



Sofaer Global MBA

1238.2412.01 – Operations Strategy

Prerequisites: none

May-June – 2021

Course Section Details

Day	Hour	Classroom	Lecturer	Email
Wed. May 12 – June 23	12:45- 15:00	405	Prof. Yossi Aviv	yaviv@tauex.tau.ac.il

Teaching Assistant (TA): Yaniv Grosman, yanivgro@gmail.com

Office Hours: By appointment

Course Units

1 Course Units = 4 ECTS

The ECTS (European Credit Transfer and Accumulation System) is a framework defined by the European Commission to allow for unified recognition of student academic achievements from different countries.

Course Description

This course considers the subject of operations strategy from a process and resource management perspective, where operations are broadly defined as the processes by which firms create and deliver value. Operations Management is concerned with the production and delivery of goods and services. It encompasses the design of products and processes, the planning and execution of production, and acquisition and deployment of resources. Successful crafting and execution of operations strategy can provide organizations with strong and sustainable competitive advantage. This course provides a rigorous introduction to the design and management of business processes; its scope is therefore relevant to all types of organizations.

Course Objectives

Upon completion of the course, students will be able to:

1. Appreciate the importance of achieving proper alignment between operations management and the organizations' strategy, and the challenge of coordination in complex operational environments.

2. Conduct basic analyses of processes to evaluate improvement strategies.
3. Explain key concepts in capacity planning and resource utilization in service settings, and utilize basic waiting-line theory.
4. Explain the fundamental principles of inventory deployment, and be able to perform basic calculations of inventory requirements using simple inventory models.
5. Explain the cost of uncertainty and the value of actionable information in operational environments via fundamental theory, and propose practical ways for creating real options in such settings.
6. Understand the underlying logic behind the lean management philosophy.

Assessment and Grade Distribution

Percentage	Assignment/Case	Date	Group Size/Comments
10%*	Active class presence and contribution		Individual
5%	Technical Assignment:	By midnight prior to class Session #2	Individual
15%	A Retrospective Analysis of a Service System's Performance	Electronically: 24 hours prior to the beginning of session #3	In groups of 3-4 students
5%	Technical Assignment:	By midnight prior to class Session #4	Individual
5%	Technical Assignment:	By midnight prior to class Session #5	Individual
15%	Toyota case	Electronically: 24 hours prior to the beginning of session #6	In groups of 3-4 students
15%	HP DeskJet Supply Chain	Electronically: 24 hours prior to the beginning of session #7	In groups of 3-4 students
30%	Final exam		Individual

* According to University regulations, a student must be present in every lesson (Article 5). The lecturer reserves the right to have a student removed from a course if the student is absent from a class with mandatory participation or did not actively participate in class. (The student will remain financially responsible for the course irrespective of his/her removal from the course)

Course Assignments

Active class presence and contribution (10%): Class participation will consist mainly of voluntary contributions, although I may call upon students to encourage broader participation. Each person brings a unique set of experiences, a unique perspective and knowledge to the classroom, and I would like all class participants to tap into this diverse pool of resources and benefit from it. Therefore, we will have in-class discussions. Constructive contribution to the class discussions and active listening are important

elements of this course. It is therefore essential that you be fully prepared to participate actively in class. This means you must read the assigned material prior to the class session. Effective participation includes: (1) providing insightful questions and comments on concepts from lectures and readings; (2) sharing your experience or point of view with the class; (3) building on points raised by others; (4) clarifying issues; and (5) relating ongoing topics to previous class discussions. Please keep in mind that I will base your score on the quality of your comments and not their quantity.

Group Case Reports (45%): Three group reports are required during the course, and must be submitted via Moodle 24 hours prior to the beginning of the class sessions in which they are discussed. The work on the cases can be done in groups of 3-4 students only. The case questions/guidelines appear in the detailed course plan below (or in the body of the case). Late submission will not be accepted!

Individual Technical Assignments (15%): Three technical assignments, primarily based on self-study, and “attempt-to-solve before learning”, will be assigned. These assignments are for individual work only, and their primary purpose is to get you into the spirit of what we shall learn in class. Grading on these assignments will be based on reasonable effort, a clear explanation of your approach and calculations, and (if called) your ability to explain to the rest of the class what you did in your analysis.

Final Exam (30%): Information about the location and time of the final exam will be communicated by the SOFAER program office. Details about the structure of the exam and the allowed materials will be communicated by the instructor in a timely fashion.

Should a student become unable to complete an assignment or course requirement, s/he must notify the TA of the course in advance via email.

Grading Policy

As of the 2008/9 academic year the Faculty has implemented a grading policy for all graduate level courses. This policy applies to all graduate courses in the Faculty, and will be reflected in the final course grade. Accordingly, the final average of the class for this course (which is a core course) will fall between 78-82%. This policy may result in a final grade that is above or below your “raw score” in the course.

Additional information regarding this policy can be found on the Faculty website.

Evaluation of the Course by Student

Following completion of the course students will participate in a teaching survey in order to evaluate the instructor and the course for the benefit of the students and the university.

Course Site (Moodle)

The Moodle course site will be the primary tool used to communicate messages and material to students. It is therefore recommended to periodically check the course site in general, prior to each session, and at end of the course. Presentation slides will be available

on the course site in a pdf format in the morning of each session (we do not encourage printing the slides, and we do not encourage reviewing the slides prior to the class session).

Implications for Business Ethics

Issues in business ethics will be discussed on the 6th (lean management) and 7th (resource flexibility) sessions. Specifically, we will discuss ethical issues pertaining to the usage of actionable information in processes, and operational aspects pertaining to social responsibility.

Course Outline*

Week	Date	Topic(s)	Recommended Reading	Submission/Preparation
1	Wed., May 12	Introduction to Operations strategy: A value-creation perspective	MSD 1, 2, (6)	None
2	Wed., May 19	Production constraints, resource utilization, and bottlenecks	MSD 3, (4)	Technical Problem Set #1 – Submit your answers via Moodle
3	Wed., May 26	Variability in processes and its impact on performance – Part 1	Case exercise: A Retrospective Analysis of a Service System’s Performance MSD 8	Group Case Analysis is due the night prior to the beginning of this class session. – Submit your answers via Moodle
4	Wed., June 2	Variability in processes and its impact on performance – Part 2	MSD 9, (5)	Technical Problem Set #2 – Submit your answers via Moodle
5	Wed., June 9	Resource deployment: Inventory management	MSD 12, 14, (7)	Technical Problem Set #3 – Submit your answers via Moodle
6	Wed., June 16	The Core Principles of the Lean Management Philosophy	Motor Manufacturing MSD 10, 11	Group Case Report (Toyota Motor Manufacturing) is due 24 hours prior to the beginning of this class session. – Submit your answers via Moodle
7	Wed., June 23	Matching supply and demand in an uncertain world: Resource flexibility and postponement strategies	HP DeskJet Supply Chain MSD 17, (13), (15)	Group Case Analysis (HP DeskJet) is due 24 hours prior to the beginning of this class session. – Submit your answers via Moodle

*Subject to change

** MSD refers to the recommended book. Chapters denoted in brackets are somewhat related to the session topics.

Required Reading

Three cases will be discussed in the course. You must thoroughly read all cases and be ready to discuss them in class.

Recommended Reading

A recommended book for this course is: ***Matching Supply with Demand***, by Christian Terwiesch & Gerard Cachon, 3rd Edition, McGraw-Hill, 2013. You may refer to earlier or later editions of the book. The recommended chapters for each session are listed in the detailed course outline below.

DETAILED COURSE STRUCTURE

Session 1: Introduction to Operations Strategy: A Value-Creation Perspective

The objective of this session is to define the scope of process (operations) management, and characterize the operational capabilities of business processes and their links to strategic success. Using a case study from the airline industry, we will illustrate the formulation of an operations strategy, and examine the challenge of coordination in complex operations environments.

Topics

- Part A: OPERATIONS MANAGEMENT – A PROCESS PERSPECTIVE
 - o Operations Management: A Definition; “Staple yourself to an order”;
Concurrent Engineering; “Manufacturing – missing link in corporate strategy”
- A BRIEF COURSE OVERVIEW
- Part B: COMPLEXITY (as time permits)
 - o The Operational complexity gap; “The Problem with Product Proliferation”
- Part C: STRATEGIC PERSPECTIVE
 - o Operations Strategy – Definition; Southwest Airlines case illustration

Optional Pre-readings

- **Course Outline** (this document)
- **MSD Chapter 1 (Introduction)**
- **MSD Chapter 2 (The Process View of the Organization)**

Session 2: Production Constraints, Resource Utilization, and Bottlenecks

During this session you will learn how to conduct a simple resource utilization analysis, examine the importance of identifying and managing bottlenecks in processes, and understand the “wandering/shifting bottleneck” phenomenon.

Topics

- Part A: MOTIVATION
 - o Types of process capacity analysis; Sales and Operations Planning
- Part B: A BASIC CAPACITY REQUIREMENT ANALYSIS
 - o An example: Operational Planning at Towerton Financial; Capacity requirement calculations; Resource utilization, and implied utilization
- Part C: BOTTLENECKS
 - o A simple model of production; Process capacity; Bottlenecks
- Part D: THE WANDERING BOTTLENECK – CAPACITY EXPANSION

Technical Problem Set #1 (5%): Capacity Analysis

A few short problems on the subject of capacity analysis will be posted on the course’s web page 4-5 days prior to this session. The problems should be solved

individually, and submitted by midnight prior to this class session. Late submission cannot be accepted.

Since the material is not taught in advance, we will not require your answers to be perfectly correct, but you will need to show your calculations, and be ready to explain your solution approach in class, if called to do so.

Optional Pre-readings

- **MSD Chapter 3 (Understanding the Supply Process...)**

Session 3: Variability in Processes and its Impact on Performance – Part 1

During this session you will understand the adverse impact of variability on process performance and process capacity. Using a case exercise, we will learn about the interplay between capacity deployment and process responsiveness. We will also present a basic model of queues, named the “Erlang Model.”

Topics

- PART A: MOTIVATION
- PART B: PREDICTABLE DEMAND VARIABILITY
- PART C: UNPREDICTABLE (RANDOM) DEMAND VARIABILITY
 - o The Erlang Model of Queues

Case

- **A Retrospective Analysis of a Service System’s Performance**

(Note: The case exercise, written by the instructor, will be posted on the course’s web page a week in advance of this session.)

This is a short case exercise that describes a performance problem encountered by a service center. The case requires the students to examine a data set containing the timings of customer arrivals to the center, and their processing time (by the center). Via some sort of retrospective quantitative and qualitative analysis, students are asked to explain the drivers for the problems in the system, and propose potential ways to improve performance.

Optional Pre-readings

- **MSD Chapter 8 (Variability and Its Impact on Process Performance: Waiting Time Problems)**

Group Assignment #1 (15%)

- Read the case exercise, and address the questions presented therein. Submit your answers to the questions via the course’s web site by the indicated due date. Format: 2-5 pages; PDF file format; font size 11-12. Do not forget to write your names on the assignment; one submission per team.
- Note: this case assignment is used in EMBA courses, and it is hence a bit vague and unstructured, by design. In particular, the case requires you to conduct an analysis prior to learning about the session material. Thus, we are not necessarily looking for a particular type of a technical analysis, nor do we expect specific proposals for ways to enhance performance. We are primarily looking for “good thinking” that blends quantitative (statistical) analysis with a coherent and clear

presentation of your: (i) interpretations of the root problems; and (ii) your proposals for improvement.

Session 4: Variability in Processes and its Impact on Performance – Part 2

We will continue studying the managerial insights emerging from the basic waiting-line theoretical model known as the *Erlang Model*. We will also discuss the problem of overproduction and learn about an operational mechanism to prevent it.

Topics

- Part A: THE ERLANG MODEL (CONT.)
 - o The impact of load (server utilization) on customers' waiting experience; Benefits of improving operational efficiency; Impact of variability reduction.
- Part B: OVER-PRODUCTION -- A MOTIVATING EXAMPLE
- Part C: THE PULL MECHANISM AND THE KANBAN SYSTEM
- Part D: CAPACITY LOSS DUE TO VARIABILITY.
 - o The matchstick game

Technical Problem Set #2 (5%): The Erlang Model

- A few short technical questions on the Erlang Model will be posted on the course's web page 4-5 days prior to this session. The problems should be solved individually, and submitted by midnight prior to this class session. Late submission cannot be accepted.
- Since the material is not taught in advance, we will not require your answers to be perfectly correct, but you will need to show your calculations, and be ready to explain your solution approach in class, if called to do so.

Optional Pre-readings

- **MSD Chapter 9 (The Impact of Variability ... Throughput Losses)**
- *A related topic, not covered in class: MSD Chapter 5 (Project Management)*

Session 5: Fundamental Principles of Inventory Deployment

The purpose of this session is to cover fundamental principles of inventory management. In this session we shall discuss the mismatch costs that arise in operational settings in which resource commitments are made in the presence of uncertainty. We will introduce a theoretical framework named the "Newsvendor Model."

Topics

- Part A: CONSIDERATIONS IN INVENTORY MANAGEMENT
 - o Reasons for holding inventory; Costs of inventory; Types of inventory
- Part B: THE NEWSVENDOR MODEL
 - o Expected mismatch cost; Cost of uncertainty; The Newsvendor Model
- Part C: AVAILABILITY-BASED INVENTORY PLANNING
 - o Measures: Cycle Service Level (CSL) and Line-Item Fill Rate (LIFR)

Technical Problem Set #3 (5%): Inventory Management

- A few short technical questions on inventory management will be posted on the course's web page 4-5 days prior to this session. The problems should be solved individually, and submitted by midnight prior to this class session. Late submission cannot be accepted.
- Since the material is not taught in advance, we will not require your answers to be perfectly correct, but you will need to show your calculations, and be ready to explain your solution approach in class, if called to do so.

Optional Pre-readings

- **MSD Chapter 12 (Betting on Uncertain Demand...)**
- **MSD Chapter 14 (Service Levels and Lead Time....)**
- Related Reading: **MSD Chapters 7 (Batching and Other Flow Interruptions...)**
16 (Revenue Management with Capacity Controls)

Session 6: The Core Principles of the Lean Management Philosophy

A large number of organizations across the globe have attempted to implement lean management initiatives, with drastically varying results. Unfortunately, many managers hold wrong perspectives about the true meaning of lean. In this session we shall introduce and discuss the fundamental principles of the Lean Management philosophy. To do so, we shall look at it from the perspective of its origin: the Toyota Production System (TPS).

Topics

- Part A: WASTE ELIMINATION AND TYPES OF WASTE
- Part B: THE TOYOTA PRODUCTION SYSTEM (TPS)
- Part C: JUST-IN-TIME PRODUCTION
- Part D: JIDOKA

Case

- **Toyota Motor Manufacturing**

The Toyota case describes a problem with the seats installed in the plant's sole product -- Camry. While we will talk about this issue in class, this will not be the center of our discussion. Rather, the main objective is to discuss the principles of the Toyota Production System (TPS).

Optional Pre-readings

- **MSD Chapter 10 (Quality Management) 11 (Lean Operations and the Toyota Production System)**

Group Assignment #2 (15%)

Read the Toyota Motor Manufacturing case, and be ready to discuss the following questions. Submit your answers to the questions below via the course's web site by the night prior to the session. Format: 2-3 pages PDF file; font size 11-12. Do not forget to write your name on the assignment.

1. Consider the concept of Just-in-time (JIT). What does it mean? To what extent does Toyota provide cars to its customer, in a "just-in-time" fashion, according to the case?
2. Is the JIT concept suitable for a non-manufacturing setting, such as a start-up company, or a retail organization?
3. What is the "Andon cord"? What is its purpose? Do you believe that the way in which it is implemented in the Toyota assembly line is reasonable?
4. Consider the seat problem. Where, if at all, does the current routine for handling defective seats deviate from the principles of the Toyota Production System?

Session 7: Achieving Flexibility via Resource Pooling and Postponement Strategies

The purpose of this session is to introduce students to some of the operational considerations in implementing resource pooling. Using a classic and famous case in supply chain management – the HP DeskJet case – we will introduce the concept of postponement strategies, and explore their applications in a variety of business contexts.

Topics

- Part A: A RESOURCE POOLING EXAMPLE USING THE WAITING LINE MODEL
- Part B: A RESOURCE POOLING EXAMPLE USING AN INVENTORY POSITIONING MODEL
- Part C: RISK POOLING AND POSTPONEMENT STRATEGIES

Case

- Hewlett-Packard Co.: DeskJet Printer Supply Chain (A)

Hewlett-Packard's (HP) Vancouver Division faced a challenge in 1990. Although its new inkjet printers were selling well, inventory levels worldwide were rising as sales rose. In Europe, high product variety was making inventory levels especially high. HP considered several ways to address the inventory issues.

Optional Pre-readings

- Related Readings: **MSD 17 (Supply Chain Coordination)**
- Related reading: **MSD Chapters 13 (... Quick Response with Reactive Capacity), 15 (Risk-Pooling Strategies...)**

Group Assignment #3 (15%)

Read the HP DeskJet case and be ready to discuss it in class. Submit your answers to the questions below via the course's web site by the indicated due date. Format: 2-3 pages; PDF file format; font size 11-12. Do not forget to write your names on the assignment; one submission per team.

1. What are the possible root-causes for the "Inventory/Service Crisis" mentioned in the case? Think deeply about this question, as there could be many causes for this crisis.

2. One of the initiatives considered by HP was to “localize” the printers in Europe rather than at the factory in Vancouver. This strategy is one of the classic examples of the concept of “design for postponement (DFP),” also known as “delayed product differentiation.” In what way could the proposed “delayed product differentiation” strategy help HP resolve its inventory-service crisis? What would be the key challenges HP is likely to face in implementing DFP?
3. Suppose you had to write an article that would serve as a guide for supply chain managers in identifying suitable candidates (i.e., product categories) for delayed product differentiation (postponement). List 5-8 types of key considerations (factors) that influence the potential benefits of postponement, and explain how so. Use a short and separate paragraph (2-3 lines) for each consideration.