Geza Bottlik **ISE310L Facilities and Logistics** **Spring 2016**

12/17/2015 Revised 01/17/2016

Instructor:	Geza Bottlik, E-mail: bottlik@usc.edu
Office Hours:	Mondays/Wednesdays, 3:30 P.M. – 4:45 P.M., Room GER 202 Phone 213 740 – 5050 or by appointment.
TA:	John Franklin jpfrankl@usc.edu
TA Office Hours:	TBD
Class time/place:	Mondays/Wednesdays 12:30 P.M. – 1:50 P.M., Room VPD 105
	Lab hours Tue/Thu 11:00 – 1:50, Friday GER 309 Starts 09/01/15
Web Page:	http:// www.gezabottlik.com - Lecture notes, assignments, solutions and grades. https://blackboard.usc.edu - for uploading assignments

Pre-Requisites:

ISE 330, 460. You must have these pre-requisites to enroll in this class. You will be expected to apply methods from these courses in your homework and projects.

Test Schedule:

Midterm 1:	Wednesday, February 17, 2016	12:30 P.M. –1:50 P.M.
Midterm 2:	Monday, April 4, 2016	12:30 P.M. –1:50 P.M.
Final:	Friday, May 6, 2016	11:00 A.M. – 1:00 P.M.

The midterms and final will be based on lectures, discussions in class, homework and quizzes. **All tests and quizzes are open book and open notes and laptops**. Students are expected to **apply** what they should have learned up to that point to analyzing situations, identifying the problems and applying the appropriate techniques to solve them or interpreting computer solutions.

Assignments:

Readings, problems and software exercises will be included in each week's assignment. These are assigned on Monday and are due on the following **Sunday at midnight on the assignment manager on Blackboard.** We will return the assignments electronically only if there are any points taken off. Reading assignments are due when the material will be covered in class. It is imperative that you **prepare for class** -- you will find it extremely difficult to follow the discussion if you have not read the material.

I will **not accept** late homework, unless **prior** arrangements have been made (e.g. out of town funeral). Homework is to be a **digital Word (or Excel) 97 or later file**. Do not type results into spreadsheets – use formulas. If it is a team assignment, the team members' names, assignment number, the date and any other team that you worked with must be in the **header**. Use a consistent template and format the output for a professional appearance. A sample will be available on the web site. File names are assigned by the assignment manager. Use the shortest possible title for your file –e.g 310_1. **There can only be one file per homework. (no zip files)**.

The assignments should be as professional in appearance as if you were preparing reports at work or for publication. Clearly label the problem number and your conclusions for each problem, followed by the supporting calculations. **The problems must be in the order assigned. Out of sequence problems will receive no credit.**

Assignments will be either individual or team. If two teams discuss or collaborate on a homework, they must indicate that on their assignments. Each team must turn in a separate homework. Generated data and essay questions must be unique to each team.

It's OK to work on individual homework together, but finish it by yourself and indicate with whom you worked. For individual homework each student must turn in a separate homework. Generated data

and essay questions must be unique to each student Do not give your files to others and do not use others' files. Do not copy problems. Homework files will be named by the assignment manager in addition to your file name, so keep it short as indicated above, otherwise I have to truncate it to be able to open it. The same rules apply among teams for team assignments. **If the answer is given in a book, don't just copy it, explain how you got it.**

Objectives and Content

This course introduces students to strategic issues in the design of production and distribution systems. ISE 410, which covers tactical and operational issues in these systems, such as scheduling, inventory control and operational planning, follows this course.

The focus is on design issues accompanying major investment in facilities, emphasizing the layout of facilities and the location of facilities. Another emphasis is on transportation of products between and within facilities. Finally, students will be exposed to the basics of supply chain management.

ISE 310L includes a strong element of exposure to software in both facility layout and facility location. In both areas, students learn professional level software. AutoCAD will be used for layout design and analysis, and ArcView (a-geographic-information-system) will be used for facility location. Both packages provide spatial representation and analytic features.

Lastly, students will develop their technical communication abilities through two course projects, one for facility planning and the other for facility location.

It is up to you to become familiar with and learn the mechanics of the material in the texts. I am here to explain things you don't understand, to add things that are not in the books, and to evaluate whether you can apply the material to real problems.
The lecture and class discussion is a supplement to what is contained in the books. It is NOT intended to be a duplication of what is contained in the books.

I am looking forward to an intellectually stimulating and rewarding semester with you.

Quizzes:
We will have approximately 9 quizzes during the semester. I will let you know the week before if there will be a quiz the following week. These are short, usually with one or two problems or about 10 True and False or fill in the blank. The lowest grade will be dropped. There are no makeup quizzes.

Required Texts:

Facilities Planning and Design. – Garcia-Diaz, A. and Smith Macgregor, Prentice Hall
Supply Chain Management, Sunil Chopra and Peter Meindl, Prentice Hall

Grading:

Team Projects	~16%	16 points	8 pts each
Homework	~15%	15 points	1 or 1.5 pts each (- 0.5 if not submitted)
Laboratory	~10%	10 points	(by the TA) 1 point each (- 0.5 if not submitted or made up)
Midterm Exam 1	~9%	9 points	
Midterm Exam 2	~12%	12 points	
Final Exam	~21%	21 points	
Participation (Attendance, **discussion**, **preparedness for class, in class feedback**)	~5%	4.8 points	0.2 pt. each, drop 2 lowest
Quizzes	~12%	12 points	1.5 pt. each, drop 1 lowest

The grade for the course will only be based on the required work listed above and cannot be improved with additional work. Note that the average difference between adjacent grades is less than 1%.

References: **Miller & Freund's Probability & Statistics for Engineers**, Richard A. Johnson, Prentice-Hall, 1994 [A very clear and straightforward book – I used it for a two semester course in probability and statistics]
Introduction to Operations Research, Hillier, Frederick S And Lieberman, Gerald J, Mcgraw-Hill, 1995
Contemporary Engineering Economics 3rd Ed. - C. S. Park. Menlo Park, CA, Addison Wesley Publishing Company (www.prenhall.com/park or www.eng.auburn.edu/~park/cee.html

Projects:

There will be two projects. Each project will be done by a team of students (four or five members). Team members will receive identical grades except as modified by peer evaluation of the level of contribution and the executive summary. The purpose of the projects is to familiarize students with the process of selecting a problem, defining an approach, gathering data, analyzing the data and presenting them, drawing conclusions and discussing the results, as well as evaluating performance

Much of your career will be spent generating reports by which you will be judged, so this is good practice. Consultation with the instructor and the TA is encouraged.

The reports are limited to no more than 6 (double spaced font 12), single sided 8 1/2 by 11 format, submitted as a digital **Word 97 or more recent** files by 03/13/16 at midnight and 04/29/16. A good minimum is 5 pages (These limits do not include title, reference and summary pages). Extensive data should be placed in an Appendix beyond the regular pages.

The report must include:

- A cover page with name, title and summary not to exceed the page
- Text containing definition, development of the topic, analysis and conclusions
- References (books and articles): title, author, publication, date, volume and pages

The projects are required. If you do not turn them in by the final, you will receive an F for the class. Details for the projects are at the end of this syllabus.

Approximate Course Outline:

Session	Date	Material	Homework No. due
01	01/11	Introduction and Organization	
02	01/13	Supply Chain overview - Chopra Chapter. 1	
03	01/20	Garcia Chapter 1 & 2– Facilities Planning and project	No. 1
04	01/25	Chopra Chapter 2 – Performance, Quiz 1	No. 2
05	01/27	Chopra Chapter 3 – Drivers	
06	02/01	Chopra Chapter 4 – Design Quiz 2	No. 3
07	02/03	Chopra & Garcia Chapter 5 – Network Models	
08	02/08	Chopra & Garcia Chapter 5 – Network Models Quiz 3	No. 4
09	02/10	Review, Project discussion Chopra Chapter 6 – Uncertainty	
10	02/17	Midterm 1	
11	02/22	Review Midterm, Chopra Chapter 6 – Uncertainty	No. 5
12	02/24	Chopra Chapter 14 – Sourcing Quiz 4	
13	03/02	Chopra Chapter 14 – Sourcing	No. 6
14	03/04	Garcia Chapter 3 Product, Process Planning, Quiz 5	
15	03/09	Garcia Chapter 4 – Layout Planning	No. 7
16	03/11	Garcia Chapter 4 Quiz 6, Project one due 3/13	
17	03/23	Garcia Chapter 6 – Layout procedures	
18	03/25	Garcia Chapter 6 – Layout procedures Quiz 7	
19	03/30	Garcia Chapter 6, Review	
20	04/04	Midterm 2	
21	04/06	Review midterm 2 Garcia Chpt 7&8 – Material Handling	No. 8
22	04/11	Garcia Chapter 7&8 – Material Handling Quiz 8	
23	04/13	Garcia Chapter 9 – Storage Quiz 9	No. 9
24	04/18	Garcia Chapter 9	
25	04/20	Garcia Chapter 11 – Offices and Support	No. 10
26	04/25	Garcia Chapter 11 – Offices and Support Quiz 10	
27	04/27	Review, Project 2 due 4/29	No. 11
Final	05/08	Final	

ALWAYS BE SURE TO GIVE THE SOURCE OF ALL YOUR INFORMATION. ANYTHING TAKEN VERBATIM FROM SOMEONE ELSE MUST BE IN QUOTATION MARKS AND REFERENCED. (This includes partial sentences!)

This is intended to be an interactive class and your participation should increase as the semester progresses. Attendance at **all** classes for the **whole** class is expected of everyone. Frequent absences will result in a reduction in grade. Punctuality is expected. If you are late, be sure not to disturb the class as you enter. The use of iPhones, laptops, iPads or similar devices in class is strongly discouraged.

PLEASE DO NOT BRING FOOD OR DRINKS TO THE CLASS. BEVERAGES IN PLASTIC CONTAINERS ARE OK. NEATNESS, SPELLING, AND GRAMMAR COUNT. THEY ARE AN EXPRESSION OF YOUR COMMITMENT TO DO A GOOD JOB. USE THE TOOLS IN WORD AND EXCEL!

12/17/2015 Revised 01/17/2016

Laboratory Schedule (Attendance is Mandatory; Must Attend on Assigned Day)

Session	Lab Material	Date - Tue	Date - Thu	Date - Fri
1	Lab Introduction, ArcView Lab 1	01/19/16	01/21/16	01/22/16
2	ArcView GIS Lab 2	01/26/16	01/28/16	01/29/16
3	ArcView GIS Lab 3	02/02/16	02/04/16	02/05/16
4	ArcView GIS Lab 4: Exercise	02/09/16	02/11/16	02/12/16
5	ArcView GIS Answer and Questions	02/16/16	02/18/16	02/19/16
6	AutoCad Lab 1	02/23/16	02/25/16	02/26/16
7	AutoCAD Lab 2	03/01/16	03/03/16	03/04/16
8	Factory CAD Lab 1	03/08/16	03/10/16	03/11/16
9	Factory CAD Lab 2	03/22/16	03/24/16	03/25/16
10	Factory FLOW Lab 1	03/29/16	03/31/16	04/01/16
11	Factory FLOW Lab 2	04/05/16	04/07/16	04/08/16
12	Factory PLAN Lab	04/12/16	04/14/16	04/15/16
13	Project time	04/19/16	04/21/16	04/22/16

Project 1

You can use the teams you had for the homework to date, or form new ones. Everyone must be on a team.

Grading

Both project grades will be divided into five categories:

1. Executive Summary 15%
2. Peer evaluation 10%
3. Technical Accuracy and Completeness 30%
4. Creativity in Method and Solution 30%
5. Organization of report as a whole 15%

For each category, you will be graded on a 1 - 10 scale, where 10 represents exceptional work, 7.5 represents average work, 5 represents passable but below average work, and 3 represents a substantial deficiency. The project grade will be a weighted average of the grades for the separate elements.

A single group grade will be assigned for elements 3 - 5. The executive summary and peer evaluation

grade will be assigned on an individual basis, and each person in the group should turn in his/her own executive summary and peer evaluation. Team members should not collaborate at all on their executive summaries. These will be graded on the basis of quality of writing, clarity and organization. Team members should also not collaborate on the peer evaluation. If you rate everyone the same, you will lose part of the credit for doing the peer evaluation.

The technical accuracy grade will depend on errors in analysis, and whether the analysis was complete. A project will be graded down if there are omissions, mistakes in the application of methods, or application of inappropriate methods.

The creativity grade will be based on the uniqueness of the approach and the solution, as well as the quality of the solution obtained. The projects do not have a single right answer. It is important to be innovative in your method and in the development of your solution and to use what you learned in class.

Project Elements

Each project will include the following elements

1) Executive Summary (1 page, double-spaced, 12 point text, 1" margins)

The executive summary shall provide the essential results of the project. It will include:

a) Recommendations: recommended course of action and financials for the client
b) Overview: description of problem addressed and why
c) Methodology: description of the method used in the analysis
d) Alternatives: description of alternatives that were investigated
e) Results: summarized numerical results from the analysis of alternatives

2) Body of Paper

The body of the paper should elaborate on the executive summary. It should include, at a minimum:

- detailed description of the methods used, with example calculations
- detailed description of each alternative investigated (including plans), and the analysis of the alternative
- References

3) Appendix

Lengthy numerical analyses should be placed in the appendix and appropriately labeled.

4) Peer Evaluation

The format is up to you, but you must rate all your teammates on a scale of 1 - 10. You can explain your ratings, but do not have to.

Topics

The first project is similar to the case study at the end of chapter 5 of the Chopra book. That study gave you the demand and shipping costs and the locations of the distribution centers. It also specified the product. The differences between the project and the case study are that you have to select your own product, generate your own demand (census data, Arcview, etc.), extended for six years (from 2017 through 2022). You should also use transportation cost and distances that are based on some research on your part. The location and cost of the distribution centers (both storage and fixed costs) should be reasonable and be the result of thorough analysis.
Use the given numbers for demand as a starting point and adjust them according to your product, demographics that you deem important and for economic factors.
The report should give a good indication of the finances of the company and take into account the time value of money and the effects of inflation, as well as the time required to establish distribution centers. You should include the cost of materials and the income earned from sales.
It is your project – look at it as if you were the owner or owners of the company.
Give the sources of your research.
Be careful to structure the amount of work you do for the project with the amount of time you have available.
It is also helpful to establish roles and responsibilities for each of the team members.

Project 2 –(in addition to the data provided for Project 1)

The second project is an extension of the first. In it you selected the size, number and the locations of the distribution centers (or something similar). Select one of these centers and design its interior and the lot on which it stands (parking, docks). Your final product should include drawings and descriptions of the contents of the building, how they achieve the objectives you set for it in your first project and any supporting calculations and data and sources.
It is your project – look at the final report as if you were the prospective manager of the facility. While working on it, alternate between thinking of yourself as the project manager and one of the IEs working on it.

Be careful to structure the amount of work you do for the project with the amount of time you have available, the value of the grade and how much you need the points and how much interest you have in the topic. Also consider that your teammates will be rating your contribution for 10% of the project grade. Most importantly, note that:

The project is due on 04/29 at midnight. There will absolutely be no extensions – so act accordingly.

The approximate grading rubric for both projects is given below.

Team No.		Grade
2. Technical Accuracy and Completeness	30%	
3. Creativity in Method and Solution	35%	
4. Organization of report as a whole	10%	

Item	High Grade	Medium Grade	Low grade
Technical Accuracy and Completeness	Correct analysis	Some errors in analysis	Many errors, incomplete analysis
	Appropriate conclusion	Conclusions consistent with calculations	Unwarranted or Vague conclusion
	Tools appropriate to the subject	Most tools appropriate	Inappropriate use of tools
	Few if any grammatical and spelling errors	Some grammatical and spelling errors	Many errors in grammar and spelling
	Appropriate data sources	Few sources	No sources
Creativity in Method and Solution	Unique product	Average product	commodity
	Several tools	Fewer tools	Little use of tools
	Clever solutions	Common solutions	Vague solutions
	Good sources of data	Missing sources	No back of data
Organization of report as a whole	Table of contents	none	none
	Abstract with recommendations	Abstract	none
	Appendix for supporting material	Too much in main body	None or little to support main body
	Page numbers	missing	missing
	Paragraphs and subsections	Fewer than needed	No subtitles
	Use of tables and pictures	Fewer then natural for the topic	None or inappropriate
	Appropriate length	Longer than needed, wordy	Either very short or very long (without substantial content)
	Appropriate References	Some missing	none

Last, but most important:

Academic Conduct

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Section 11, *Behavior Violating University Standards* https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, http://policy.usc.edu/scientific-misconduct.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any

incidents to the *Office of Equity and Diversity* http://equity.usc.edu or to the *Department of Public Safety* http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us. This is important for the safety of the whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* http://www.usc.edu/student-affairs/cwm/ provides 24/7 confidential support, and the sexual assault resource center webpage http://sarc.usc.edu describes reporting options and other resources.

Support Systems

A number of USC's schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* http://dornsife.usc.edu/ali, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information http://emergency.usc.edu* will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.