



MicroMasters™

SUPPLY CHAIN MANAGEMENT



MIT Center for  
Transportation & Logistics

# Educational Portfolio in SCM at CTL

Welcome HR Professionals and Learning Managers!



MIT Center for  
Transportation & Logistics

# Access to learning in SCM

We believe learning can be available to everyone everywhere

# Agenda

Introductions

MIT CTL educational portfolio

The need for global supply chain education

MITx MicroMasters in SCM

Impact on organizations

Customized programs

Q&A

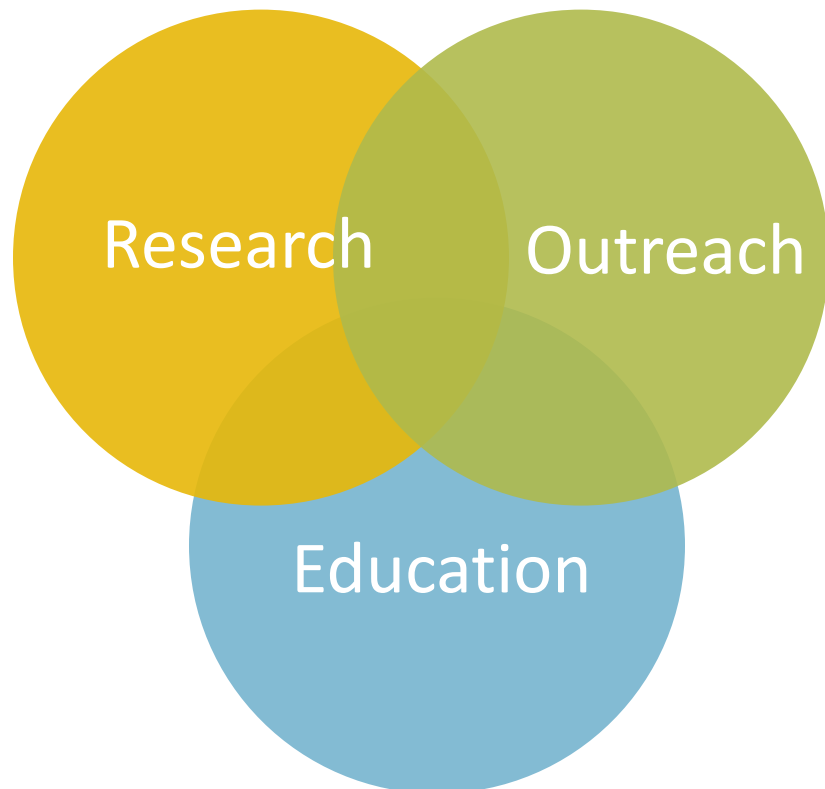
# Who are we?

Why MIT chose Supply Chain Management as their first MicroMasters



# MIT Center for Transportation & Logistics (CTL)

We create supply chain innovation and drive it into practice  
40 year history leading supply chain research and education



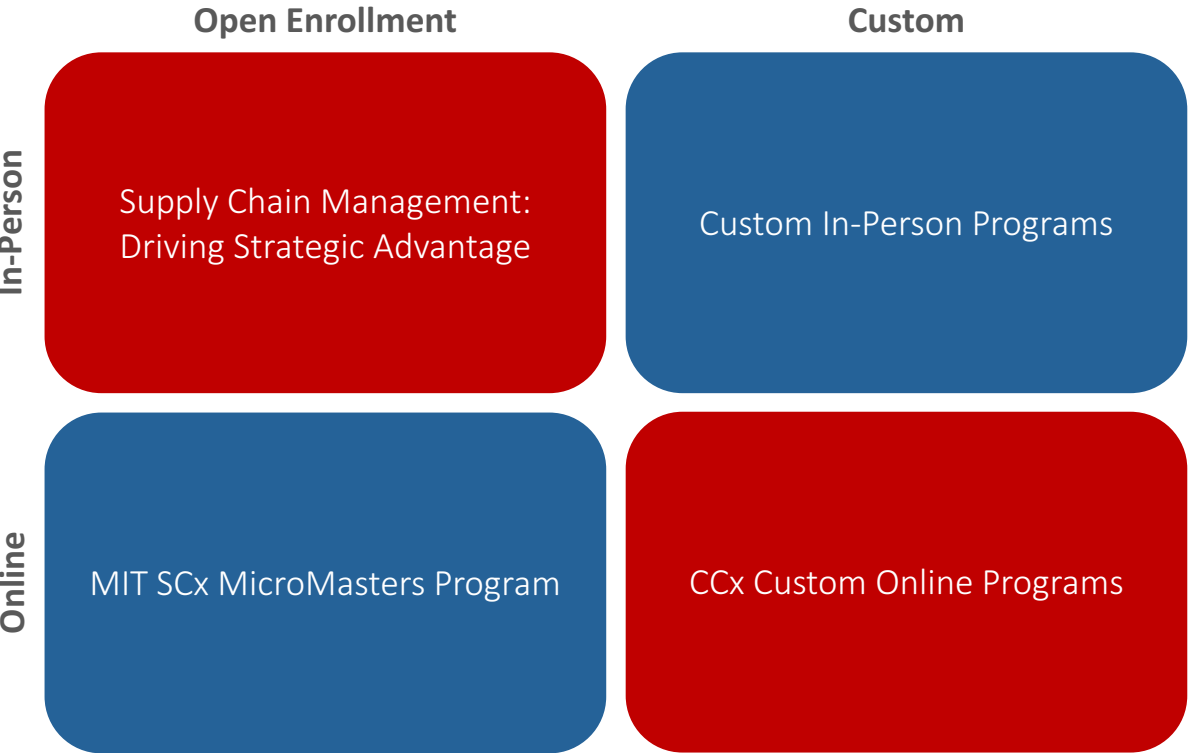
- \$15M Research Budget
- 15 Full-Time Researchers
- 20+ Active Research Projects
- 60+ Faculty & Researchers Across MIT SCALE Network

- 50+ Member Companies
- Industry-Driven Workshops & Symposia

- #1 Supply Chain Management Master's (since 1997)
- PhD in Logistics
- Founder of MIT SCALE Network (Since 2007)
- Executive Education
- MicroMasters in Supply Chain Management (Since 2015)

# Supply Chain Executive Education

We host a range of educational offerings to ensure that each company and individual who partners with us finds the right fit.



**Supply Chain Management: Driving Strategic Advantage**  
Every January and June we offer a 4-day, intensive course featuring simulations, case studies, interactive lectures, and discussions by distinguished MIT lecturers and faculty.

**MIT SCx MicroMasters Program**  
The MITx MicroMasters credential consists of 5 intensive online courses covering all aspects of logistics and supply chain management along with a proctored final exam.

**Custom In-Person Programs**  
A flexible, in-person learning experience developed closely with your organization, and focused on specific issues crucial to your company goals.

**CCx Custom Online Programs**  
We work alongside you to create an online learning space comprised of content from the SCx series, tailored to your organization's needs.

# Helping solve your talent shortage

A global problem that needs new solutions

# World Bank study in logistics competencies

Key Findings

Shortages range from a lack of truck drivers to problems filling senior positions.

Key findings from the study show a general shortage of logistics-related labor is in developed and developing countries to problems in filling senior positions in developing countries point to the most severe perceived skills shortage (figure ES.1). Skill shortages were perceived at all levels, but at a much greater extent that this problem is likely to worsen.



Why do staff lack the necessary competencies to perform tasks as assigned?

Key findings from the study show a general shortage of logistics-related labor is in developed and developing countries to problems in filling positions. Why do many employed staff lack the necessary competencies to adequately perform the tasks assigned? This could reflect the competence of the people attracted into the workforce, the training they receive and the way they are managed and this is often constrained by its

## LOGISTICS COMPETENCIES,

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A lack of executives with the necessary capabilities could negatively affect international growth.

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Karl Hoberg, and Christina Busch

Logistics, Skills, and Training • <http://dx.doi.org/10.1596/978-1-4648-1140-1>



# MITx MicroMasters in SCM

Leveraging our capability to reach learners everywhere

# Guiding Principles

1. Educate the world for free
2. Credential qualified students at minimum cost
3. Customize for organizations at sustainable margin




MIT Center for  
Transportation & Logistics

# Five courses and Comprehensive Final Exam

Anyone Anywhere




edX



Analytics  
SC0x



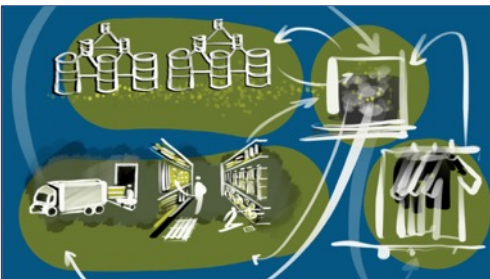
Fundamentals  
SC1x



Design  
SC2x



Dynamics  
SC3x



Technology  
SC4x

+



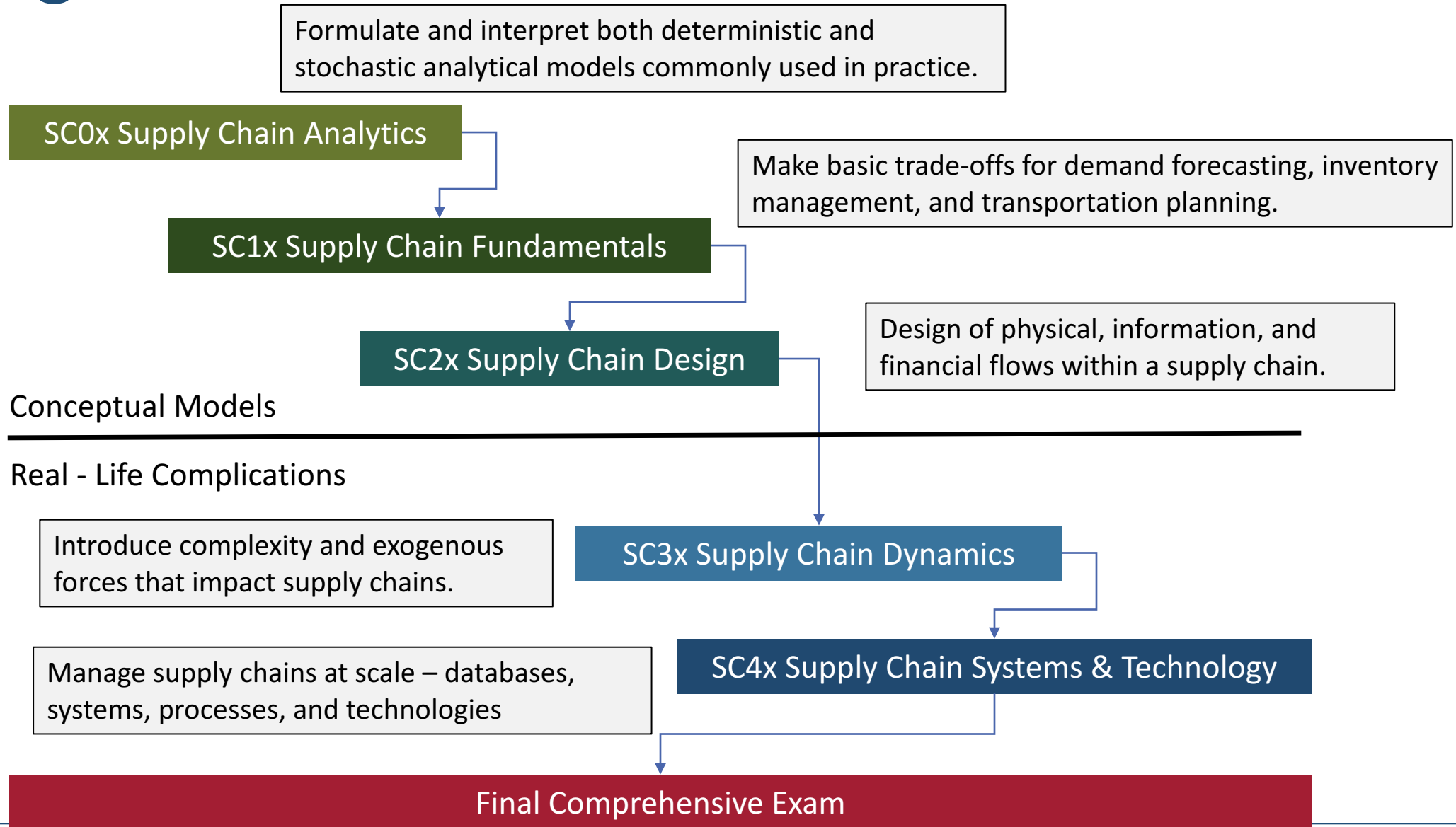
Proctored Final Exam  
CFx

=



Stand Alone Credential or  
Pathway to MIT M. Eng.

# The Big Picture





# Cost and duration



US\$ 200 8-12 hrs/wk 13 weeks	US\$ 200 8-12 hrs/wk 13 weeks	US\$ 200 8-12 hrs/wk 13 weeks	US\$ 200 8-12 hrs/wk 13 weeks	US\$ 200 8-12 hrs/wk 13 weeks	US\$ 200 4 hours 2 weeks prep
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Total of **65 weeks (roughly 18 months)**  
**520 to 650 hours** of study and examination  
 Total of **US\$ 1200** to earn the MicroMasters credential in SCM.



# How do we know it works?

We now know this works as individual courses or the entire credential

# MITx MicroMasters in SCM Learners



233,575 Learners Enrolled

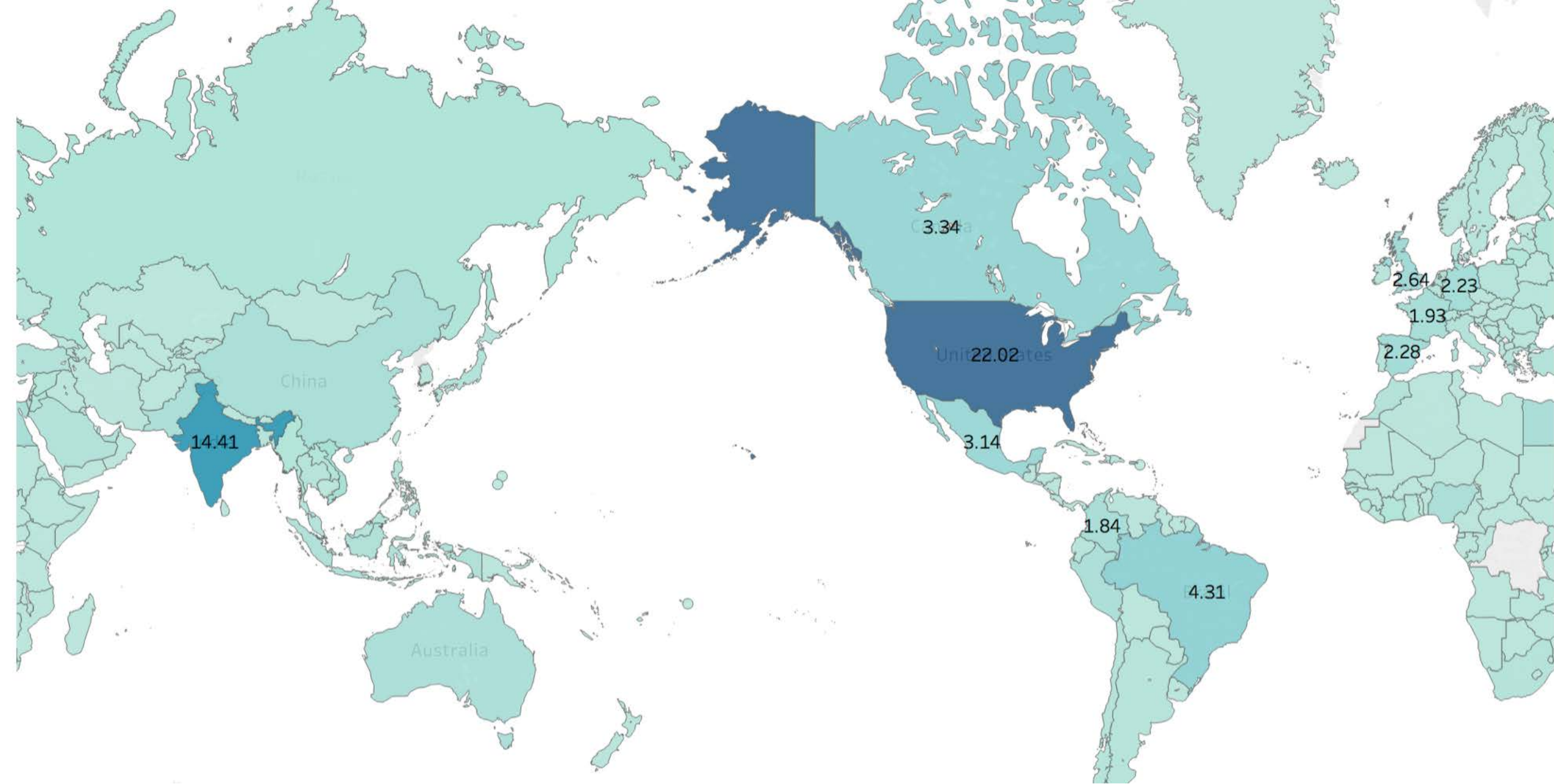
15,053 Learners Verified

22,135 Certificates Issued

196 Countries Represented

1,000\* Credentials





SCx learners are from... +190 countries

# But, what is in a MOOC?

How content is delivered in a massive open online course

# MOOCs – Asynchronous Content Delivery

Welcome to Week 1

SC2X SUPPLY CHAIN DESIGN  
Spreadsheet / Physical Info. Financial Org.

NETWORKS  
 $C_{ij}$

TRANSHIP  
TRANSHIP

FACILITY DESIGN

WEBER PROBLEM  
$$\text{MIN } Z = \sum_k W_k \sqrt{(x-x_k)^2 + (y-y_k)^2}$$

CENTER OF GRAVITY  
$$X = \frac{\sum W_k X_k}{\sum W_k} \quad Y = \frac{\sum W_k Y_k}{\sum W_k}$$

NETWORK FACILITY LOCATION

$$\text{MIN } \sum_{ij} C_{ij} X_{ij}$$

s.t.  

$$\sum_j X_{ij} \leq S_i \quad \forall i \in S$$

$$\sum_i X_{ij} \geq D_j \quad \forall j \in D$$

$$X_{ij} \geq 0$$

YouTube

3:28 / 6:35  
Speed 1.25x

Video  
Download video file

Transcripts  
Download SubRip (.srt) file

that we'll do for the rest of the course. Now I'm going to show everything in spreadsheets and LibreOffice. But you can also use other tools. So don't feel like you're restricted to use the spreadsheets. I just do that because it's easier to explain. So after we do these simple problems, we'll move to facility location.

And so what we have there is we have three locations. let's say three locations. And each one of these has a demand. Think there are cities. And there's a units expected or it's a board and these are weights. But there's a location and a demand that I need to satisfy each one of these locations. We're going to talk about three methods for determining where I should place my facility.

## SandyCo – Formulation

$$\text{Min } z = \sum_i \sum_j c_{ij} x_{ij}$$

$$z = C_{11}X_{11} + C_{12}X_{12} + C_{13}X_{13} + C_{21}X_{21} + C_{22}X_{22} + C_{23}X_{23}$$

s.t.

$X_{11} + X_{12} + X_{13}$	$X_{21} + X_{22} + X_{23}$	$\leq S_1$	$\leq S_2$							
$X_{11}$	$X_{12}$	$X_{13}$	$X_{21} + X_{22} + X_{23}$	$\geq D_1$	$\geq D_2$	$\geq D_3$				
$X_{11}$	$X_{12}$	$X_{13}$	$X_{21}$	$X_{22}$	$X_{23}$	$\geq 0$	$\geq 0$	$\geq 0$	$\geq 0$	$\geq 0$

Indices  
Plants  $i$   
Regions  $j$

Input Data  
 $S_i$  = Available supply of sand from Plant  $i$  (tons)  $\forall i \in S$   
 $D_j$  = Demand for sand in Region  $j$  (tons)  $\forall j \in D$   
 $c_{ij}$  = Cost for sending sand from Plant  $i$  to Region  $j$  (\$/ton)  $\forall i, j$

Decision Variables  
 $x_{ij}$  = Flow on arc from Plant  $i$  to Region  $j$  (tons)  $\forall i, j$

SC2x - Supply Chain Design Lesson: Introduction to Network Models 9





# MOOCs - Instantaneous P

4.1

Which segment of a global transportation shipment typically has the smallest variability in terms of coefficient of variation?

- A. Origin Landside
- B. Origin Port Dwell
- C. Ocean Transit (port to port) ✓
- D. Destination Port Dwell
- E. Destination Landside
- F. None of the above.

## EXPLANATION

Interestingly, the time on the water is the least variable segment in most cases. The majority of the disruptions and delays in shipping a container globally occur at the origin landside transit or at either the origin or destination ports. The actual sailing duration is comparatively stable.

Check

Save

Hide Answer

You have used 0 of 3 submissions

2 - C

3 - A

The physical network is the actual path on the ground (or water or air) that the specific transportation conveyance follows. The operational network is comprised of nodes and arcs that entail the decision points and costs for each option. The strategic network is a path view where each option is consolidated into a single arc from initial origin to final destination.

Check

Save

Hide Answer

You have used 0 of 3 submissions

4.1

Suppose you are managing the inbound lane from one of your major suppliers. You want to set your inventory policies but first need to determine the expected and standard deviation of demand over lead time. The details are as follows:

- Demand,  $\mu_D = 594$  units/day
- Standard Deviation of Demand,  $\sigma_D = 89.1$
- Expected transit time,  $\mu_L = 30$  days
- Standard deviation of transit time,  $\sigma_L = 9.0$

What is the expected demand (in items) over lead time?

3.1

Point to

Answer: 17820

What is the standard deviation of demand (in items) over lead time?

Answer: 5368.23

## EXPLANATION

This is simply a plug and chug problem. The expected demand over lead time is:

$$\begin{aligned}\mu_{DL} &= \mu_L \mu_D \\ &= 594 * 30 = 17820\end{aligned}$$

The standard deviation of demand over lead time is:

$$\begin{aligned}\sigma_{DL} &= \sqrt{\mu_L \sigma_D^2 + (\mu_D)^2 \sigma_L^2} \\ &= \sqrt{30 * (89.1)^2 + (594)^2 * (9.0)^2} = 5368.23\end{aligned}$$

We would now use this distribution to set our safety stock.

Final C

Check

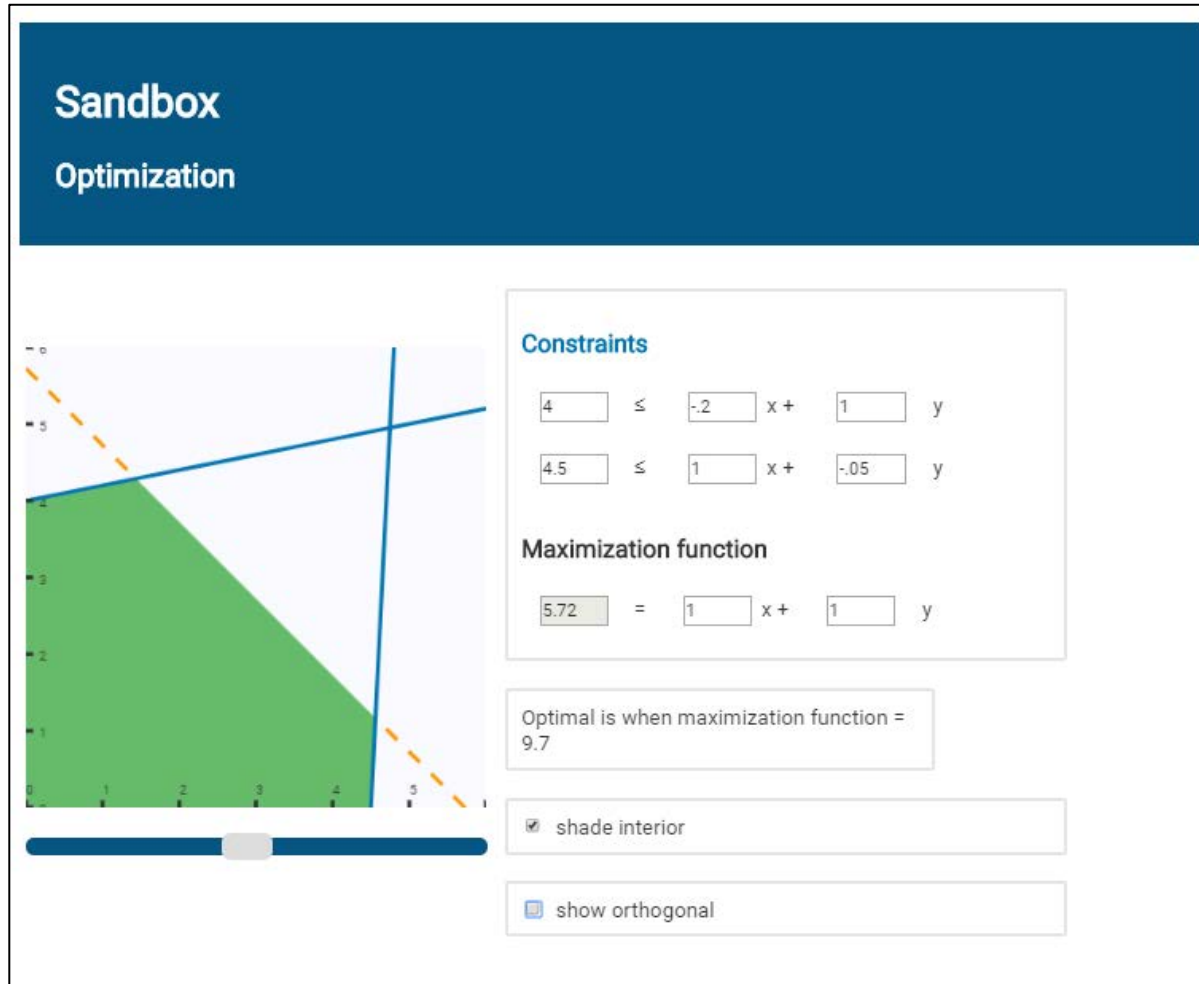
Save

Hide Answer

You have used 0 of 3 submissions

# MOOCs - Interactive Sand Box Apps

## Sandbox Optimization



The interface shows a 2D plot with a green shaded feasible region bounded by a solid blue line and a dashed orange line. The x-axis ranges from 0 to 5, and the y-axis from 0 to 5. To the right, there are input fields for constraints and a maximization function.

**Constraints**

$$4 \leq -0.2x + 1y$$
$$4.5 \leq 1x + -0.05y$$

**Maximization function**

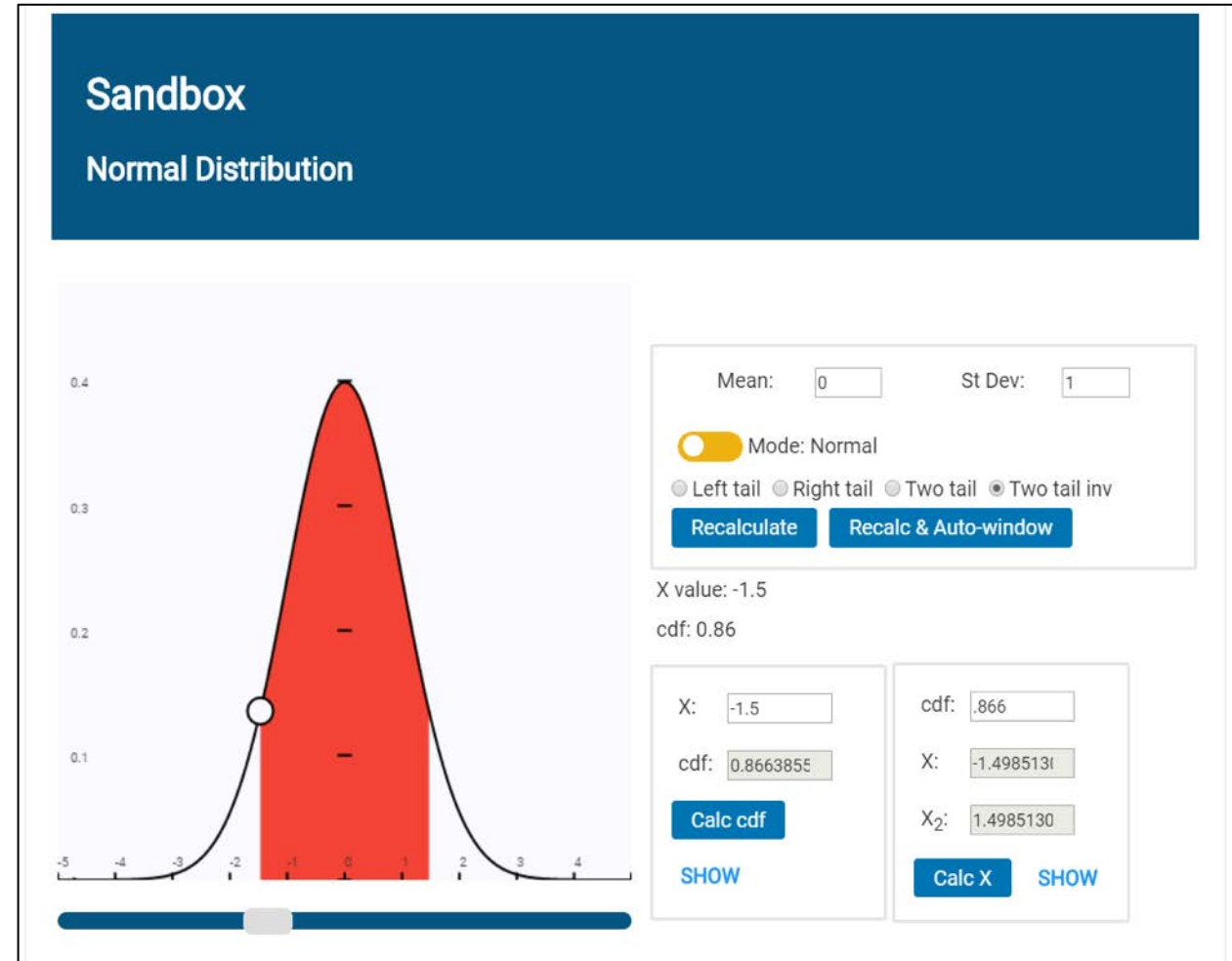
$$5.72 = 1x + 1y$$

Optimal is when maximization function = 9.7

shade interior

show orthogonal

## Sandbox Normal Distribution



The interface features a normal distribution curve with a red shaded area under the curve. The x-axis ranges from -5 to 4, and the y-axis from 0 to 0.4. A white circle marks the left boundary of the shaded area at x = -1.5.

Mean: 0 St Dev: 1

Mode: Normal

Left tail  Right tail  Two tail  Two tail inv

**Recalculate** **Recalc & Auto-window**

X value: -1.5  
cdf: 0.86

X: -1.5	cdf: .866
cdf: 0.8663855	X: -1.4985131
<b>Calc cdf</b>	X <sub>2</sub> : 1.4985130
<b>SHOW</b>	<b>Calc X</b> <b>SHOW</b>

# MOOCs – Discussion Forums

*This post is visible to everyone.*

## Pipeline Inventory

discussion posted 3 months ago by [tafanza](#) 4 Votes +

In the Video 2 of lesson 2, I am not able to Understand how they calculated the pipeline inventory, It is  $LD * Ce = 38 * 1500 * 16085 = 916.85$  Million but in the video it is 2.62 Million. What I have figured out that you have to divide by 350.

(this post is about [Week 1 / Topic-Level Student-Visible Label](#))

1 response

[Add A Response](#)

[gwynmarcelo](#) 3 months ago 5 Votes +

Hi! I have the same problem. I recreated the whole think in a spreadsheet and keep getting 916.85 million. Why is it divided by 350? Thank you for posting!

Hi!

Remember to check your units. Pipeline inventory is calculated as Tafanza states:  $ce * LD$

When you multiply by L, that is in days, and you have to convert the units by dividing by 350 (days/yr)

That is (for path 1)  $16,085 \text{ dollars/cnt/yr} * 1,500 \text{ cnt/yr} * 38 \text{ DAYS} / 350 \text{ days/yr}$

See that in the ecuation cnt and days get cancelled.

then the answare is 2,619,557 dollars/yr

posted 3 months ago by [rmmassano](#)

Thank you! I had the same problem.

posted 3 months ago by [yabejones](#)

Thank you rmmassano! I had the same problem.

posted 3 months ago by [manikatex](#)

*This post is visible to everyone.*

## Welcome to the Course

discussion posted 6 months ago by [ChrisCaplice](#) STAFF 31 Votes +

[PINNED](#)

Hello Everyone,

Welcome to CTL.SC1x! I am excited to start the class! I look forward to interacting with all of you over the next 11 weeks!

(this post is about [Week 0 / Introduce yourself](#))

643 responses

[Add A Response](#)

[SatyamK](#) 6 months ago 1 Vote +

Thank you !

Very glad to be here!

posted 6 months ago by [Leostange](#)

Hi, this is Keshav from [India](#). I am doing this course bcz I have a start-up in mind Based on core supply chain management.

posted 6 months ago by [KeshavPadia](#)

Hi, My name is Sibusiso from [South Africa](#) and work in the logistics and supply chain industry. Am looking forward to the course and hope to gain some knowledge and insight in the intracate workings of Supply Chain Management

posted 6 months ago by [Sbuda](#)

Hi! I am Irene, from [Seville, Spain](#), and hope to learn a lot on this course. I am industrial engineer, but I do not deal with supply chain. Nevertheless, my flatmates are working on that and I got very curious about it. Thanks!

posted 6 months ago by [Irenedeia](#)

Hi guys, this is Inez from [Germany](#). I am doing this class to get a better understanding of supply chains to use in my own company. Looking forward to this!

posted 6 months ago by [InezInez](#)

Hi, I am Lucile, from [Paris, France](#). I am a telecommunication engineer and I would like to learn more about Supply Chain Management. Thank you very much !

posted 6 months ago by [lucilejaumard](#)

# Impact on Individuals

Who are the MicroMasters learners?





I often watch a class at night and then right away the next morning, I use some idea or some example in a meeting or in an analysis at my current work.

~ Michel, Civil Engineer | Brazil



The MicroMasters is not only enjoyable, but it brought many professionals from around the world together in a community of learners to share valuable discussions, and motivate each other to complete the program.

~ Mohamed, Assistant Logistics Manager Manufacturing | Morocco



The instructors of this course series taught complex concepts in a clear way. I can easily apply what I learned from these courses to my work and career.

~ Su, Analyst | Taiwan



I can definitely say the MicroMasters courses have strengthened my confidence. They have also armed me with the analytical frameworks that set me apart from my colleagues.

~ Srideepti, Senior Manager Online Retail | United States





# Impact on Business

How you can use the MicroMasters in your training and development

# GE and the MITx MicroMasters in SCM

The screenshot shows the top portion of the Supply Chain Management Review website. At the top left is the logo "SUPPLYCHAIN MANAGEMENT REVIEW". To the right are social media icons for Facebook, Twitter, and LinkedIn, along with a search bar and links for "Login", "Become a member", and "SUBSCRIBE".

The main content area features a red navigation bar with the following categories: HOME, MAGAZINE, TRANSPORTATION, MATERIAL HANDLING, TECHNOLOGY, STRATEGY, LIFT TRUCKS, DCV-TV, and BLOGS & MORE. Below this is a secondary navigation bar with categories: FINANCE, GLOBAL, LOGISTICS, MANUFACTURING, PROCUREMENT, TECHNOLOGY, CURRENT ISSUE, ARCHIVES, VIDEO, WEBCASTS, and WHITE PAPERS. A search bar is located below the secondary navigation.

The article title is "MIT adopts 'in-person' program" under the "STRATEGY" section, dated September 1. The byline is "By DC Velocity Staff". The article text includes: "By SCMR Staff · October 2, 2017", "The MIT Center for Transportation MicroMasters Credential in Supply Chain Management Leadership Program", "The first course in the five-course special session to familiarize students with such as GE that are corporate", "Thirty-five GE employees are taking the course, they gain full access to MicroMasters materials that are supplemented by GE's own materials. In addition, GE can request customized company's specific education: 'MicroMasters has opened a new chapter for GE builds on this success with supply chain skills they need to lead the future. Director, MITx MicroMasters in Supply Chain Management, says: 'This is the first time that MIT Center for Transportation and the center is talking with GE'".

The article is also featured in "CSCMP's Supply Chain [QUARTERLY]" magazine. The date is "October 05, 2017 | 10:12 AM". The article is categorized under "FORWARD THINKING". The main headline is "GE enrolls 35 employees in MIT supply chain course". The byline is "By | October 3, 2017". The article text includes: "Students in GE's management leadership students will attend mix of online and in-person courses."

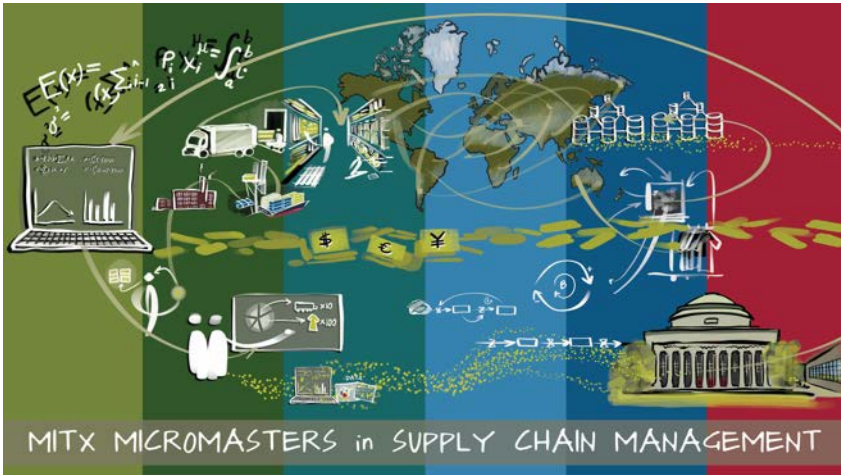
# Value Proposition

- Retain quality talent
- Promote career development
- Train and upskill your staff in specific learning areas
  - Accessible, scalable and affordable learning model
  - Collaborative, engaging and effective
- Open a pathway to the MIT Master's of Engineering





# Pathway to a Master's at MIT & Elsewhere



Application to MIT Blended Master's in SCM

  **Supply Chain MANAGEMENT**

Five month residential program  
Culminating in MEng degree

 **Massachusetts Institute of Technology** 

# Benefit for the organization

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- Any employee can join and learn specific techniques
- Flexible, but w/ fixed enrollment & course deadlines
- Modest price for official certification and credential
- Batch enrollment for companies
- Online learning and immediate feedback
- A growing global community of learners

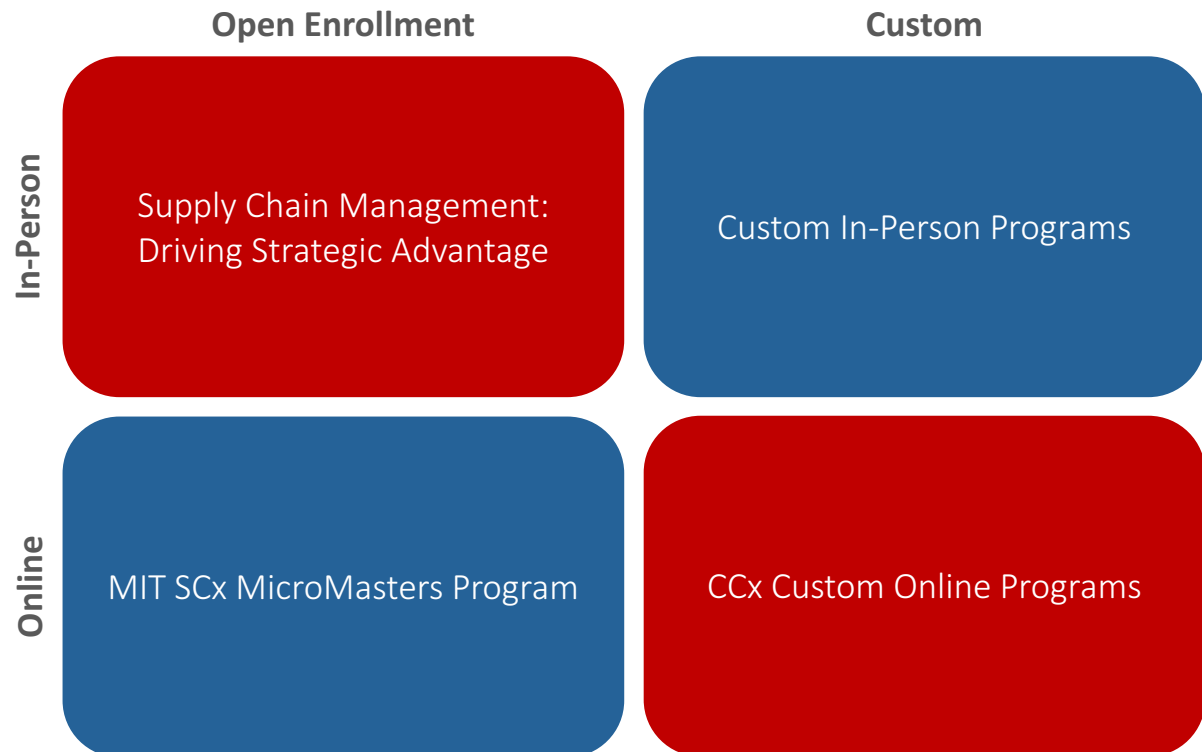
# Linking back to MIT CTL

How MicroMasters online learners also apply themselves on campus



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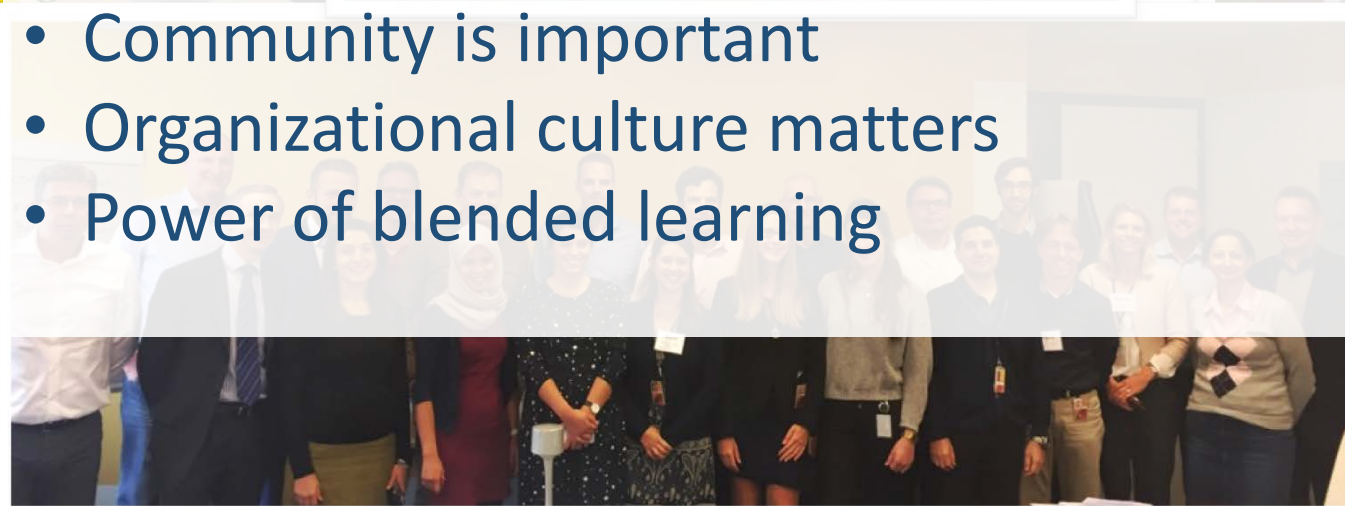
# Custom Courses

## The numbers...

- 12 courses created
- Over 500 students educated

## Key Learnings...

- Community is important
- Organizational culture matters
- Power of blended learning







# MicroMasters™

## SUPPLY CHAIN MANAGEMENT



MIT Center for  
Transportation & Logistics

# MITx MicroMasters in SCM

Thank you!

