Applied Studies (APST) 350

Applied Architectural Sciences (Revision 3)

Status:	Replaced with new revision, see the **course listing** for the current revision
Delivery mode:	**Individualized study online** with **eText**
Credits:	3
Area of study:	Applied Study
Prerequisites:	APST 230
Precluded:	None
Challenge:	APST 350 is not available for challenge.
Faculty:	**Faculty of Science and Technology**
Notes:	APST 350: Applied Architectural Sciences is intended for students enrolled in the BSc (Architecture) program at the RAIC Centre for Architecture at Athabasca University. For those students interested in pursuing a career as a registered architect, this course also contributes to the **RAIC Syllabus**

Diploma .

Overview

APST 350: Applied Architectural Sciences introduces the scientific basis underlying the design, analysis, and evaluation of the building envelope as a separator of different environments. The purpose of this course is to link theoretical knowledge to applications in practice. This approach will support an increase in evidence-based practice.

The building envelope, or the skin of the building, performs many functions and is a critical element in the design of a beautiful, sustainable building. Like a person's skin, the building envelope is the critical interface between inside and outside, both technically and metaphorically. The envelope has an enormous impact on the building's appearance, its energy performance, the design of its mechanical and electrical systems, and the comfort of its occupants.

This course relates building assemblies, components, and materials to different thermal, hydrostatic, and hygrometric conditions. A building's impact on its own microclimatic conditions and the interactions of building form, orientation, and envelope with building energy consumption are discussed.

Outline

Part 1 Factors in the Environment

- Unit 1: Principles in Sustainable Design
- Unit 2: Climate
- Unit 3: Water

Part 2 Concepts and Principles

- Unit 4: Envelope Design for Air and Water

- Unit 5: Thermal Comfort: A Qualitative Approach
- Unit 6: Heat and Thermal Transfer

Part 3 Managing Environmental Factors in Design

- Unit 7: Design for Heating and Cooling
- Unit 8: Passive Solar Energy Systems
- Unit 9: Active Solar Heating and Photovoltaics
- Unit 10: Solar Geometry and Shading
- Unit 11: Passive Cooling
- Unit 12: Site Design Strategies

Learning outcomes

This course presents both qualitative and quantitative techniques to relate the principles of equilibrium to building design to the climatic factors and principles that influence building performance, including solar radiation, wind, precipitation, temperature, thermal dynamics, and vapour migration.

After completing this course, you should be able to

- discuss the relationships between building performance and environmental and climatic factors.
- discuss the concepts of heat transfer, thermal gradients, thermal bridges, air leakage, convection, and stack effect.
- predict the responses of common building assemblies and materials to climatic cycles through a systematic analysis of environmental factors including radiation, precipitation, heating, and cooling.
- discuss the impact that buildings have on the microclimate of their environment, including such factors as snow drifting, shading and reflection.
- relate the performance of windows and mechanical systems in passive and active building systems.

Evaluation

Your work will be evaluated on the basis of 4 assignments and the final examination. Assignments 1 and 2 are each worth 15% of your final course grade, Assignment 3 is worth 30%, and Assignment 4 is worth 20%. The final examination will cover the entire course and is worth 20% of your final grade. This information is summarized in the table below.

You must achieve a cumulative grade of **67% or greater** to receive credit for APST 350.

Activity	**Weight**
Part 1: Factors in the Environment Assignment 1	15%
Part 2: Concepts and Principles Assignment 2	15%
Part 3: Managing Environmental Factors in Design Assignment 3	30%
Assignment 4	20%
Final Exam	20%
Total	**100%**

The **final examination** for this course must be requested in advance and written under the supervision of an AU-approved exam invigilator. Invigilators include either ProctorU or an approved in-person invigilation centre that can accommodate online exams. Students are responsible for payment of any invigilation fees. Information on exam request deadlines, invigilators, and other exam-related questions, can be found at the **Exams and grades** section of the Calendar.

To learn more about assignments and examinations, please refer to Athabasca University's **online Calendar** .

Materials

Grondzik, Walter T., Kwok, A. G. (2019). *Mechanical and electrical equipment*

for buildings (13th ed.) [eText]. John Wiley & Sons.  (eText)

eText

Registration in this course includes an electronic textbook. For more information on **electronic textbooks** , please refer to our **eText Initiative site** .

Online Materials

The course website contains the items listed immediately below.

Course Orientation

The Course Orientation provides specific information about how to proceed through the course. We recommend you read the Course Orientation entirely before you begin the course because there are many useful sections to help you complete this course successfully.

Study Guide

The Study Guide for this course consists of twelve units presented in three parts. Each unit elaborates on key concepts in the form of commentary, focus questions, required reading, learning activities, and supplementary resources.

Student Manual

The Student Manual provides information on Athabasca University procedures at the undergraduate level.

Digital Reading Room

The **Digital Reading Room** (DRR) contains a compiled list of the required online materials for this course. You will be directed to these readings at the appropriate points in the Study Guide. You may also access the DRR directly through either the course home page or the AU Library home page.

Resources

Other useful resources are available on your course home page.

Forms

Forms you may need are available through the **myAU portal.**

Important links

- **Academic advising**
- **Program planning**
- **Request assistance**
- **Support services**

Athabasca University reserves the right to amend course outlines occasionally and without notice. Courses offered by other delivery methods may vary from their individualized study counterparts.

Opened in Revision 3, November 15, 2021

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View **previous revision**