting, whether intentionally or not, the ideas, expression of ideas or work of others as one's own." This can include:

- reproducing or paraphrasing portions of someone else's published or unpublished material, regardless of the source, and presenting these as one's own without proper citation or reference to the original source;
- submitting a take-home examination, essay, laboratory report or other assignment written, in whole or in part, by someone else;

- using ideas or direct, verbatim quotations, or paraphrased material, concepts, or ideas without appropriate acknowledgment in any academic assignment;
- using another's data or research findings;
- failing to acknowledge sources through the use of proper citations when using another's works and/or failing to use quotation marks;
- handing in "substantially the same piece of work for academic credit more than once without prior written permission of the course instructor in which the submission occurs."

Plagiarism is a serious offence that cannot be resolved directly by the course's instructor. The Associate Dean of the Faculty conducts a rigorous investigation, including an interview with the student, when an instructor suspects a piece of work has been plagiarized. Penalties are not trivial. They can include a final grade of "F" for the course.