

COURSE DESCRIPTION: CTL.SC1X SUPPLY CHAIN AND LOGISTICS FUNDAMENTALS

DETAILS:

Timing: Fall Semester 2014

- Class Start: Tuesday 30 September 2014 at 1500 hours UTC (11:00 AM EDT)

(each week's material will be released on Tuesdays at 1500 hours UTC)

- Class End (last assignment due): Tuesday 16 December 2014 at 1500 hours UTC

Instructor: Dr. Chris Caplice (caplice@mit.edu)

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COURSE DESCRIPTION:

This course is a survey of the fundamental analytic tools, approaches, and techniques used in the design and operation of logistics systems and integrated supply chains. The material is taught from a managerial perspective, with an emphasis on where and how specific tools can be used to improve the overall performance and reduce the total cost of a supply chain. We place a strong emphasis on the development and use of fundamental models to illustrate the underlying concepts involved in both intra- and inter-company logistics operations.

The three main topic areas we will focus on are: Demand Forecasting, Inventory Management, and Transportation Planning. While our main objective is to develop and use models to help us analyze these situations, we will make heavy use of examples from industry to provide illustrations of the concepts in practice. This is neither a purely theoretical nor a case study course, but rather an analytical course that addresses real problems found in practice.

This is the first of three courses that CTL is offering in its Supply Chain XSeries. The second course, CTL.SC2x Supply Chain Design, launches in the spring of 2015 while the third and final course in the XSeries, CTL.SC3x Supply Chain Strategy, runs through the summer of 2015. While designed to be taken sequentially, the three courses may be taken out of order, if desired.

COURSE ORGANIZATION

CTL.SC1x is divided into eleven weeks numbered from week 0 to week 10. Week 0 is different from the other weeks in that it is primarily concerned with the course logistics and background material.

Weeks 1 through 10 are the course content-based weeks. Each of these weeks is comprised of a number of sub-sections to include:

- **Welcome to the Week Video** – a short (<1 minute) video welcome from me providing an overview of what will be covered in the coming week.
- **Interactive Lessons** – each week will have 2-3 lessons. Each lesson consists of a bundle of short videos interspersed with Quick Questions and discussions. Each video is between 2 – 12 minutes in length with the total duration of videos in a complete lesson ranges from 40 minutes to just over an hour. They are designed to be able to be watched in one sitting – but do not need to be. The Quick Questions within each lesson are not graded, but are designed to help reinforce the concepts introduced in the videos. In one week (Week 5) we have added a Recitation video by Prof. Asad Ata to provide additional assistance on a difficult concept.
- **Practice Problems** – these are problems that you can use to test your skills on the concepts covered in the lessons. They range in level of difficulty from basic to intermediate to advanced. They are not graded (which is why they are called *practice* problems), but are solely designed to help you learn the concepts.
- **Graded Assignment** – this is the only graded component each week. The assignment will usually consist of two to three somewhat involved problems that may include a data set. Graded assignments are due one week after being assigned.

We designed each week to take approximately 6 to 8 hours of total time watching videos and working problems. Your actual time will, of course, vary. We will be asking you each week to assess the prior week's material in terms of quality, efficacy, and effort.

DISCUSSION FORUM:

There is a discussion forum on the website that is designed to be used by students of CTL.SC1x. You may use this as a forum to discuss course concepts, problem-solving approaches, interesting references, New England sports teams, and any other topics related to the course or the course material. You may also use it to ask questions for the teaching assistant. However, **please do not post full solutions to any of the graded assignments.** They will be removed and the student who posted will be contacted and dealt with individually. Please observe appropriate online etiquette as outlined in the Forum Guidelines posted in the Course Handouts section of the course Info tab. The course staff moderates the forum. Hours of live moderation will be posted for each week.

GRADING:

The only grading in this course is the Graded Assignments each week. There are 10 total graded assignments; one each for weeks 1 through 10. While the number of questions asked within each week varies slightly, each week's Graded Assignment counts as one tenth of your total grade. You must score at least 60 percent correct to pass this course.

CERTIFICATION:

Online students who achieve a passing grade in CTL.SC1x earn a certificate of mastery. These certificates indicate that you have successfully completed the course, but will not include a specific grade. Certificates are issued by edX under the name of MITx. For this course in Fall 2014, there will be two certificate options: ID verified certificate and a free hone code certificate. Additionally, CTL.SC1x is the first of three courses in the MITx XSeries in Supply Chain Management. Students completing all three courses earn a certificate of achievement.

See the edX FAQ for more details on certificates (<https://www.edx.org/student-faq>).

PREREQUISITES:

This is a fundamental modeling course so we presume you have a basic understanding of high school level math (especially algebra). We will be utilizing some more advanced (college level) methods involving statistics, probability, and optimization, but we will spend time explaining the principles involved. However, CTL.SC1x is not designed to be an introductory methodology course, so if you feel that you need to brush up on some specific topics (before or during the course) I highly recommend using the Khan Academy (<http://www.khanacademy.org/>). It is free and is very useful. I periodically use it to refresh myself on topics and techniques I have not used for a while.

We also assume you are proficient with (or at least vaguely comfortable) using spreadsheets. You will need to use spreadsheets to solve many of the practice and graded problems. We have taken great pains to make sure that all functions and features we demonstrate in the video lectures and require for the problems can be accomplished in either Microsoft Excel or LibreOffice. Excel is the world's most commonly used spreadsheet but is not free, while LibreOffice's Calc module is a very comprehensive spreadsheet and has the benefit of being opensource (i.e., free). Week 0 contains some practice problems for you to brush up on your spreadsheet (Excel or LibreOffice) skills.

REFERENCE MATERIAL:

There is no single textbook for this course. However, there are many excellent texts and reference books that you might want to consider looking up or adding to your personal library if this topic is of interest. One sad note about books on supply chain management is that they rarely use similar notation for the same concepts! This is a long-standing frustration with any one working in this space. We will be consistent within our class, but chances are if you consult any text on Supply Chain Management the specific notation will differ slightly.

Here is a list of reference texts that I find very helpful. These are not the only books out there; they are just the ones I typically find myself referring back to.

Silver, Ed, David Pyke, and Rein Peterson, Inventory Management and Production Planning and Scheduling, 3rd Edition, John Wiley & Sons, 1998. [Primary reference - currently out of print, but 4th edition due out in 2015]

Ballou, Ronald, Business Logistics: Supply Chain Management, 3rd edition, Pearson Prentice Hall, 2003.

Cachon, Gerard and Christian Terwiesch, Matching Supply with Demand: An Introduction to Operations Management, 3rd edition, McGraw-Hill, 2011.

Chopra, Sunil and Peter Meindl, Supply Chain Management, Strategy, Planning, and Operation, 5th edition, Pearson Prentice Hall, 2012.

Daganzo, Carlos, Logistics Systems Analysis, 4th edition, Springer-Verlag, 2004.

Nahmias, Steven, Production and Operations Analysis, 5th edition, McGraw-Hill, 2004.