

Appendix H

# **Descriptive Geometry**

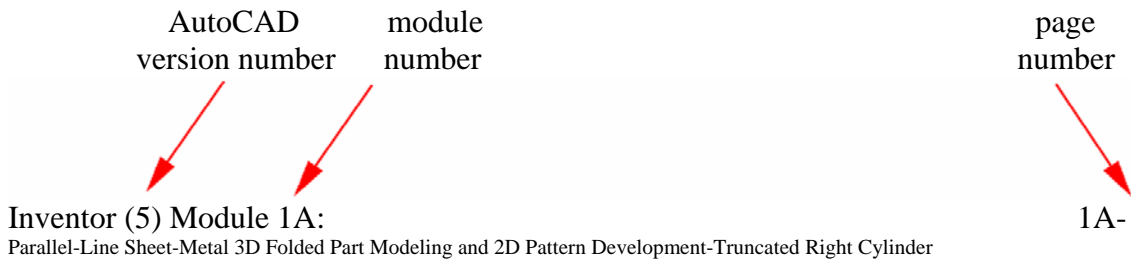
## **with Autodesk Inventor**

**A Collection of Step-by-Step Learning Modules for  
Mechanical Engineering Students**

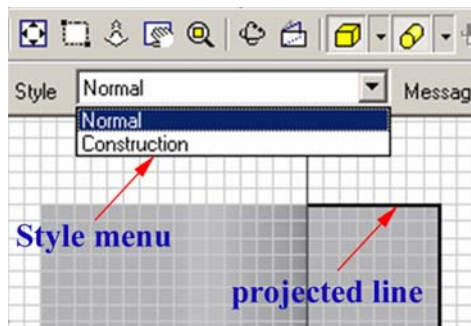
**By Edward Lock**

# Notice to Readers

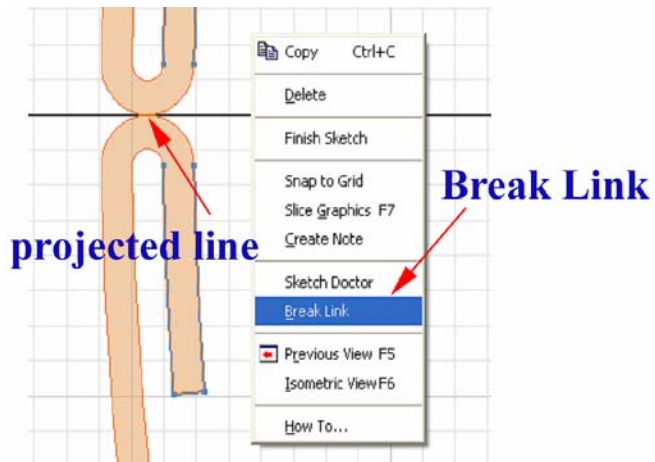
The Inventor-based descriptive geometry learning modules included in the Appendix H have all been developed with Inventor version 5 and version 10 Professional. The header of the module pages indicates the version number, as shown in the example below:



The techniques and tools for solving descriptive geometry problems in Autodesk Inventor are similar in both versions 5 and 10, except that the GUIs (graphical user interface) might be different for some tools, notably the tools related to changing the line **Style** of projected lines. In Inventor 5, you can click-select the projected line first, and then go to the **Style** pull-down menu and choose the **Normal** option (*Figure 1*). In Inventor 10, you can click-select the projected line first, and then right-click for the shortcut menu and choose the **Break Link** option (*Figure 2*).



*Figure 1: Click-selecting the projected line, and choosing the Normal option in the Style pull-down menu, in Inventor 5.*



*Figure 2: Click-selecting the projected line, and choosing the Break Link option in the shortcut menu, in Inventor 10.*

# List of Inventor-Based Learning Modules

Introduction:

The Autodesk Inventor Program and the Solution of Mechanical Engineering Descriptive Geometry Problems

Inventor (5) Module 1A:

Parallel-Line Sheet-Metal 3D Folded Part Modeling and 2D Pattern Development- Truncated Right Cylinder

Inventor (5) Module 1B: Parallel-Line Flat Pattern Development of Sheet-Metal Folded Model Wrapping the 3D Space of a Truncated Right Prism

Inventor (5) Module 1C:

Adding Dovetail Seams to Curved Edges on a Flat Sheet-Metal Piece

Inventor (5) Module 1D:

Parallel-Line Flat Pattern Development of a Sheet-Metal Folded Model Wrapping the 3D Space of an Oblique Hexagonal Prism

Inventor (10) Module 1E:

Parallel-Line Flat Pattern Development of Sheet-Metal Folded Model Wrapping the 3D Space of An Oblique Circular Cylinder

Inventor (10) Module 1F:

Creating a Circle-Based Cylindrical Sheet-metal Part with Locking Seams on the Lateral Edges

Inventor (10) Module 1G:

Creating a Circle-Based Cylindrical Sheet-metal Lateral Piece with an Overlaying Lateral Edge Seam and Dove-Tail Seams on the Top Edge

Inventor (10) Module 1H:

Creating an Ellipse-Based Cylindrical Sheet-metal Lateral Piece

Inventor (5) Module 2:

Radial-Line Sheet-Metal 3D Modeling and 2D Pattern Development: Right Cone (Regular, Frustum, and Truncated)

Inventor (5) Module 3A:

Intersection and Development of Sheet Metal Parts in Inventor

Inventor (5) Module 3B:

Intersection of Three Cylinders - Creating a Y-Branch

Inventor (5) Module 4A:

Creating the 3D Model of Right and Oblique Pyramids

Inventor (5) Module 4B:

Creating Sheet Metal Parts Enclosing the 3D Space of Right and Oblique Pyramids with the Work Surface of Derived Parts

Inventor (5) Module 5:

Creating Sheet Metal Transition Piece Between a Square Tube and a Rectangular Tube with Triangulation

Inventor (5) Module 6A:

Creating Poly-Cylindrical (Gore) Sheet Metal Pieces for a Spherical Space

Inventor (5) Module 6B:

Creating Poly-Conic Sheet Metal Pieces for a Spherical Space

Inventor (10) Module 6C:

Intersection and Development of Cylindrical and Spherical Sheet-Metal Parts

Inventor (5) Module 7A:

Creating Oblique Surfaces on a 3D Model Through a Multi-Faceted Tube Connector Project

Inventor (5) Module 8A:

Creating a Sheet Metal Part & Flat Pattern Wrapping the 3D Space of a Polyhedron

Inventor (5) Module 8B:

Creating an Octagon-Based Star in Inventor

Inventor (5) Module 8C:

Creating a Star with Spikes Radiating From the Center in Inventor

Inventor (5) Module 9:

Creating 2D Working Drawings of the Flat Patterns of Sheet Metal Parts

Inventor (5) Module 10A:

Creating a Compound Elbow in Inventor

Inventor (10) Module 10B:

Creating Dove-Tail Seams on a Double-Curved Edge