

Course overview: Preliminary version Dec 28, 2013, subject to change

Class	Date	Module and Description	Readings	Cases	Hand-In
Part I. Operations Strategy: Concept & Value & Competencies					
1	1/7	<input type="checkbox"/> Course overview <input type="checkbox"/> Framework for operations strategy	Chapter 1 of <i>Operations Strategy</i>		
2	1/10	<input type="checkbox"/> Tailoring operations strategy		Swiss Watch Industry (Ch1, p. 32)	
3	1/14	<input type="checkbox"/> Investor/External view of ops <input type="checkbox"/> Operations Forensics			
4	1/17	<input type="checkbox"/> Linking to Financials		Peapod (Ch13, p. 415)	<u>Peapod</u>
5	1/17	<input type="checkbox"/> Speaker: Note special time and room: from 12:10 to 13:20 in Rm G40			
6	1/21	<input type="checkbox"/> Management/Internal view of ops <input type="checkbox"/> Tradeoff curves	Chapter 2	Sugar & Spice (blackboard)	
7	1/24	<input type="checkbox"/> Competitive cost advantage analysis		American Connector Corp. (in case pack)	<u>American Connector</u>
Part II. The Resource View: Asset Strategy					
8	1/28	<input type="checkbox"/> Capacity strategy <input type="checkbox"/> Risk Management	Chapter 3 (skip 3.7)		
9	1/31	<input type="checkbox"/> Network capacity and Operational Hedging	Chapter 9	Seagate Technology (Ch12, p. 405; SimClass)	Seagate Technology (via SimClass)
10	2/4	<input type="checkbox"/> Capacity expansion and timing	Chapter 4 (skip 4.6)	Harley-Davidson (Ch11, p. 391)	
11	2/4	<input type="checkbox"/> Speaker: Note special time and room: from 12:10 to 13:20 in Rm G40			
12	2/11	<input type="checkbox"/> Capacity Flexibility	Chapter 5.1-3 and 5.7	Eli Lilly: Flexible Facility (in case pack)	<u>Eli Lilly</u>
13	2/14	<input type="checkbox"/> Capacity location	Chapter 6		
14	2/18	<input type="checkbox"/> Global networks and offshoring		Mexico or China? (Ch6, p. 230)	Mexico-China

Class	Date	Module and Description	Readings	Cases	Hand-In
		Part III. The Process View: Sourcing Strategy			
15	2/25	<input type="checkbox"/> Strategic Sourcing and Supplier Relations	Chapter 7 (skip 7.5)	Boeing 787 Dreamliner (BlackBoard)	
16	2/28	<input type="checkbox"/> TCO and supplier economics		GenPower (BlackBoard)	Integrative Case I
17	3/4	<input type="checkbox"/> Make or buy decision <input type="checkbox"/> Buyer-Supplier negotiation		Neuvotella (SimClass)	Neuvotella (via SimClass)
		Part IV. Closing The Loop: Innovation & Improvement			
18	3/7	<input type="checkbox"/> Should you sell the plant? <input type="checkbox"/> Should you buy the plant? Acquisitions & Operational Turnarounds		Boeing 737: Wichita Decision Morton Grove Pharmaceuticals	Morton Grove Pharmaceuticals (via SimClass)
19	3/11	<input type="checkbox"/> Improvement and learning <input type="checkbox"/> Global standardization/automation <input type="checkbox"/> Innovation in existing operations	Chapter 10.1-10.2	ITT Automotive (in case pack)	Integrative Case II
		Part V: Summary			
20	3/14	<i>Course Summary and WrapUp</i>			
	TBD	Final Exam (closed book, in-class)			

BUILDING AND EVALUATING THE OPERATING SYSTEM

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1. Course Description and Objectives

THE GOAL OF THIS COURSE is to make strategic decisions that are grounded in operational reality. We study how to build and evaluate the “operating system” of the firm to maximize value. This involves tailoring the firm’s operational competencies, assets, and processes to a specific business strategy. The focus of the course is on product companies.

CONTENT: The course provides you with a framework to 1) formulate an operations strategy and 2) analyze, value, and optimize the key decisions involved in operations strategy. Our key evaluation metric will be how operations strategy impacts the net present value and risk exposure of the firm. The key decisions studied are evaluating competitive operational competencies and benchmarking; capacity expansion, timing, flexibility, and location; sourcing and supply mgt; risk management and operational hedging; improvement, innovation and learning.

RELATIONSHIP TO OTHER COURSES: This operations elective course builds on the core operations class and also assumes you are familiar with the basics of finance, economics, and strategy. The strategic decisions studied in this course require a detailed analysis and understanding of the underlying operations. Thus this course has a greater amount of concreteness and detail than a competitive strategy class. Yet it is the highest-level elective in the operations major and can be supplemented by more specialized electives such as *supply chain operations*, *service operations*, or *analytic spreadsheet modeling*.

APPROACH: Each topic will be discussed using a combination of models, case-discussions, readings and speakers. The anticipated mix for the course is 50-50 qualitative-quantitative. In a typical week we will cover one major case in-depth, supplemented by mini-lectures, presentations and qualitative discussions of other examples. Many of these cases can be approached from the position of the general manager and therefore all the functional issues should be addressed. In addition, we will use a *data-driven* approach where tools and analysis will start with realistic data. This will allow you to implementing the course content directly in practice.

PRE-REQUISITES: The core operations class and a genuine interest in operations and financial valuation (the latter implies an interest in quantitative analysis).

INTENDED AUDIENCE: Students interested in (1) operations and supply chain management, (2) general management, and (3) management consulting. It may also be of interest to private equity and entrepreneurship given that operations typically employs the greatest number of employees and requires the largest investment in assets.

2. Grading and “Rules of the Game”

GRADING: The grade you receive for the course is intended to certify your demonstrated proficiency in the course material. Proficiency will be estimated by measuring your performance in:

1. Course contribution:	Individual	10%
2. Final exam:	Individual	30%
3. Mini-case submission (1):	Individual	5%
4. Mini-case submission (2):	Group plus Peer Review	10%
5. Case submissions (3):	Group plus Peer Review	30%
6. Integrative case:	Group plus Peer Review	15%

1. COURSE CONTRIBUTION = Your contributions to create and enhance a *positive learning environment* for this course. To create this environment, computers should only be used in class for “honest note taking” because other use only creates distraction. Grading will be based on the quality and impact of your contributions, not on quantity (although a minimum amount of the latter is necessary to deliver on the former.)

VOLUNTARY: In-class contribution will consist of voluntary contributions and occasional cold calls, usually to answer opening questions. Please leave your name-card up for the entire duration of each class and keep the same seat for the duration of the quarter. (Although cold calling may increase anxiety, the GMA suggests that “supportive” cold calling encourages you to be better prepared for class and as a result improves the overall class discussion.) A thorough preparation of the assigned materials is all that is necessary for such leadoff questions. If you feel uncomfortable with being called on in class please let me know in advance so that we can agree on an alternative mode of interaction.

ATTENDANCE AND CLASSROOM ETIQUETE: While I hope you will find it valuable to attend class and will decide to do so, attendance is *not* mandatory. There is no penalty for missing classes, except that it will of course reduce your opportunities for earning class participation points. When you attend, you will be expected to fully follow the principles of the Kellogg code of classroom etiquette (http://www.kellogg.northwestern.edu/stu_aff/policies/etiquette.htm). In addition, to maintain a positive learning environment, the use of your computer in the classroom is interpreted as your honor statement that you are only taking “honest notes.”

2. FINAL EXAM = in-class, closed-book so it can focus on first-order, qualitative questions.

3. CASE SUBMISSIONS = underlined in the table above and to be done in group. Please read *guidelines for case write-ups* later in this syllabus.

GROUPS should have four or five students, each of them bringing different strengths to the table. To increase the learning from the skills and knowledge that each person brings to the group, groups must be balanced. For example, groups must balance 2Ys, 1Ys, Exchange students, JDMBAs and MMMs, as well as geographical origins to benefit from cross-learning and multi-disciplinary experiences. You will have an opportunity to form groups during the first class.

4. MINI-CASE SUBMISSIONS = these are short submissions. Please read *guidelines for mini case write-ups* later in this syllabus.

5. INTEGRATIVE CASE = a group assignment to integrate the course learnings near the end of the quarter. Specifics will be given in class.

*. HONOR CODE

A. SUBMISSIONS may not be discussed with anyone outside your study group nor may you use other sources without acknowledgment. It is important that everyone has a level playing field so this also means that materials from previous years or websites cannot be used. I'm sure you understand. It also is extremely important and part of the honor code that each member of a group makes a **material** contribution to **each** case analysis of the group. *If any individual has not contributed for a particular write-up, s/he should not append his/her name to the case report but can submit a separate report his/her own. It will also be the group's responsibility to ensure that this happens.* Only one written report will be due per group per assignment.

B. PEER EVALUATIONS: Given the importance of group work in this class, each member should make every effort to contribute and carry his/her part of the load. Your grade will reflect peer evaluations to be done at the end of the course.

C. Other parts of the honor code:

- For **standard violations of academic integrity**, please see <http://www.northwestern.edu/uacc/defines.html>
- For a **detailed discussion on plagiarism**, please see <http://www.northwestern.edu/uacc/plagiar.html>

3. Text and Course Materials

- Required and available at the bookstore:
 - OPNS 454 Course-pack I
 - Only 1 of the following:

- Textbook *Operations Strategy: Principles and Practice* by J.A. Van Mieghem. Publisher: Dynamic Ideas, Charlestown, MA. 2008. As the author, I obviously believe that the textbook is a useful companion to the course and I recommend it. It also contains several cases and mini-cases that are covered in the course.
 - However, to avoid any conflict of interest, the textbook's cases are available in course packet II if you do *not* have the textbook.
- Additional readings are downloadable from Blackboard.

4. Guidelines for Case Write-ups

FORMAT: A case write-up is not to exceed three pages of typed text plus maximally three supporting exhibits. *Hand in a hardcopy before the start of the class when the write-up is due.* (Exhibits must be relevant and described in the text.)

STRUCTURE OF CASE WRITE-UP: A good paper should clearly and succinctly state:

1. Your recommendation in the first paragraph to provide the reader with a framework (if a lengthy description of the recommendation seems necessary, append it to the report).
2. To stay in line with the objective of the course, the second part of the write-up should always qualitatively analyze and assess the operations strategy of the company (“the big picture”).
3. The remaining part of the write-up should explain your quantitative analysis (in words), what the key sensitivities are, and use it to justify your specific recommendation taking into account both the desirable and undesirable consequences of adopting it. If there are options under consideration in the case that you reject, a clear rationale for your decision should be provided.

Keep in mind that you write to someone who knows all the facts in the case—no need to repeat them. A good report is not a chronology of analysis, but a clearly articulated statement of recommendation and support. Finally, the case write-up should answer the key questions in the case (and *not* be just an answer to the guiding questions that come with the case).

MAIN EXPECTATION: **each** case write-up must have (1) an analysis and assessment of the big picture of the current operations strategy and (2) a quantitative analysis that must be used to justify your specific operations strategy recommendation as it pertains to the problem of the case. There are many ways to Rome: many analyses may work and choosing an appropriate one is part of the assignment. (In real life, nobody will tell you in advance what to do either.)

5. Guidelines for Mini-Case Submissions

For the individual mini-case submission, format is 2 pages max.

For the Group Mini-case Submission

FORMAT: A **mini case submission is not to exceed two slides** which answer a specific question with your supporting argument. *Upload the slides to Blackboard before 9:00pm on the day prior to the due date of the submission. Also hand-in a hardcopy at the start of the class.*

STRUCTURE OF CASE WRITE-UP: The slides should succinctly state:

1. Your recommendation
2. Basic (qualitative + quantitative) analysis supporting your recommendation

MAIN EXPECTATION: the slides allow your group to explain in class how you “make strategic decisions that are grounded in operational reality.” They allow a richer, fact-based discussion using the medium that you will use later in your professional life.

6. Detailed topics and assignments

- *All cases must be read before the class they are to be discussed in (whether a submission is required or not).*
- Lectures will follow the book which aims to give you the theory and practice behind our topic. As such it contains more than we will cover in class. Each assigned chapter is perhaps best scanned before class and read afterwards to reinforce the class discussion.

Part I: Strategy & Operations

Class 1: Introduction & A Framework for Operations Strategy

Content: **What is operations strategy?** Introduce a framework to describe a company's operations strategy. The key premise is that an operations strategy must be evaluated in terms of the performance it delivers. This performance depends on the activity network and the asset bundle that operations puts in place. We will discuss the goal of operations strategy and a framework to think about operations strategy.

Read:

- Chapter 1

Class 2

Content: Apply the operations strategy framework and tailor it to specific business situations. We will use the Swiss Watch Industry mini-case as our main discussion vehicle.

Read:

- Swiss Watch Industry, mini-case 1 in Chapter 1. Be prepared to discuss the accompanying questions.

Class 3: VALUE: Investor/External Assessment: Operations Forensics

Content: **How to assess an operations strategy as an outsider?** Use public information together with personal estimates of key resources and processes to assess the attractiveness of an operations strategy. During this process, distill key operational metrics that create value, tie them to financial performance, and suggest how to improve profitability over time.

Class 4

Content: Apply the operations forensics concept. We will use the Peapod case as our main discussion vehicle.

Prepare: • Peapod, *Chapter 13 in textbook*. (Guiding questions come with the case.)

Hand-in write-up of **Peapod**. Submit your recommendation and supporting arguments to:
How attractive is Peapod's operation from an external investment perspective? What are the key performance drivers of Peapod's cost to serve a customer and what is the improvement potential?

Class 5 will feature a speaker. *Note special time: directly following class 4 from noon-1:15pm.*

Class 6: COMPETENCIES: Management/Internal Assessment: Competition, Competencies and Operations

Content: [How to assess an operations strategy using internal data and competitive intelligence?](#) Discuss how the concepts of operational trade-offs and competency focus relate to strategic positioning and operational efficiency and how they can be used--qualitatively and quantitatively—to evaluate a firm’s operations strategy in a competitive setting.

Read:

- Chapter 2
- Sugar & Spice (case-pack or BlackBoard)

Class 7

Content: Apply the content of classes 1-5: describe and contrast two firms’ operations strategy. Use competitive cost analysis and trade-off curves to guide the design of a defensive strategic response based on process and resource capabilities.

Prepare:• American Connector Company (A), Case (No. 9-963-035)

Hand-in write-up of **American Connector**. The objective of this case is to operationalize the concepts of strategic positioning and operational efficiency to evaluate current strategy and design a competitive response.

Guiding questions:

1. Evaluate ACC’s operations strategy (using the framework of Chapter 1) and contrast it with DJC’s.
2. Perform a detailed quantitative analysis of the cost differential ΔC . Based on that analysis, how serious is the threat of DJC to American Connector Company and what do you recommend?

The case situation is similar to Sugar and Spice’s and to the interior aircraft manufacturer example in the textbook. [This case asks you to push the quantitative analysis of \$\Delta C\$. This requires some detective work and estimation, given that not all data is available. The idea is to do your best in estimating financial performance, using case data where possible and supplement it with justified estimates where needed. Use the ACC Kellogg Addendum from Blackboard.](#)

- Calculate the overall cost difference between DJC’s plant and ACC’s Sunnyvale plant. Consider both DJC’s performance in Kawasaki and its potential in the United States.
- What accounts for these differences? How much of the difference is inherent in the way each of the two companies competes; that is, how much is a function of the strategic

competitive positioning decision? How much is due strictly to the differences in the operational efficiency; that is, how much can cost be improved *without* impacting the ability to offer its strategically chosen value proposition?

- Quantify these differences for each line item in the COGS: For each line in the COGS, break up the cost differential between DJC and ACC and determine what amount is due to (i) volume being different from targeted volumes, (ii) operational inefficiency, and (iii) strategic positioning.

Part II: The Resource View: Asset Strategy

Class 8: Capacity Strategy and Risk Management

Content: **How to design a capacity strategy?** A major part of operations strategy is deciding on a capacity strategy. This includes deciding on the sizing, timing, type, and location of each asset change.

How can we structure resources and processes to mitigate the firm's risk exposure? We approach risk management as a process with focus on operational risks and methods to mitigate that risk. We start by investigating how resource networks can be structured to provide an operational hedge against demand risk.

Read:

- Chapter 3 (skip 3.7)

Class 9: Network Capacity and operational hedging

Read:

- Chapter 9

Prepare: • Seagate Technology: Operational Hedging, *Chapter 12 in textbook*. Guiding questions come with the case. The objective of this case is to analyze and optimize the impact of each asset's (location) capacity on the overall value and risk of the processing network.

Submit INDIVIDUALLY your answer to the questions using the SimClass enhanced Seagate case. You can edit and revise your answers over time, *just make sure to finish your final "Submit" click by midnight (11:59pm) before class.*

Class 10: Capacity expansion and timing

Content: **When and how should we change capacity?** Which strategies can a company use to decide when to expand or contract capacity? What are the key drivers influencing that decision?

Read:

- Chapter 4 (skip 4.6)

Prepare:• Harley-Davidson Motor Company, *Case in textbook*. (Guiding questions come with the case.)

Class 11 will feature a speaker. *Note special time: directly following class 10 from noon-1:15pm.*

Class 12: Capacity Types and Flexibility

Content: **Should we invest in specialized or flexible capacity?** Once a company decides it needs to build new capacity, it must decide on what type of capacity. This involves deciding on the type of technology and facility. This class will discuss when and why product-dedicated or product-flexible technology is more appropriate. We also will explore what flexibility means and the various approaches to achieve it and be better positioned to respond to changes in demand, supply or processing.

Read:

- Chapter 5.1-5.3 and 5.7 (other sections will be covered later in the course)

Prepare:• Eli Lilly & Co: The Flexible Factory Decision (1993), *HBS Case*.

Hand in a write-up of **Eli Lilly**. The objective of this case is to value flexibility and investigate when and why dedicated or flexible capacity is more appropriate and to connect the technology & facility strategy with new product introduction plans. **DO USE THE EXPLICIT COST ASSUMPTIONS IN THE KELLOGG ADDENDUM THAT COMES WITH THE CASE.** Guiding questions:

1. Describe and evaluate Lilly's operations strategy (using the framework of Chapter 1)
2. What type of flexibility does the "flexible facility" provide?
3. From a qualitative perspective: What is the value of this flexibility to Lilly? How much is Lilly paying for the flexibility? What are the strengths of the specialized facility?
4. *Quantify the financial value of flexibility, incorporating technical risk (i.e., likelihood of NDA approval of technology) and other relevant factors and options as outlined in the case and the Kellogg addendum. Let your analysis drive your recommendation: What facility strategy do you recommend for Eli Lilly's new product plans?*
5. Looking forward, how does each facility option affect Lilly's cost structure and capacity management rules? How does each affect their process development capabilities?

A few guidelines for your analysis:

1. The focus of the case is on valuation (=quantification of benefits) of capacity strategies for technical risk, for which you can limit yourself to performing a PV of cost analysis. (We will assume that you build sufficient capacity so to not have shortages; then the revenue stream is not impacted by your strategy.) Do clearly discuss your approach in the main text. Discuss qualitatively how your recommendation would impact the revenue side.
2. Implications of product line breadth on flexible plant cost: you can assume that there is a broad product line of existing and future products besides Alphatine, Betazine, and Chlorozine which will be the focus of our financial analysis. You don't need to model those other products explicitly; rather, **do adopt the specific cost assumptions in the Kellogg addendum** (they implicitly assume that there are other products in the portfolio).

Class 13: Capacity location

Content: **Where should we change capacity?** Introduce the location decision and global networks. Which factors should be considered when designing a global operational network? How can the concept of *total landed cost* help making such decisions?

Read: • Chapter 6

Class 14: Global Networks and offshoring

Content: We will play an in-class simulation of the global dual sourcing problem described in Min-Case 6. The objective is that each group identifies how to best manage a global network and the key challenges faced in such setting.

Background Reading:• Mini-case 6: “Mexico or China? Managing a Global Network” p. 230. The simulation is inspired on this mini-case, but the assignment does *not* use any data from mini-case 6.

Prepare:• The Mexico-China Dual Sourcing Game: download “Mexico_China_Student Assignment and Planning Tool.xlsx from Blackboard.

- Integrative Case I

Before class: Submit your recommendation and supporting argument to (2pages max):

What is your strategic allocation to Mexico and China? (The strategic allocation is key in setting up the sourcing relationship and includes the total number of units you expect to order over the product life cycle and how the aggregate order would be allocated to each source (the % allocated to each source captures supplier shares.)

What replenishment sourcing policy will you use?

Come to class with one laptop for your group with FireFox or Google Chrome installed and ready to start the simulation game.

Submit Integrative Case I

Part III: The Process View: Sourcing Strategy

Class 15: Strategic Sourcing and Supplier Relations

Content: [How do we choose and manage an appropriate supplier portfolio?](#) Deciding on which suppliers to use for particular goods or services and on how to manage the supplier relationship over time is called strategic sourcing.

Read: • Chapter 7 (skip 7.5)

Prepare: • Boeing 787 Dreamliner, *MIT Case* (download from Blackboard).

Guiding questions:

1. What are the key factors in determining whether to outsource or vertically integrate?
2. To sustain its competitive advantage, Boeing will need to support its existing core knowledge base while carefully selecting new opportunities for innovation and new competencies. Effective vertical integration decision-making and global sourcing may be among the most important factors in the ultimate success or failure of Boeing in the future market. If you were a supply chain manager at Boeing and you were asked to define a sourcing strategy for Boeing's next airplane what would you recommend?
3. Given the supply chain challenges experienced on the 787 program, there was a general sense among some company leaders that Boeing may have accepted too much supply risk. Furthermore, recent volatility in fuel costs and the U.S. dollar had led many U.S. companies to rethink the previous notion that offshore outsourcing is always likely to be cheaper than local production. What should Boeing decide to source internally versus outsource? Produce domestically versus offshore?

Class 16: Supply Mgt: TCO and supplier economics

Content: Manage the supply base by better understanding supplier economics. This involves visiting and analyzing the suppliers' operations and agreeing on targets for key operational drivers that constitute the TCO.

Prepare: • GenPower, *in case packet*. (Guiding questions come with the case.)

Questions to consider:

What are the TCO components and drivers for grey iron castings? How much of the TCO is in the direct control of the supplier? What levers can the purchasing team pull to reach the 15% target?

Class 17: Supplier-Buyer Negotiations

Content: How to negotiate a supplier-buyer agreement. Experiential negotiation exercise.

Prepare:• Neuvotella

Before class: Submit your recommendation and supporting argument for the Neuvotella case using SimClass

Part IV: Closing the Loop: Risk, Improvement and Innovation

Class 18: Sell the Plant? Buy the Plant? Acquisitions & Operational Turnarounds

Content: How should a firm decide whether to keep an underutilized asset or outsource production? How would you decide to acquire and improve it?

Prepare: *“Boeing 737 Industrial Footprint: The Wichita Decision”*

Discussion Questions to consider:

1. Do you agree or disagree with the Stonecipher’s strategy of only doing design and final assembly of commercial airplanes? What does theory suggest? Is there a performance- defining subsystem?
2. Is a horizontal industry structure a benefit or a liability for a company like Boeing? For Airbus? For Commercial Aircraft Corporation of China (COMAC)?

Prepare: Morton Grove Pharmaceuticals

Before class: Submit your recommendation and supporting argument for the Morton Grove Pharmaceutical case using SimClass

Class 19: Improvement: learning and standardization

Content: Every organization must build capabilities for future growth. Such capabilities include processes for new product and process development, for learning, and for building a global culture.

The ITT case is our vehicle to discuss how organizations use their total process skills in bringing products to market strategically. What impact do geographic and cultural differences have on this capability?

We review the learning curve concept to predict process improvement.

Read: • Chapter 10.1-10.2

Prepare:• ITT Automotive, *HBS* case. (I will assign role playing in class.) Consider:

1. What are your recommendations regarding the issue of standardizing process technology across all plants? Are there motives behind this proposal other than those stated in the case?
2. As Jergen Geissenger, how would you go about implementing your recommendations? How would you overcome resistance from the plants? As Steve Dickerson, the plant manager of Asheville, North Carolina, what line of reasoning would you use to convince senior managers that full automation is the less desirable alternative?
3. As Klaus Lederer, what option would you like to see pursued? How do various options fit into the broader corporate strategy of ITT Automotive?

Class 20: Part V: Course Summary and Wrap-up