

## IE 460 Spring 2019 Information on Final Exam

Final Exam will take place on May 18<sup>th</sup>, 2019 Saturday, 17:30, at EB-201,EB-202.

All topics covered are included in the exam. The detailed outline of the course was posted at the course WEB site earlier. The following gives a detailed account of the readings and parts included for this exam:

### 1. Introduction

#### Required Reading:

Chapter 1 Chopra and Meindl (2016) – I almost completely covered the first three learning objectives mentioned in Section 1.7 in class.

Chapter 2 Chopra and Meindl (2016) – I have not covered the material in class. However, the material is becoming more and more relevant as we are going through the topics in detail.

Chapter 3 Chopra and Meindl (2016) – I have not explicitly covered the material. However, we have been talking and considering the issues mentioned in all learning objectives summarized in Section 3.10.

#### Optional Reading:

Background: (IE375 material) Chapter 7 Chopra and Meindl (2016) – Forecasting

Background: (IE375 material) Chapter 8 Chopra and Meindl (2016) – Aggregate Production Planning

2. *Issues of Cycle Inventory - Review (ABC Analysis, EOQ), Joint Replenishment Problem, Multi-Echelon Inventory Problem under Continuous Review (Two-Stage), Price Discounting*

#### Required Reading:

Chapter 11, Chopra and Meindl (2016) – I almost completely covered the all except Section 11.6 in class and more. You are not responsible for 11.6.

#### Optional Reading:

Background: (IE375 Material to be build up for this course topics) Chapter 4, Chapter 2 – 2.11, 2.13 - Nahmias and Olsen (2015)

Chapter 5, Silver et al (1998) – Review Material

Chapter 12.1-12.3, Silver et al (1998) – multi-echelon system covered in class.

Monahan (1984) – “Quantity Discount Pricing Model to Increase Vendor Profits”, *Management Science*, Volume 30, Number 6, pp. 720-726, 1984 (pdf available at the course WEB page) - covered in class.

3. *Issues of Optimal Inventory under Uncertainty – Review (Newsvendor Problem);*

*Contracting structures and Coordination issues – Application to the single-period, stochastic demand environment; Safety Inventory*

#### Required Reading:

Chapter 13, Chopra and Meindl (2016) – Section 13.1, 13.2 – pp. 373-380 (until the end of Example 13-2, page 380) is covered in class. Remaining material is an application of IE375, service level concept.

Chapter 15, 15.1 through 15.6, Chopra and Meindl (2016) – I have not covered the material in 15.1 through 15.4 explicitly. However, I used those parts to build up the discussion in class. Therefore, you are responsible for those parts as well. Additionally, I mentioned more contractual types in class, including Pasternack (1985).

Pasternack, B. A., “Optimal pricing and return policies for perishable commodities”, *Marketing Science*, 4, 166-176 (1985) (pdf available at the course WEB page)

Chapter 12, Chopra and Meindl (2016)

#### Optional Reading:

Background: (IE375 Material) Chapter 5 - Nahmias (2015)

Background: (IE375 Material) Chapters 7-10, Silver et al (1998)

Remaining parts of Chapter 15, Chopra and Meindl (2016)

Eppen, G. P., “Effects of centralization on expected costs in a multi-location newsboy Problem”, *Management Science*, 25, pp. 498-501, (1979) (pdf available at the course WEB page) (presented in class)

### 4. Transportation issues in Supply Chain.

Required Reading: Chapter 14, Chopra and Meindl (2016)

Optional Reading: Lee, C., “The Economic Order Quantity for Freight Discount Costs”, *IIE*, 318-320 (1986).

### 5. Bullwhip effect

Required Reading: Chapter 10, Chopra and Meindl (2016)

Optional Reading: Chapter 17, Chopra and Meindl (2016)

Optional Reading: Lee, H.L. Padmanabhan, V. and Whang, S., “Information Distortion in a Supply Chain: The Bullwhip Effect”, *Management Science*, Vol: 43, No: 4, 1997, pp. 546-558 (pdf available at the course WEB page)

### 6. Issues of inventory aggregation – Risk-pooling, Advantages of Centralization, Introduction to Distribution Systems

Required Reading: Chapter 4, and Chapter 12 Chopra and Meindl (2016),

Optional Reading: Eppen, G. P., “Effects of centralization on expected costs in a multi-location newsboy Problem”, *Management Science*, 25, pp. 498-501, (1979) (pdf available at the course WEB page)

Required Reading: Nozick, L.K. and Turnquist, M.A., "Inventory, Transportation, Service Quality and the Location of Distribution Centers", *EJOR*, Vol: 129, 2001, pp. 362-371 (pdf available at the course WEB page)

**7. Inventory Positioning - Multi-Echelon Stochastic Inventory Problem under Continuous Review**

Optional Reading: Chapter 12.4, Silver et al (1998)

**8. Designing Supply Chains**

Required Reading: Chapter 5, Chopra and Meindl (2016)

Optional Reading: Chapter 6, Chopra and Meindl (2016)

**9. Issues of Postponement**

Required Reading: Chapter 12 and Chapter 13, related pages, Chopra and Meindl (2016).

For all items above you are responsible for the material and models covered in class. For Item 9 – postponement, we have not covered any mathematical models – this was the only part I couldn't cover in class, despite I planned.

You are expected to go over the Comments for Exam 1, all HW and Cases for not only finding out possible approaches to the problems asked in the homework, but for other general hints and statements of general expectations, as well. Especially, expect to be asked about the material covered in cases.

More information on the exam is presented below:

- (1) Please, read the questions carefully. Do not try to figure out the pattern of the question compared to what you solved before, as there is probably no resemblance.
- (2) If you cannot solve a part of a problem, and you think you need the solution of the part to go ahead for the next part, define a parameter for the value and proceed with that parameter.
- (3) Numerical problems may be asked. I advise you to be systematic in computations – write the formula you are using and then start to play with number. If you only have numbers and incorrect solution (or nothing but just a final number and even correct solution), you will never get the full grade.
- (4) You are not expected to memorize any formula or procedure (algorithm) like "solution techniques", as they will be supplied in the exam, **without any explanation**. Additionally, you are not allowed to ask any questions about the meaning of those symbols in the formula or procedures supplied. This means you are expected to understand the logic of those beforehand. The supplied information is just to make sure that you do not miss anything.
- (5) Modeling questions will likely to be asked. Always define whatever symbols you are using. If you think that you need some assumptions or new definitions, state them clearly and explain the reason why you needed those. Additionally, more conceptual questions will be asked. You are expected to make concise explanations when necessary.
- (6) Time usage in the exam will probably be important. Try to concentrate on questions. You will not be allowed to ask any questions during the exam; except asking the meaning of some words that you may not know.
- (7) No definitions will be asked, so you do not need to memorize any. However, you need to understand the definitions, as the questions may explicitly or implicitly ask for those.
- (8) The exam will be closed book, closed notes. No cellular phones will be allowed. You should have phones switched off and put them away during the exam. You will need a calculator for the exam. You have to have your own calculator and other necessary supplies; **SHARING IS NOT ALLOWED**.
- (9) Exam Duration: usually around 120 minutes. However, the exact duration will be decided once the questions are set. Please do not ask – we will announce the duration in the classroom before we start the exam.