





Applied Studies (APST) 240

Introduction to Structures (Revision 3)

Status:

Replaced with new revision, see the [course listing](#)  for the current revision 

Delivery mode:

Individualized study online 


Credits:

3

Area of study:

Applied Study

Prerequisites:

[ADST 300](#) . Basic trigonometry and algebra are recommended.

Precluded:

None

Challenge:

APST 240 is not available for challenge.

Faculty:

[Faculty of Science and Technology](#) 

Notes:

APST 240: Introduction to Structures 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 240: Introduction to Structures introduces theories of statics and the strengths of various construction materials. Qualitative and quantitative analyses demonstrate the reaction of building elements to external forces and are instrumental in determining the design of structural members and assemblies. Throughout this course, the relationships between architectural design and structural design in the generation of expressive form are discussed.

APST 240 focuses on the most common building materials now in use: steel, masonry, timber, and concrete.

Outline

APST 240 is comprised of the following eleven projects:

Part I: Introduction to Graphic Statics

- Project 1: Learning the Basics by Designing a Series of Suspension Footbridges
- Project 2: Force Systems and Designing Unreinforced Masonry

Part II: The Flow of Forces

- Project 3: Designing Efficient Trusses
- Project 4: Using Materials Wisely
- Project 5: Designing with the Flow of Forces
- Project 6: Designing a Bay of Framing

Part III: Beams

- Project 7: Bending Action on Beams
- Project 8: How Beams Resist Bending
- Project 9: Bending Resistance in Beams of Any Shape

Part IV: Other Structural Elements and Reflecting on What You Have Learned

- Project 10: Designing Columns, Frames, and Load-Bearing Walls
- Project 11: Reflecting on What You Have Learned

Learning outcomes

After successfully completing this course, you will acquire proficiency in the following areas:


1. *Ability* to produce an architectural design that broadly integrates contextual factors, structural systems, regulatory requirements, and environmental stewardship.
2. *Ability* to integrate appropriate structural systems into a building and to use appropriate representational media, including freehand drawing and computer technology, to convey essential structural elements at each stage of the design development process.
3. *Understanding* of the principles of structural behaviour in withstanding gravitational, seismic, and lateral forces, including the evolution, range, selection, and application of appropriate structural systems.
4. *Understanding* of the basic building science principles and the appropriate application and performance of various construction materials, products, components, and assemblies common to the Canadian construction industry, including their environmental impact and reuse.
5. *Ability* to analyze structural elements in terms of equilibrium, the resolution of forces, and shear and bending moments.
6. *Ability* to make technically precise drawings in order to develop a structural system for a proposed design.
7. *Understanding* of the broader ecologies that inform the design of buildings and their systems and of the interactions among these ecologies and design decisions.

8. *Understanding* of the basic principles that inform the design of passive and active environmental modification and building service systems, the issues involved in the coordination of these systems in a building, energy use and appropriate tools for performance assessment, and the codes and regulations that govern their application in buildings.
9. *Ability* to raise clear and precise questions; record, assess, and comparatively evaluate information; synthesize research findings and test potential alternative outcomes against relevant criteria and standards; and reach well-supported conclusions related to structural systems.
10. *Ability* to write, speak, and use visual media effectively to appropriately communicate on structural matters related to the architectural discipline within the profession and with the general public.

Evaluation

Your work in this course will be evaluated based on four collections. A final course grade of 67% or higher is required to pass the course. Grading information is summarized in the following table:


Activity	Weight
Collection 1	20%
Collection 2	30%
Collection 3	30%
Collection 4	20%
Total	100%

To learn more about assignments and examinations, please refer to Athabasca University's [online Calendar](#) .

Students who wish to be certified by the Canadian Architectural Certification Board must achieve and maintain a final grade point average of 2.3 or

greater.

Materials





Allen, E., & Zalewski, W. (2010). *Form and Forces: Designing Efficient, Expressive Structures*. Hoboken, New Jersey: Wiley.  (eText)

Other Materials

Course materials for APST 240 are available online through the course home page. These materials include a Course Orientation and a Study Guide. All Required Readings are available in the Digital Reading Room.

Students must have access to a digital camera as well as basic drafting equipment and/or a CAD program. Students will also perform hands-on experiments and need items such as modeling clay, tape, string, and glue.

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.

Updated July 22, 2024

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