RUTGERS - THE STATE UNIVERSITY OF NEW JERSEY
Rutgers Business School – Newark and New Brunswick

Operations Analysis
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Spring 2014

Dr. Yao Zhao
Associate Professor
Department of Supply Chain Management & Marketing Sciences
1 Washington Street, Room 972, Newark Campus

Phone: 973-353-5017
Fax: 973-353-1325
Email: *yaozhao@andromeda.rutgers.edu*

Course Outline
The objective of this course is to introduce models and tools to efficiently manage operations that produce and distribute products and services. Topics include *Forecasting*, *production and logistics*, *inventory management*, and *project management*. We illustrate the effectiveness of these models and tools by real-life cases and examples drawn from industries such as manufacturing, transportation, pharmaceutical, fashion and healthcare.

Lectures
Tuesdays 6:40 – 9:40pm. 100 Rock (BRR) – 5101.

Textbook
Suggested: *Production and Operations Analysis,* S. Nahmias, McGraw-Hill/Irwin ($\geq$2004, 5e), ISBN 0-07-286538-5. Abbreviated as *SN*.

Required: A *Case-pack* is required for the course. Instructions and ordering information will be announced in Week 1 of the semester

Office hours
Myself: Tuesdays 5:40-6:40pm. For appointment, by email request
TA (Anh Ninh, ninhtuananh@gmail.com): Tuesdays 5pm-6:40pm.

Software
In this course, we will use *Microsoft Excel* extensively. Either *Excel 2003, 2007 or 2010* will be fine. Please install the following Excel Add-Ins before class starts: "Analysis ToolPak" and "Solver Add-in".

Teaching Method
The course will be taught using PowerPoint presentations and case studies. In each week, we will complete one lecture and all the associated readings, case studies, exercises and homework (see attached weekly schedule). Class-related material (lecture notes, videos, homework and solutions, etc.) will be posted on Blackboard. Students should be enrolled in Blackboard to access the posted materials. The URL is: **http://blackboard.rutgers.edu**.

Grading

A mid-term exam will cover the first half of the semester's materials, and a final exam will cover the rest. In addition, there will be homework assignments and a term project with an in-class presentation (see term project). The weights for course work components are given below.

Class summary	5%
Class participation	10%
Mid-term	15%
Project & Presentation	20%
Homework Assignments	25%
Final	25%
Bonus	1% each successful volunteering work
TOTAL:	≥100%

Class Summary

At the second last class, students are required to hand-in a class summary which includes
- o What did you learn in this class.
- o Which topic/example/case study you find more interesting and relevant.
- o List two applications in your work/life that you can apply the models/tools to.
- o Topics and subjects you like to cover but not covered in class.

Homework Assignments

Homework assignments should be typed and handed in paper copies in class. Be sure to put your name and contact information (email and optional telephone) on all homework submitted. Team work is expected for *some* assignments (to be specified in lectures), but team members must specify on the homework the percentage of work done by each of its members (for example, if everyone contributes equally in a 4-student team, then the percentage of work done by each student is 25%).

Assignments of a class are due by the next class, unless otherwise stated. Penalty for late submission (within one week) is 40% of the points allocated to the assignment. **Submission will not be accepted if it is more than one week late**.

Term Project

A term project on an operations-related topic is a necessary part of the course. Each project should be a team effort of 4-5 people. Please select your team members in the first two weeks. Each project team will select a topic of interest (following the guidelines listed below), make a proposal (on the story, the problem, and your solution approach) and make a thorough presentation for about 10-15 minutes towards the end of the semester (see weekly schedule for dates). Every team member must present (detailed requirements for the project are noted below). **Each team member must specify his/her percentage of contribution on the final submitted work. The project will be graded as a whole but each team member's grade also depends on his/her contribution.**

Select one of the two formats below (an operations-case or an operations-technology), and follow carefully the reporting instructions. If you want to do a project that does not obviously fall within the suggested categories, please contact me for permission. In any event, please select a topic that will be a benefit to the class. You may be as original and creative about the topic as you can be, but please keep your fellow classmates in mind.

I. Operations-Case

Describe an operations–related problem, present data and facts, apply the methods/tools of this class and show how it can be solved. Please also include and be prepared to discuss implementation issues. You can draw on your own work experience (that would likely be most interesting to the class) or study a case appeared in the literature or press. Avoid the very popular press or a shallow source. Rather, look for a serious professional article, such as a financial magazine (Wall Street Journal, New York Times, BusinessWeek), economics magazine, or a trade magazine (Sloan Management Review, Supply Chain Management Review, Inbound Logistics, etc.).

II. Operations-Technology
First, select a novel operations technology, and describes its contribution (or projected contribution if really new) to the current state of the operations art. It would be most useful if you have been exposed to that technology on your job, and can report on first hand. Examples of technologies of interest are sourcing and procurement strategies, manufacturing operational strategies, distribution strategies, supply chain information systems, electronic commerce, or anything else that is of interest to you and would likely interest class members, but within the domain of operations. If in doubt, contact me.

Second, **research the current state of the chosen technology** and summarize it in your report. Find out the current or emerging commercial "players", and look at their future technological directions. Based on at least three sources (ordinary articles or Web pages, to be referenced in your report), address at least the following points using **data and facts**:
- What are the key technical and economical aspects of the technology which benefit the marketplace (consumers of this technology, both individual and corporation)?
- Who are the current "movers and shakers" in this area? Compare and contrast their technological and business approaches, products, etc.
- What are the current impediments to their approaches for acceptance in the marketplace? Examples are ease of use, price, technological longevity, etc.

Third, based on the current state of the technology, **express your personal opinion and conclusions on the future** of the chosen technology and its applications. Make sure your arguments are logical and backed by your research; you are encouraged, however, to voice opinions gleaned from your personal "crystal ball" (convictions and intuition), but be reasonable (and brief…). You may attach to your report supporting material, such as graphs and charts. Remember, anybody can collate material from the Web, but it is more difficult to analyze such material and reach conclusions. Analysis and conclusions will be the components of your term project most heavily weighted.

Note: You should **_not_** cut-and-paste verbatim material from Web pages or copy verbatim material from any other sources, unless you use that material as exact quotes. In that case be sure to enclose any pasted text material in double quotes and to provide an exact reference for it! All pasted graphs and charts should also be properly referenced. If you are unsure about referencing materials, please see the Academic Integrity information on Blackboard and/or the Academic Integrity at Rutgers webpage.

III. Submission
The project is due in the penultimate week of the course (see weekly schedule). We will have in-class presentations so that teams can learn from each other. Prior to the presentation, each team should submit three (3) documents through Blackboard:

(1) A PowerPoint file for the presentation

(2) A Word document that includes background story, assumptions, the model, the solution, the interpretation and citations
(3) An Excel file with all data and the calculations

A space will be created in the Assignment area of Blackboard where your project documents are to be submitted.

Class Schedule (tentative)

Sessions	Topics covered	Assignments
1 [1/21]	**Introduction** *(SN, Chapter 1)* Course policy, Overview	• Readings, to be posted at Bb
2 [1/28]	**Forecasting I** *(SN, Chapter 2)* Time series models, Simple linear regression for trends	• HW 1 assigned
3 [2/4]	**Forecasting II** *(SN, Chapter 2)* Multiple Regressions: Forecasting the box-office revenue of new movies	• HW 1 due • HW 2 assigned
4 [2/11]	**Linear Programming Modeling & Solution** *(SN, Supplement 1)* LP formulation, Excel solution	• HW 2 due • HW 3 assigned
5 [2/18]	**Linear Programming Sensitivity Analysis & Real-World Applications** *(SN, Supplement 1)* Sales & Operations Planning, Workforce Planning, Transportation	• HW 3 due • HW 4 assigned
6 [2/25]	**Integer Programming** *(SN, Supplement 1)* Modeling & Formulation: Project selection, Logistics network design, *Case study – C&H Logistics*	• HW 4 due • HW 5 assigned • Reading: *C&H logistics*
7 [3/4]	**Mid-term exam**	
8 [3/11]	**Project Management I** *(SN, Chapter 9)* Critical path method *Case study – American Royal Financial*	• HW 5 due • HW 6 assigned • Reading: *American Royal Financial*
9 [3/25]	**Project Management II** *(SN, Chapter 9)* Crashing, project evaluation and review technique, Critical chain project mgmt.	• HW 6 due • HW 7 assigned
10 [4/1]	**Inventories – Fashion Items** *(SN, Chapters 4 & 5)* Inventory management overview Newsboy models, Fashion industry examples	• HW 7 due • HW 8 assigned
11 [4/8]	**Inventories – Cycle Stock & Safety-Stock** *(SN, Chapters 4 & 5)* *Case study – ImportHome, LLC* Cycle stock model, Safety-stock model	• HW 8 due • HW 9 assigned • Reading: *Importhome LLC*
12 [4/15]	**Project Proposal & Course Review**	• Project proposal due • HW 9 due
13 [4/22]	**Student Project Presentation**	• Project due
14 [4/29]	**Final exam**	