IAT106: Spatial Thinking and Communicating

Lab 6: Auxiliary Views, Cross-Sections, and Assemblies

In this lab you will complete exercises on auxiliary views, cross-sections, and creating assemblies in OnShape. The lab is divided into three parts, one for each of the subjects. For part one and two, your TA will complete an example exercise, and then you will complete some exercises on your own. For the OnShape component, the TA will help guide you through the exercises. All exercises are due at the start of next week's lab. This lab is worth **100 points**.

Part I: Auxiliary Views (Chapter 6)

Many times, in a multi-view drawing, a face will not be parallel to any of the primary planes, which results in no view that is true shape and size. Often, you will want a view that is of true shape and size, so you will need to construct an auxiliary view.

Follow along with the TA using the image below. You do not need to hand this exercise in.
TA Demo: Fig 6.17 exercise #1 (pg 355)
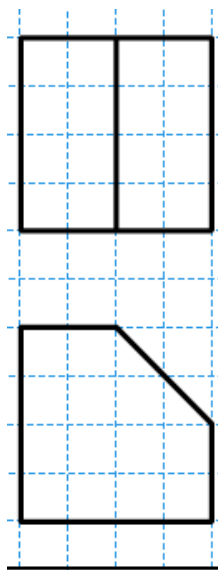
(1)

For each exercise listed below, sketch the given views and create a partial auxiliary view for the inclined surface. You should use graph paper for these exercises. Label the points of interest, label the fold lines, and keep your construction lines. Each drawing should occupy half a page.
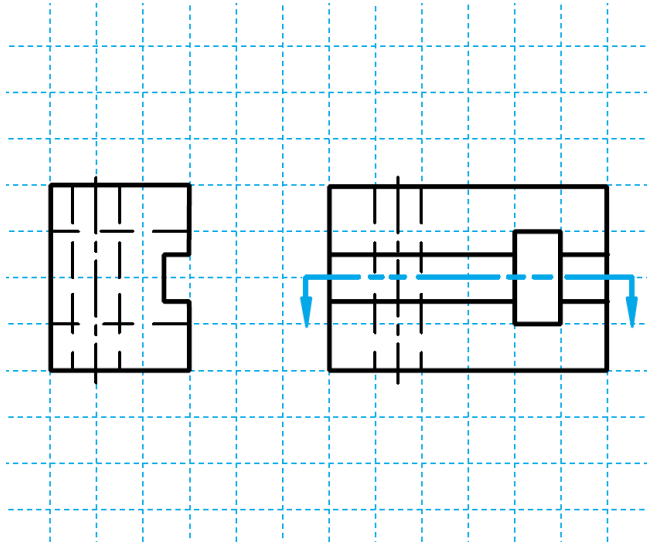
    In-class: *Fig 6.17 exercise #5 (pg 355)*
    Homework: *Fig 6.18 exercise #4 and #10 (pg 356)*

Part II: Cross-sections (Chapter 8)

As you saw in the lecture, often the interesting parts of an object are hidden by the object's own surfaces. In this type of situation, a cross-sectional view of the object is needed in order to communicate design intent.

Follow along with the TA using the image below. You do not have to hand in this exercise.
        TA Demo: Fig 8.57 exercise #12 (pg 462)

For each exercise listed below, sketch the given views and create a cross-section for the given cutting plane. You should use graph paper for these exercises. Each drawing should occupy half a page.

   In-class: Fig 8.57 exercise #5 (pg 462)
        Homework: Fig 8.57 exercise #8 and 15 (pg 462 and 463)

Part III: Assemblies in OnShape

In the last week's lab, you created two parts on Onshape. This week you'll learn how to create assemblies that incorporate many parts together to create a functioning object.

Exercise: Please open the OnShape online website and start the learning path by clicking here: https://learn.onshape.com/learn/learning-path/introduction-to-cad.

The TA will show you where to find this learning pathway from inside the OnShape and you have used it once in week 04's lab submission. Within this learning path, you will have to do 3rd courses, i.e., Introduction to Assembly Design. You'll have about 60 min to work on these courses; don't worry though if you don't finish, you can do this on your own outside of lab time and submit the links of the files via Canvas any time before the next lab.
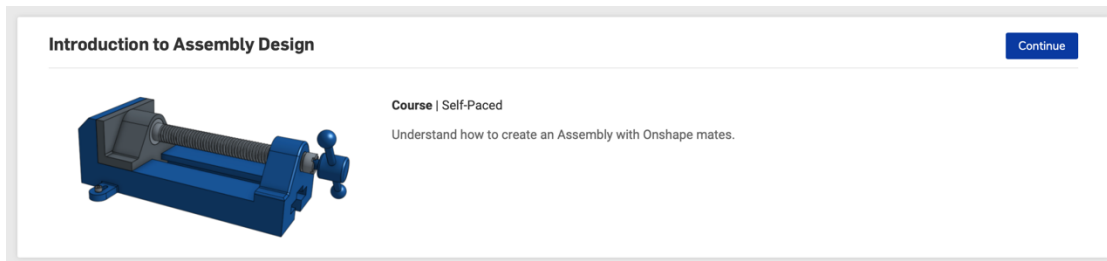
PART IV: STAMPER ASSEMBLY – Optional (NOT REQUIRED – It's more like a challenge)
In this optional exercise you create a somewhat more complex assembly using pre-made parts. Go to the OnShape website, and open a folder named Week 06 Submission. There you will find a sampleFile with all the parts necessary to create an assembly inside the file. Copy the sample file and rename it with your own name and start an assembly inside your copied file.

Using those parts, try to create this assembly, a stamping device. This stamper is shown in the figure below fully assembled along with an exploded view showing each individual component.
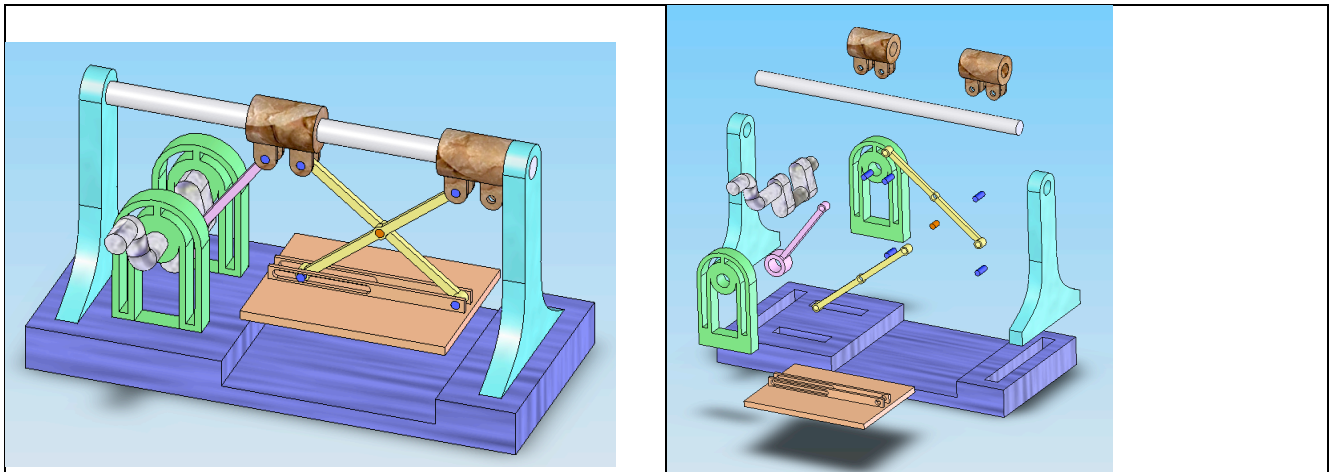
Submission Instructions

All **homework** exercises are due at the beginning of your next lab. Upload the sketches to the Lab 06 container on Canvas. For the OnShape assemblies, copy the Sample file available under week 06 submissions folder and name it using the following convention; <your canvas name>_<lab section>.

Assigned Readings from the Textbook

Auxiliary Views: Ch 6:   6.1 to 6.2.7 and 6.3.4
Cross-sections: Ch 8:   8.1-8.2 and 8.4.1 - 8.4.6

Item	Due	Individual or Team	Criteria	Activity Mark	Part Mark	Total
Auxiliary views	before next lab	Individual on canvas			**30**	
			view alignment	3		
			fold and construction lines	6		
			named vertices in all views	6		
			proper shape	15		
Cross sections	before next lab	Individual on canvas			**30**	
			view alignment	3		
			position and section cut lines	3		
			hash marks	3		
			centre lines	6		
			no hidden lines	3		
			proper shape	12		
OhShape assembly	before next lab	Individual on OnShape → Week 06 submissions			**40**	
			subtract 5 for every incorrect mate	35		
			Test animation	5		
TOTAL						**100**