Industrialized Construction

Curriculum overview

John Herridge
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About me

John Herridge
AEC Technical Marketing Mgr.
Autodesk, Inc.

- 35 years of AEC industry experience
- 16 years with Autodesk Education team
- Autodesk University speaker for multiple years
- Autodesk Certified Instructor Platinum
Presentation agenda

- About industrialized construction curriculum
- Module overview
- Course format and applications
- Virtual Autodesk Technology Center tours
- Q & A
Industrialized Construction
Autodesk overview
Autodesk IC strategy

Enable Data for Manufacturing & Assembly

Connect Autodesk platform for the ecosystem to make IC easier

Create a collaborative knowledge center for IC to share best practices
Industrialized Construction
The application of manufacturing techniques to the built environment
Industry Convergence
- Manufacturing
- Design
- Construction

Industrialized Construction

Technology Convergence
- e.g. melding of Telco, computing, consumer electronics

Process Convergence
- Design ↔ Build ↔ Operate
- Operate ↔ Build ↔ Design

Industry Convergence
- Manufacturing – Design – Construction
- Industrialized Construction

Business Model Convergence
- New value propositions, new roles, new drivers

Source: Unsplash
INDUSTRIALIZED CONSTRUCTION

Prefabrication Continuum

Productization

PROCESS ENABLERS

TECHNOLOGY ENABLERS
100% increase in global building floor area by 2060 owing to population growth and rapid urbanization.

40% of solid waste comes from the construction industry.

50% of all global material consumption comes from the building sector.

Sustainable Construction
Maximizing Quality, Safety, Schedule and Cost Control while Winning More Work
Transformation framework

1. Foundational
   - Culture, Skills, Tools, Technology and Processes
2. Productization
   - Mindset change to drive data reusability
3. Digitization
   - Enable automation and connected processes
4. Connection
   - Platform thinking, enabled by the cloud
5. Optimization
   - Enhance capabilities (GD, Digital Twins, IC)
6. Circularity
   - Digital and physical reuse

First Steps

The New Possible for AECM-O

STRATEGY FOR TRANSFORMATION

Certainty | Business Growth | (Holistic) Sustainability | Schedule | Risk Reduction | Safety | Create Better Products
Industrialized Construction curriculum
High level overview
Curriculum authors

Industrialized construction curriculum

Amy Marks (Queen of Prefab)
VP, Industrialized Construction Strategy
Autodesk, Inc.

Anil Sawhney
Dir. of Infrastructure Sector
RICS
Industrialized Construction curriculum

Industrialized construction for the build environment lifecycle

Introduction to Industrialized Construction
An introduction to the whole course, this module introduces students to the megatrends encompassing Industrialized Construction for the built environment lifecycle.

Productization, DfMA, and Sustainability
Students will explore the concept of productization, design for manufacture and assembly (DfMA) and DATA for manufacture and assembly with a large emphasis on linkage of these concepts with other elements of the House of Industrialized Construction (IC).

Rise of MEP Assembly
Students will learn about the MEP subcontractors' evolution and innovation in prefab processes and explore the role of an integrated, multi-trade approach and applied manufacturing techniques in product orientation.

Applying the Transformation Framework to Industrialized Construction
Students will explore the application of the transformation framework to Industrialized Construction through the layers of outcomes, strategy, and final state by looking in-depth at each stage of the six-stage transformation framework.
Industrialized Construction curriculum

Course modules high level

Modules included are:
M1: Introduction to Industrialized Construction
M2: Productization, DfMA, and Sustainability
M3: Rise of MEP Assembly
M4: Applying the Transformation framework to Industrialized Construction
M5: Convergence of Technology, Process, and Business models in Industrialized Construction
M6: Applying machine learning, AI, and Advanced Construction Technologies
M7: Future of Work in Industrialized Construction

Content breakdown

25 hours of content
- Videos, readings, and podcasts
- Discussion questions
- Social media posts

7 assessments
- One for each module
Industrialized Construction curriculum

Module overview
Introduction to Industrialized Construction

Module 1

- Overview of four types of convergence
- Introduction to the house of industrialized construction
- Introduction to the transformation framework
Productization, DfMA, and Sustainability

Module 2

- What is design for manufacturing and assembly (DfMA)?
- The shift from a project-centric mindset to a productization-centric mindset
- Introduction to a circular economy
Rise of MEP Assembly
Module 3

- The rise of multi-trade assemblies
- Overview of three types of convergence customers
- Explore where the opportunities are for MEP assemblies
Applying the Transformation Framework

Module 4

- Overview of Autodesk’s vision for industrialized construction
- Discuss the need for transformation
- Explain the six stages of transformation
Convergence of Technology, Process, and Business Models

Module 5

- Convergence, why now?
- Risks associated with assumption-based design
- The solution is manufacturing informed design for the built environment
The impact of bad data in construction

Introduction and applications of:
- artificial intelligence and machine learning
- robotics
- additive manufacturing
- digital twins
- ar/vr/mr
Future of Work in Industrialized Construction
Module 7

- What trends and processes are driving change in the future of work
- Culture changes required to embrace the future of work
- Overview of the new convergence roles
- Overview of the future of work whitepaper
# Course applications

<table>
<thead>
<tr>
<th>Module name</th>
<th>Course applications</th>
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<tbody>
<tr>
<td>M1: Introduction to Industrialized Construction</td>
<td>Introduction to Construction Management</td>
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<tr>
<td>M2: Productization, DfMA, and Sustainability</td>
<td>Construction Techniques</td>
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<td>Advanced BIM</td>
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<td>Sustainable Construction</td>
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<td>M3: Rise of MEP Assembly</td>
<td>Building Mechanical Systems</td>
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<td>Construction Estimating</td>
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<td>Project Control and Scheduling</td>
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<tr>
<td>M4: Applying the Transformation framework to Industrialized Construction</td>
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<tr>
<td>M5: Convergence of Technology, Process, and Business models in Industrialized Construction</td>
<td>Construction Information Technology</td>
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| M6: Applying machine learning, AI, and Advanced Construction Technologies | Elective courses  
Advanced Construction Information Technology  
Construction Estimating 2 |
| M7: Future of Work in Industrialized Construction                           | Introduction to Construction Management  
Construction Project Management  
Jobsite Construction Management |
Next steps

- Pilot two to three modules this fall semester
  - Provide course feedback
  - Let us know what topics you would be interested in learning more about

- Request access to the module assessment answer keys

- Autodesk University 2022 | Sep 27 – 29 in New Orleans
  - Face to face conference
  - Registration for conference; educator discount available
  - Attend our panel session: CS502038
    IC Curriculum that Brings Industry and Academia Together
Virtual Autodesk Technology Center tours

technologycenterstours.autodesk.com/

The Autodesk Technology Centers catalyze new possibilities for making. Explore the global Technology Centers 360-degree virtual tours to get a glimpse into how the global network of innovation leaders and data-enabled fabrication workshops are empowering innovators in achieving the new possible, together.
Questions and Answers