

Mechanical Engineering: Rapid Concept Generation - Instructor Guide

This instructor guide is a comprehensive tool for facilitating this course in the classroom. Prepare to teach this course by thoroughly reviewing this document, as well as all related course materials and resources. You don't need be expert in Autodesk® Fusion 360™ to deliver this course. If you are new to Fusion 360 and/or new to CAD, we suggest developing a solid foundation in the core concepts of Fusion 360.

The following learning resources are pre-requisites to help prepare you in supporting your students through this course.

Fusion 360: Foundational Concepts (academy.autodesk.com) explores core concepts behind Fusion 360 CAD/CAM through a series of lectures and hands-on exercises. We highly recommend you enroll in this course if you are new to Fusion 360 and/or new to CAD.

We've summarized the core Fusion 360 skills in Mechanical Engineering: Rapid Concept Generation course so you can familiarize yourself with them before delivering this learning content in the classroom. It's always recommended that you work through the course yourself in preparation for each lesson.

- Sketch – Basic Sketch Modeling.
- Sketch – Application of Dimensions and Constraints.
- Feature – Extrude, Revolve, Sweep and Fillet.
- Sculpt – Subdivided creation and edit.
- Sculpt – Advanced Sub-divided modeling
- Assembly – Application of Joints, As-Built Joints and Motion Links.
- Assembly – Contact Sets
- Simulation – Static Simulation Study

Each lesson is listed below along with suggested time allocations for instruction. The referenced demonstrations are based on the step-by-step instruction included in the course. Review the video tutorials and/or step by step print guides for the detailed instruction in each lesson.

Getting Started

Total Time Required for Lesson: 20 minutes

Discuss Objectives: 3 Minutes

Demonstrate: 10 Minutes

- Review course overview and learning objectives
- Download the course resources and software
- Create an Autodesk ID
- Install the software
- Review the starter activity and articles

Hands on Time: 5 Minutes

Review Objective: 2 minutes

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Lesson 1: Starter Activity

Total Time Required for Lesson: 20 minutes

Discuss Objectives: 3 Minutes

Demonstrate: 5 Minutes

- Create a sub-divided body.
- Edit a sub-divided body.

Hands on Time: 10 Minutes

Review Objectives: 2 minutes



Lesson 2: Rapid Mechanical Motion

Total Time Required for Lesson: 95 minutes

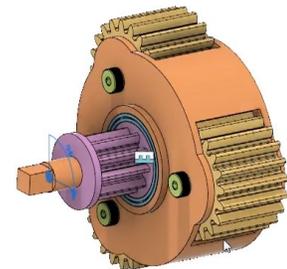
Discuss Objectives: 3 Minutes

Demonstration: 10 Minutes

- Create basic representations of mechanical gears.
- Apply joints and motion links to evaluate motion.
- Edit features in the timeline.
- Create a motion study.

Hands-on Time: 80 Minutes

Review Objectives: 2 minutes



Lesson 3: Creation of Contact Sets

Total Time Required for Lesson: 25 minutes

Discuss Objectives: 3 Minutes

Demonstration: 5 Minutes

- Create component contact sets.
- Effectively use contact sets.

Hands-on Time: 15 Minutes

Review Objectives: 2 minutes



Lesson 4: Basic Frame Concept Generation

Total Time Required for Lesson: 30 minutes

Discuss Objectives: 3 Minutes

Demonstration: 5 Minutes

- Create a revolve.
- Create a sweep.
- Use Boundary Fill.
- Create an extrude.

Hands-on Time: 18 Minutes

Review Objectives: 2 minutes



Lesson 5: Perform a Basic Simulation

Total Time Required for Lesson: 25 minutes

Discuss Objectives: 3 Minutes

Demonstration: 5 Minutes

- Use the Simplify Workspace.
- Setup a basic simulation study.
- Evaluate simulation results.
- Identify design areas for improvement.

Hands-on Time: 15 Minutes

Review Objectives: 2 minutes



Lesson 6: Rapid Frame Concept Generation

Total Time Required for Lesson: 120 minutes

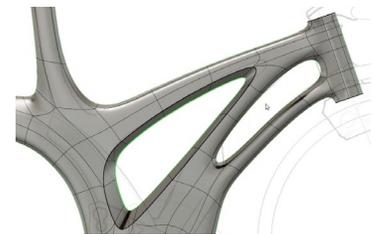
Discuss Objectives: 3 Minutes

Demonstration: 5 Minutes

- Create a sub-divided model.
- Use Edit Form.
- Apply symmetry to a sub-divided model.
- Create a rapid concept frame.

Hands-on Time: 110 Minutes

Review Objectives: 2 minutes



Next Steps

Total Time Required for Lesson: 10 minutes

Discuss Objectives: 1 Minutes

Demonstration – 1 Minutes

- Launch website <http://academy.autodesk.com> and <http://academy.autodesk.com/portfolios>
- Create an Autodesk Design Academy account
- Share designs to Portfolio
- Review additional courses under the Learn and Explore menu tab
- Review Inspiration menu for real world examples of industry design



Hands-on Time: 5 Minutes

Review Objectives: 3 minutes