

Course Syllabus – DRAFT

ISEN 462 Sustainable Supply Chain

Spring 2020

Northwestern University

Course Synopsis: This class will cover three main topics: 1) the basic principles of supply chain management, 2) evolving trends in sustainable supply chain and 3) the practical realities of driving sustainable practices into the supply chain operations.

Course Goals: Students will develop a solid foundation in:

- **Supply chain basics**, including but not limited to Sourcing, Logistics, Distribution & Transportation, Capacity Management, Risk Management, the role of ESG, Continuous Improvement / Lean Operations (incl Six Sigma, Hoshin), and Flexible Supply Chain
- **Emerging concepts in sustainability as relevant to supply chains**, including but not limited to International ESG Risk Management (currency, labor, environment), Sustainable Production & Efficiency, Sustainable Product / Service Design, Closed loop supply chain / circular economy, End of life / reverse logistics management, and Sustainable Procurement & Supplier Management (incl renewable energy, transportation)
- **How to incentivize and measure the supply chain**, including but not limited to Financial impacts of sustainability on supply chain, Carbon footprint and lifecycle assessment, GHG Measurement & ESG Reporting, and Measuring, managing & monitoring supply chain performance.

Students interested in operations, manufacturing, sustainability reporting and the concept of sustainability driving value should consider this course.

This course will require some technical and quantitative competency as the impact of a supply chain (including production, transportation, procurement etc) on the environment must be understood and calculated for some of the course work. This includes work on determining greenhouse gas emissions and other “light” technical analysis.

As many students will not have deep knowledge of supply chain and sustainability topics, the reading list is significant. Students are expected to complete readings prior to class. Please refer to the reading list for primary texts that will be used for the class. There will also be supplemental readings, including articles and essays, that will be provided by the instructor.

As part of the class, we will have a series of guest panels and lectures by business professionals from a variety of stakeholders that work in the sustainability field. Particular focus will be placed on the practical reality of how to navigate emerging and changing nature of sustainability in the supply chain.

The course will likely include at least one field visit to a manufacture and speakers will include sustainability reporting experts, procurement professionals and other business executives.

Grading/Assessment:

Grading will be based on the following rubric:

Component	Weight	Details	Due
Quiz	15%	Will cover Supply Chain Fundamentals (Week #3); online, in-class quiz (~40 min) <i>Case companies and teams for remaining assignments will be formed after quiz</i>	Week #3
Short Paper	15%	Supply Chain & Sustainability Current State Assessment – student teams will review the supply chain of their case company and submit a short paper (~5 pages) with a high level assessment of the current supply chain; more details on recommended paper structure will be provided in Week #3 when teams are formed <i>*Final grade will include adjustment for peer assessment from team</i>	Week #6
Summary Presentation	20%	Short summary presentation of sustainability case recommendations (5 slide, 15 minute in-class with 10 minute feedback from classmates) <i>*Final grade will include adjustment for peer assessment from team</i>	Week #9
Final Report	40%	Final paper (~15-20 pages) that includes: <ul style="list-style-type: none"> • Initial supply chain assessment (situation) • Top changes in market / at company (complication) • Overview of risks & opportunities • Recommended sustainability goals • High level plan to deliver on supply chain sustainability goals • Assessment of cost & benefits • Key Next Steps <i>*Final grade will include adjustment for peer assessment from team</i>	Week #10
Participation	10%	Based on attendance and instructor assessment of preparation and participation in class on a weekly basis	All quarter

Grading Policy:

- Grades will be assigned based on all the work you have completed during the semester following the traditional practice of A=90-100, B=80-89, C=70-79, D=60-69, F<60.
- Team assignments (Preliminary Paper, Summary Presentation and Final Team Report) will also have a component of peer rating included. In total, this work will be graded at the group level (75% of total course grade) but individual grades will be adjusted up or down up to +/-10% based on peer ratings.
 - *Given the importance of teamwork and the opportunity to increase or decrease an individual grade by a full letter grade (10%), it is critical that all students collaborate and share the work on the project.*

Course Readings:

The following texts are required for the class. Other articles and essays will be distributed in class. Students should bring the assigned texts and copies of all articles to class for discussion.

- Chopra, S. and Meindl, P. Supply Chain Management: Strategy, Planning, and Operation, 6th Edition. 2016.
- Harvard Business Review. “Future Proof Your Climate Change Strategy”. May 2019¹
- Lovins, A., Lovins P. and P. Hawken. Natural Capitalism. December 2008
- “The State of Sustainable Supply Chains”, EY and the UN Global Compact. September 2016²
- Greening Global Supply Chains, The Sustainability Consortium. 2016.³

Supplemental Reading List

<https://www.projectmanager.com/blog/supply-chain-management>

Video Viewings

Throughout the quarter, students will be required to view videos outside of class time. Videos are available online.

https://www.ted.com/talks/olivia_tyler_the_complex_path_to_sustainability#t-464149

Instructor may also assign a number of industry news services to discuss timely/current updates in Markets Design and Regulation that are illustrative of core course topics.

¹ <https://hbr.org/2019/05/future-proof-your-climate-strategy>

² <http://www.unglobalcompact.org.au/new/wp-content/uploads/2016/09/UN-GC-EY-building-responsible-and-resilient-supply-chains.pdf>

³ <https://www.sustainabilityconsortium.org/wp-content/themes/enfold-child/assets/pdf/2016-impact-report.pdf>



CLASS OUTLINE

Weekly Topic	Description
<p>1: Intro to Supply Chain & Operations Management</p>	<ul style="list-style-type: none"> • What is a supply chain? • Key Elements such as: <ul style="list-style-type: none"> ○ Sourcing / Procurement ○ Logistics ○ Distribution & Transportation ○ Capacity Management
<p>2: Supply Chain Risks & Improvement Opportunities</p>	<ul style="list-style-type: none"> • Risk Management • Role of ESG • Continuous Improvement / Lean Operations (incl Six Sigma, Hoshin) • Flexible Supply Chain • Innovation in the supply chain
<p>3: Supply Chain Design</p>	<ul style="list-style-type: none"> • Factors influencing supply chain network design • Stakeholder analysis • Network design to maximize value (using quantitative models) • Optimizing network design decisions • Impact of uncertainty on network design decisions <p><i>Students will select their top 3 case companies of choice & teams will be formed by the end of this class</i></p>
<p>4: Quiz, Project Preparation</p>	<p>Quiz #1: Supply Chain Fundamentals (40 min)</p> <p><u>Introduction of Sustainable Supply Chain Project & Formation of Teams (40 min)</u></p> <ul style="list-style-type: none"> • Collaborative Initial paper – 5-7 page assessment of current supply chain & sustainability achievements for company • Sustainable supply chain strategy (~20 page paper + 5 slide summary) <ul style="list-style-type: none"> ○ Risks ○ Opportunities ○ (High Level) Cost / Benefit Analysis ○ Recommendation • Team Selection of Final Presentation slot • Review of team paper / project grading approach
<p>5: Sustainability & the Supply Chain</p>	<p><u>Sustainability & Core Supply Chain Concepts</u></p> <ul style="list-style-type: none"> • Sustainable Production & Efficiency • Closed loop supply chain / circular economy • End of life / reverse logistics management



	<ul style="list-style-type: none"> • Sustainable Procurement & Supplier Management (incl renewable energy, transportation) <p><u>Product Design, Innovation & Sustainability</u></p> <ul style="list-style-type: none"> • Sustainable Product / Service Design • Product Design Principles • Integration of sustainability into design process • Examples of sustainability driven innovation
<p>6: Procurement, Risk & International Supply Chain</p>	<p>Short Paper Due via email before beginning of class in Week 6</p> <p><u>Procurement & Risk</u></p> <ul style="list-style-type: none"> • Overview of supply chain risk • Discussion of Total Cost of Ownership (including carbon) in sourcing • Identifying supply chain disruption • Differences between operational mitigation and contingency approaches • Mitigating supply chain risks <p><u>International Supply Chain – Issues & Opportunities</u></p> <ul style="list-style-type: none"> • International ESG Risk Management • Offshoring / Outsourcing – differences & similarities • Currency Risk • International Shipping & Carbon Footprint • Human Rights / ESG Compliance
<p>7: Making the Case for Sustainable Supply Chain</p>	<ul style="list-style-type: none"> • Concept of Shared Value • Impacts of Sustainability on the Supply Chain <ul style="list-style-type: none"> ○ Insurance ○ Branding ○ Risk Management / Catastrophic Climate Event ○ New Products ○ Stakeholder Management ○ Operating Costs • Building the Financial Case (include case study with cost / benefit framework)
<p>8: Measuring the Supply Chain & Managing Change</p>	<ul style="list-style-type: none"> • Understand how to incentivize and measure the supply chain <ul style="list-style-type: none"> ○ Financial impacts of sustainability on supply chain ○ Carbon footprint and lifecycle assessment ○ GHG Measurement & ESG Reporting ○ Measuring, managing & monitoring supply chain performance ○ Motivating suppliers to support supply chain changes



<p>9: Student Presentations</p>	<p>Team Presentations (Powerpoint) due at midnight the day before class presentations</p> <p><i>Each team will be allotted an equal section of class time (expectation is 20 minutes of presentation + 10 minutes of Q&A + 5 min transition time between teams). Class break (typically 10 min for each 90 min of class) will be retained</i></p> <p style="text-align: center;"> <i>Team A: 35 min Team B: 35 min BREAK (20 min) Team C: 35 min Team D: 35 min Wrap Up (20 min)</i> </p>
<p>10: Additional Student Presentations & Anonymous Q&A</p>	<p>Team Presentations (Powerpoint) due at midnight the day before class presentations. All students can submit anonymous questions for coverage in Q&A session (due online at midnight before class)</p> <p><i>Each team will be allotted an equal section of class time (expectation is 20 minutes of presentation + 10 minutes of Q&A + 5 min transition time between teams). Remaining time in last class will allow student teams to get answers to open questions from instructor (in a group setting then individually)</i></p> <p style="text-align: center;"> <i>Team E: 35 min Team F: 35 min BREAK (20 min) Discussion of Q&A Additional "office hours" (as available)</i> </p>

There will be no final exam for this class but final papers will be due on scheduled final exam date.