

# ATCT-2380: ADVANCED STAIRS

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## Cuyahoga Community College

**Viewing: ATCT-2380 : Advanced Stairs**

**Board of Trustees:**

May 2024

**Academic Term:**

Fall 2024

**Subject Code**

ATCT - Appld Indus Tech - Carpentry

**Course Number:**

2380

**Title:**

Advanced Stairs

**Catalog Description:**

This is an advanced stair building course covering the calculation of stair design numbers needed to construct a set of curved stairs. Applied math with specific emphasis on the geometry of circles will be covered. In addition techniques necessary to layout, cut and fabricate curved stairs will be covered and applied in shop exercises.

**Credit Hour(s):**

2

**Lecture Hour(s):**

2

## Requisites

**Prerequisite and Corequisite**

ATCT-1710 Stairs Layout and departmental approval: admission to an Applied Industrial Technology Program.

## Outcomes

**Course Outcome(s):**

Integrate mathematical concepts and plane geometric applications to identify those that are used to generate stair design numbers needed for a curved stair.

**Objective(s):**

1. Identify respective radii and discuss how they relate to different parts of a curved stair.
2. Distinguish between the various circumferences and arc lengths as they relate to geometric stairs.
3. Explain how arc lengths relate to inside and outside total runs and line of travel.

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**Course Outcome(s):**

Compute design numbers needed to layout and fabricate a set of curved stairs.

**Objective(s):**

1. Convert standard measurements in feet, inches and fractional parts on an inch into feet and decimal parts of a foot and inches and decimal parts of an inch.
  2. Interpret floor plans and shop drawings to establish respective radii used in computing stair design numbers.
  3. Calculate circumferences and arc lengths for total runs and line of travel.
  4. Incorporate building codes in establishing unit rise and unit run numbers.
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**Course Outcome(s):**

Layout stair stringers for curved stairs using stair calculations, layout hand tools and a story pole.

**Objective(s):**

1. Establish the total runs at the location specified on construction drawings.
2. Use hand and power tools to establish the stairway location.
3. Use trammel points to identify the inside and outside radii and their respective arc lengths.
4. Transfer the stair design numbers, including total rise, radii, and unit rise on a story pole.
5. Use stair layout hand tools to transfer design numbers onto stringer material.

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**Course Outcome(s):**

Fabricate and install a set of curved stairs using hand and power tools and equipment.

**Objective(s):**

1. Construct the curved walls that house the stairway.
2. Install the respective stair stringers.
3. Cut and install the components of the stair including treads, risers and necessary bracing.

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**Methods of Evaluation:**

1. Quizzes
2. Exams
3. Classroom Participation
4. Completion of assigned projects

**Course Content Outline:**

1. Math concepts
  - a. Radii
    - i. Inside
    - ii. Outside
    - iii. Line of travel
  - b. Circumferences and arc lengths
    - i. Greater total run
    - ii. Lesser total run
    - iii. Run at line of travel
  - c. Hypotenuse
    - i. Stringer lengths
    - ii. Bridge measures
2. Calculations
  - a. Conversions
    - i. Decimal feet
    - ii. Decimal inches
3. Drawing interpretation
  - a. Floor plans
  - b. Sections
  - c. Shop drawings
  - d. Circumferences and arc lengths
  - e. Stair design numbers
  - f. Bridge and stringer lengths
    - i. Pythagorean Theorem
    - ii. Hypotenuse
    - iii. Stair codes
4. Stringer layout and story pole
  - a. Calculation transfer
    - i. Total rise
    - ii. Total runs

- iii. Unit calculations
  - 1. Rise
  - 2. Run
  - 3. Bridge measure
- b. Layout hand tools
  - i. Trammel points
  - ii. Framing square
  - iii. Scribes
  - iv. Dividers
- c. Stairway location
  - i. Drawings
  - ii. Framing requirements
- d. Tools
  - i. Hand and power
  - ii. Equipment
- 5. Fabrication
  - a. Wall framing
  - b. Stringer installation
  - c. Bracing

## Resources

Koel, Leonard. *Carpentry*. 7th ed. Homewood IL: American Technical Publishers, 2021.

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Schuttner, Scott. *Basic Stairbuilding*. Newton: Taunton Press, 1990.

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Carpenters International Training Fund. *Stair Framing*. Las Vegas, NV: Carpenters International Training Fund, 2014.

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Engel, Andy. *Building Stairs (For Pros by Pros)*. Taunton, 2007.

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Badzinzki, Stanley. *Stair Layout*. 2nd ed. American technical Publishers, 2011.

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Carpenters International Training Fund. *Interior Finishes 2*. Las Vegas, NV: Carpenters International Training Fund, 2019.

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Occupational Safety and Health Administration, United States Department of Labor. *Code of Federal Regulations 1926*. National Safety Compliance, 2022.

## Resources Other

1. Teachers of Carpentry and ESD Division. *Stair Building*. Sydney, Australia: Construction and Transport Division TAFE. 2010. <http://mikestrade.sydneyinstitute.wikispaces.net/file/view/stairs+text%2C+updated+2010.pdf>
2. Arcways, Stairways of Distinction. Arcways, Inc. 2024 <http://www.arcways.com/architect-resources.asp>
3. Thomas, John. *Stairbuilding*. San Francisco: A Roman & Co., 1893. (Classic). Available in PDF through the California Digital Library Archives: <http://www.archive.org/details/geometricalstair00thomrich> (<http://www.archive.org/details/geometricalstair00thomrich/>).
4. Carpenters International Training Fund. <https://www.carpenters.org/citf-training/>. 2024

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