Construction scheduling and cost control

# Instructor guide

Course duration if teaching with this material in class: ~5 hours, depending on lecture time

Recommended student level: Students in construction programs, 4-year and graduate level.

Product: Autodesk Construction Cloud, Navisworks, Revit

This instructor guide is a comprehensive tool for facilitating this course in the classroom. Prepare to teach the course by thoroughly reviewing this document, as well as all related course materials and resources. You may also share this document with your students to guide them in their assignments. It’s always recommended that you work through the course yourself in preparation for each module.

**Learning objectives:**

* Analyze and export takeoff data for budgeting and procurement.
* Explain core concepts in construction scheduling and cost control.
* Describe how BIM tools support time and cost management.
* Create 4D construction simulations using Navisworks.
* Link model elements to schedule tasks in TimeLiner.
* View and manage project schedules using ACC.
* Track task progress and share schedule updates with project teams.
* Set up and manage budgets in ACC Cost Management.
* Forecast project costs and monitor financial performance.

The overall course contains the following resources:

* Four video modules covering all the topics in the course.
* Dataset files for use when following the video modules and exercises.
* Quiz questions with timecodes for remedial knowledge check.
* Exam-style final test questions at the conclusion of the course.
* Three practice exercises with solutions.
* One challenge assignments with recommended assessment criteria.
* Lecture slides that introduce topics and themes covered in the course.

**Pre-requisites:**

After completing this course, learners will understand how to apply model-based scheduling and cost control workflows using Revit, Navisworks, and ACC. Students will be able to simulate construction sequences, manage project schedules, and track financial performance in a connected BIM environment. These skills will help them plan more effectively, reduce risk, and improve project delivery outcomes. While there are no pre-requisites for this course, it may be helpful to have basic knowledge of ACC and Navisworks.

**Structure of the course:**

The course is split into 4 modules and is designed to cover general scheduling and cost control concepts, scheduling in Navisworks and ACC, and cost control in ACC.

**Videos:**

Each video begins with a list of learning objectives covered in the video. The dataset mentioned throughout all the videos are available if students wish to follow along or practice after the video.

**Dataset:**

This course has one dataset folder including Revit models in Imperial and Metric units, construction schedule files (xer), and Excel files

**Practice exercises:**

There are 3 practice exercises included, each exploring a different set of topics. The practice exercises are designed to give students an opportunity to test their knowledge and apply what they have learned. Each practice exercise is accompanied by a dataset and video solution and a step-by-step guide.

**Challenge exercise:**

One challenge assignment is included, focusing on a set of topics covered in the course. Students are presented with a challenge in an applicable real-world situation, and they apply their skills and the techniques learned to solve the challenge. A grading rubric is provided for the instructor, giving guidelines on assessment criteria. You can also encourage students to work in small groups, first discussing the desired outputs and working collectively to derive the best process and execution in the software.

**Video quiz questions:**

Quiz questions are included with each video of the course and the timecodes are included so that students can review the related sections in the video for questions they have answered incorrectly.

**Final test questions:**

A cumulative set of exam-style questions are included at the conclusion of the course for students to measure what they have learned against realistic multiple-choice questions.

**Lecture slides:**

Lecture slides are offered to help facilitate in-class discussion.

**Using the course in the classroom or self-paced**

The Construction Scheduling and Cost Control course can be implemented as an independent, self-paced project, or can be completed in the classroom in a team setting. A couple of options are outline below:

Option 1: Self-paced

Each student will log into Autodesk.com/learn using their Autodesk Account credentials and follow along with the project instruction. (Alternatively, you may choose to assign the material through your LMS). Students can work through the projects on their own by following the project steps and challenge instructions, and by exploring any supporting assets. This is a great way to allow students to move through the learning materials at their own pace and explore additional learning opportunities or increase shop time. The self-paced option can also be used for out of classroom or remote assignments. A certificate of completion is awarded once the course is completed.

Option 2: Instructor-led

In this option, instructors will log into Autodesk.com/learn using their Autodesk Account credentials and download the learning materials. Instructors can then guide the students through each project, using the accompanying lecture slides for instruction and step-by-step guides and practice exercises as handouts. This option allows for guided, step-by-step classroom engagement. This approach works well in a more traditional classroom setting and will allow instructors to easily keep students on the same pace. The challenge exercise can be used as a learning opportunity for students who complete their work early or are looking for additional hands-on opportunities.

Course contents

Each module is listed below along with suggested time allocations for instruction. Review the video tutorials for the detailed instruction in each module.

**Module 1-01 What is scheduling in construction?**

**Total time required for module:** 10 minutes

**Discuss objectives:** 1 minute

**Demonstrate:** 8 minutes

* Define key parts of a schedule.
* Explain how schedules support construction decision-making.
* Describe common scheduling tools and outputs.

**Hands-on time:** 0 minutes

**Review objectives:** 1 minute

**Datasets:** *NA*

**Assignments (additional):**

* **Quiz:** 2 minutes

**Module 1-02 Understanding the Critical Path Method (CPM)**

**Total time required for module:** 10 minutes

**Discuss objectives:** 1 minute

**Demonstrate:** 8 minutes

* Describe how the critical path is determined.
* Define float and its role in schedule flexibility.
* Identify how CPM supports time-risk analysis.

**Hands-on time:** 0 minutes

**Review objectives:** 1 minute

**Datasets:** *NA*

**Assignments (additional):**

* **Quiz:** 2 minutes

**Module 1-03 Basics of cost control in construction**

**Total time required for module:** 10 minutes

**Discuss objectives:** 1 minute

**Demonstrate:** 8 minutes

* Identify components of a cost control system.
* Explain how budget, cost, and schedule data interact.
* Recognize the value of tracking cost performance over time.

**Hands-on time:** 0 minutes

**Review objectives:** 1 minute

**Datasets:** *NA*

**Assignments (additional):**

* **Quiz:** 2 minutes

**Module 2-01 Create a federated model in Navisworks**

**Total time required for module:** 20 minutes

**Discuss objectives:** 1 minute

**Demonstrate:** 8 minutes

* Export NWC files from Revit.
* Append and align models in Navisworks.
* Create a federated model for simulation.

**Hands-on time:** 10 minutes

**Review objectives:** 1 minute

**Datasets:***Structural Model\_Imperial.rvt* or *Structural Model\_Metric.rvt*

**Assignments (additional):**

* **Quiz:** 2 minutes

**Module 2-02 Link model elements to schedule tasks**

**Total time required for module:** 20 minutes

**Discuss objectives:** 1 minute

**Demonstrate:** 8 minutes

* Create a construction schedule in Navisworks.
* Assign model elements to tasks.
* Play and review 4D simulations

**Hands-on time:** 10 minutes

**Review objectives:** 1 minute

**Datasets:** *Structural Model\_Imperial.rvt* or *Structural Model\_Metric.rvt*

**Assignments (additional):**

* **Quiz:** 2 minutes

**Module 2-03 Simulate and compare planned vs actual progress**

**Total time required for module:** 20 minutes

**Discuss objectives:** 1 minute

**Demonstrate:** 8 minutes

* Run and review a planned 4D simulation.
* Update tasks with actual dates.
* Compare planned vs. actual schedules to support monitoring and control.

**Hands-on time:** 10 minutes

**Review objectives:** 1 minute

**Datasets:** *Structural Model\_Imperial.rvt* or *Structural Model\_Metric.rvt*

**Assignments (additional):**

* **Practice Exercise 1: Create a construction simulation:** 10 minutes

**Practice Exercise datasets:** *Architectural Model\_Imperial.rvt* or *Architectural Model\_Metric.rvt*

* **Quiz:** 2 minutes

**Module 3-01 Import and view schedules in ACC**

**Total time required for module:** 20 minutes

**Discuss objectives:** 1 minute

**Demonstrate:** 8 minutes

* Import a third‑party schedule into ACC.
* View tasks in Gantt and list format.
* Filter and sort schedule activities.

**Hands-on time:** 10 minutes

**Review objectives:** 1 minute

**Datasets:**

*Initial Construction Schedule.xer*

**Assignments (additional):**

* **Quiz:** 2 minutes

**Module 3-02 Create and manage plans**

**Total time required for module:** 20 minutes

**Discuss objectives:** 1 minute

**Demonstrate:** 8 minutes

* Adjust plan settings.
* Create tasks and subtasks connected to timelines.
* Manage changes between plans and schedules.

**Hands-on time:** 10 minutes

**Review objectives:** 1 minute

**Datasets:**

*WBS.xlsx*

**Assignments (additional):**

* **Quiz:** 2 minutes

**Module 3-03 Track and update schedule progress**

**Total time required for module:** 20 minutes

**Discuss objectives:** 1 minute

**Demonstrate:** 8 minutes

* Update task status and percent complete.
* Upload a revised schedule.
* Compare different versions of the schedule.

**Hands-on time:** 10 minutes

**Review objectives:** 1 minute

**Datasets:**

*Updated Construction Schedule.xer*

**Assignments (additional):**

* **Practice Exercise 2: Connect subtasks between activites:** 10 minutes
* **Quiz:** 2 minutes

**Module 4-01 Activate and set up Cost Management**

**Total time required for module:** 20 minutes

**Discuss objectives:** 1 minute

**Demonstrate:** 8 minutes

* Activate Cost Management in ACC.
* Create and configure project budgets.
* Import cost items and budget lines.

**Hands-on time:** 10 minutes

**Review objectives:** 1 minute

**Datasets:**

*Project Budget.xlsx*

*Levels.xlsx*

*Code List.xlsx*

**Assignments (additional):**

* **Quiz:** 2 minutes

**Module 4-02 Create and manage payment applications**

**Total time required for module:** 20 minutes

**Discuss objectives:** 1 minute

**Demonstrate:** 8 minutes

* Create cost payment applications.
* Create budget payment applications.
* Compare budgeted, committed, and actual costs.

**Hands-on time:** 10 minutes

**Review objectives:** 1 minute

**Datasets:**

*NA*

**Assignments (additional):**

* **Quiz:** 2 minutes

**Module 4-03 Forecast project costs**

**Total time required for module:** 20 minutes

**Discuss objectives:** 1 minute

**Demonstrate:** 8 minutes

* Link schedule to budget items.
* Create distributions for budget items.
* Monitor cost performance over time.

**Hands-on time:** 10 minutes

**Review objectives:** 1 minute

**Datasets:**

*NA*

**Assignments (additional):**

* **Practice Exercise 3: Link plan milestones to cost payment applications:** 6 minutes
* **Quiz:** 2 minutes

**Next steps: End of course (additional)**

**Challenge exercise – Develop a coordinated time and cost control process:** 60 minutes

**Datasets:**

*Architectural Model\_Imperial.rvt*

Or *Architectural Model\_Metricl.rvt*

**End-of-course exam questions:** 20 minutes

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