Geza Bottlik **ISE310L Facilities and Logistics** **Spring 2018**
11/19/2017

Instructor:	Geza Bottlik, E-mail: bottlik@usc.edu
Office Hours:	Tuesdays/Thursdays, 11:00 A.M. – Noon, Room GER 202 Phone 213 740 – 5050 (Class days only) or by appointment.
TA:	TBD
TA Office Hours:	TBD
Class time/place:	Tuesdays and Thursdays 9:30 P.M. – 10:50 P.M., Room VPD LL101
	Lab hours Mon/Wed 2:00 – 3:20 KAP141 Starts 08/29/17

Web Page: www.gezabottlik.com. See for Lecture notes, assignments, grades and notices.

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 project.

Test Schedule:

Midterm 1:	Thursday, February 22, 2018	9:30 A.M. – 10:50 P.M.
Midterm 2:	Tuesday, April 3, 2018	9:30 A.M. – 10:50 P.M.
Final:	Tuesday, May 8, 2018	11:00 A.M. – 1:00 P.M.

The midterms and final will be based on problems similar to the ones assigned in the homework and the discussions in class. **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 Tuesday and are due on the following **Monday 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 a course project, for facility planning and 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 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
ISBN: 978-0131481916
Supply Chain Management, Sunil Chopra and Peter Meindl, Prentice Hall
ISBN: 978-0133800203

Grading:

Team Project	~20%	20 points	
Homework	~10%	10 points	1 pt. each (- 0.5 if not submitted)
Laboratory	~9%	9 points	(by the TA) 0.9 point each (- 0.4 if not submitted or made up)
Midterm Exam 1	~10%	10 points	
Midterm Exam 2	~12%	12 points	
Final Exam	~21%	21 points	
Participation (Attendance, **discussion**, **preparedness for class, in class feedback**)	~6%	6 points	0.25 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

Project:

There will be one project. The 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 report is limited to no more than 12 (double spaced font 12), single sided 8 1/2 by 11 format, submitted as a digital **Word 97 or more recent** files by 04/29/18 end of the day. A good minimum is 9 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 project is required. If you do not turn it in by the due date, you will receive an F for the class.
Details for the project are at the end of this syllabus.

Approximate Course Outline:

Session	Date	Material	Homework No. due
01	01/09	Introduction and Organization	
02	01/11	Supply Chain overview - Chopra Chapter. 1	
03	01/16	Garcia Chapter 1 & 2– Facilities Planning and project	No. 1
04	01/18	Chopra Chapter 2 – Performance	
05	01/23	Chopra Chapter 3 – Drivers	No. 2
06	01/25	Chopra Chapter 4 – Design	
07	01/30	Chopra & Garcia Chapter 5 – Network Models	No. 3
08	02/01	Chopra & Garcia Chapter 5 – Network Models	
09	02/06	Chopra & Garcia Chapter 5 – Network Models	No. 4
10	02/08	Chopra Chapter 6 – Uncertainty	
11	02/13	Chopra Chapter 14 – Sourcing	No. 5
12	02/15	Chopra Chapter 14 – Sourcing	
13	02/20	Review	No. 6
14	02/22	Midterm 1	
15	02/27	Garcia Chapter 3 Product, Process Planning	No. 7
16	03/01	Garcia Chapter 4 – Layout Planning	
17	03/06	Garcia Chapter 6 – Layout procedures	No. 8
18	03/08	Garcia Chapter 6	
19	03/20	Garcia Chapter 6	No. 9
20	03/22	Garcia Chapter 7&8 – Material Handling	
21	03/27	Garcia Chapter 7&8 – Material Handling	No. 10
22	03/29	Review	
23	04/03	Midterm 2	No. 11
24	04/05	Garcia Chapter 7&8 – Material Handling	
25	04/10	Garcia Chapter 9 – Storage	No. 12
26	04/12	Garcia Chapter 9 – Storage	
27	04/17	Garcia Chapter 9 – Storage	
28	04/19	Garcia Chapter 11 – Offices	
29	04/24	Garcia Chapter 11 – Offices	
30	04/26	Review	
Final	05/08	Final 11:00 A.M. – 1:00 P.M.	

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.

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!

Laboratory Schedule (Attendance is Mandatory)

Session	Lab Material	Date – Mon/Wed
1	Lab Introduction, ArcView Lab 1	01/22, 01/17
2	ArcView GIS Lab 2	01/29, 01/24
3	ArcView GIS Lab 3	02/05, 01/31
4	ArcView GIS Lab 4: Exercise	02/12, 02/07
5	ArcView GIS Answer and Questions	02/26, 02/14
6	AutoCad Lab 1	03/05, 02/21
7	AutoCAD Lab 2	03/19, 02/28
8	Factory CAD Lab 1	03/26, 03/07
9	Factory CAD Lab 2	04/02, 03/21
10	Factory FLOW Lab 1	04/09, 03/28
11	Factory FLOW Lab 2, FACTORY PLAN	04/16, 04/03
12	Free time for your project	04/23, 04/10

Project

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

Grading

The project grade is divided into five categories:

1. Executive Summary 15%
2. Peer evaluation 5%
3. Technical Accuracy and Completeness 30%
4. Creativity in Method and Solution 35%
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 or peer evaluation. These will be graded on the basis of quality of writing, clarity and organization.

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 project does 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

The 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 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. You will not receive full credit for doing the evaluation if you rate all your team mates the same.

Topics

The 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 2018 through 2023). 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 some 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.
Once you have designed your supply chain, select one of your distribution centers or factories, 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.

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.

Also consider that your teammates will be rating your contribution for 5% of the project grade. Most importantly, note that:

The project is due on 04/29 at the end of the day (midnight). There will absolutely be no extensions – so act accordingly.

The approximate grading rubric for the project 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.