IME 604 FACILITIES PLANNING & DESIGN

Spring 2000 *T,Th 6:00 – 8:50 p.m.*

Catalog Description: An analytical approach to the planning and design of manufacturing facilities and material handling systems. Prerequisite: IME 404, 414, or permission of instructor.

Textbook: Tompkins, James A., et al., Facilities Planning (New York: John Wiley & Sons, 1996, Second Edition).
IT IS ILLEGAL TO COPY ALL OR A PART OF A TEXT BOOK IN ORDER TO AVOID THE PURCHASE OF ONE. AS SUCH, NO COPIES OF TEXTBOOKS WILL BE ALLOWED IN THE CLASSROOM.

References:
1. Sule, Manufacturing Facilities, 2nd Ed., PWS Publishing Company, 1994.
2. Heragu, Facilities Design, PWS Publishing Company, 1997.
3. Francis, McGinnis & White, Facilities Layout and Location, Prentice Hall, 1992.
4. James and Alcorn, A Guide to Facilities Planning, Prentice Hall, 1991.
5. Lee Hales, Computerized Facilities. Planning, IIE, 1985.
6. Black, The Design of the Factory with a Future, McGraw Hill, 1991.
7. Tompkins and Smith, Warehouse Management Handbook, McGraw Hill, 1988.
8. Myers & Stephens, Manufacturing Facilities Design and Material Handling, Prentice Hall, 2000.

Periodicals: (Housed in Waldo Library)
1. Modern Materials Handling
2. Material Handling Engineering
3. Production Engineering (formerly Automation)
4. IIE SOLUTIONS

Coordinator: Dr. Azim Houshyar, Professor, Industrial & Manufacturing Engineering.

Instructor:
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Course Schedule:

DATE	TOPIC	CHAPTER
5- 2 (T)	Introduction to Course	1
5- 4 (R)	Strategic Facilities Planning	2
5- 9 (T)	Product, Process, and Schedule Design	3
5-11 (R)	Flow, Space, and Activity Relationships	4
5-16 (T)	Personnel Requirements	5
5-18 (R)	Material Handling	6

5-23 (T)	Layout	7
5-25 (R)	Computer-Aided Layout	8
5-30 (T)	Warehouse Operations	9
6- 1 (R)	Manufacturing Operations	10
6- 6 (T)	Facilities Systems EXAMINATION # 1	11 1-10
6- 8 (R)	Quantitative Facilities Design & Location Models	
6-13 (T)	Quantitative Facilities Design & Location Models	
6-15 (R)	Quantitative Facilities Design & Location Models	
6-20 (T)	EXAMINATION # 2 (Comprehensive)	

Paper Presentations:

Each student is required to write a detailed research paper and present it in class on a topic related to facilities planning and design. A list of suggested topics is attached at the end of this syllabus. Each student must have their final topic for the research paper approved by the instructor and then write a detailed paper (10 to 15 pages in double space are recommended). Each student will then present his/her paper to the class (10-12 minutes for presentation and 3-5 minutes for Q and A—total of 15 minutes). Four papers will be presented at the beginning of each class period starting with June1. In addition to the Instructor's evaluation and assessment, peer evaluation and assessment will also be used as instructed in the class. Specific dates must be followed:

Final topic approved by Tuesday, 5-9.
Outline of paper with list of references turned in by Tuesday, 5-16.
Completed paper submitted on Thursday, 6-1.

The Instructor will schedule the specific date for presentation of each research paper by 5-25.

Evaluation Distributions:

Examination # 1	25%
Examination # 2	30%
Research Paper	30%
Paper Presentation	10%
Participation in Class activities	5%

Grading Scale:

The following grading scale will be used in my class:

A (91 – 100), **BA** (88 – 90), **B** (81 – 87), **CB** (78 – 80), **C** (71 – 77), **DC** (68 – 70), **D** (60 – 67), **E** (below 60).

All examinations will be graded on or converted to a numerical scale. At the end of the semester, the grades will be added up for all the items (with the appropriate weights) and then converted to a letter scale to determine the final course grade.

IME 604 **Topics for Research Paper** **Spring 2000**

Facilities Design:

1. Facilities Design Using Expert Systems.
2. Application of Simulation in Designing Facilities.
3. Recent Approaches to Designing Manufacturing Cells.
4. Implementation of ADA in Manufacturing Facilities.
5. Security Considerations in Facilities Planning & Design.

Office Design:

6. Designing a Virtual Office.
7. Designing an Office in the Home to Incorporate Safety and Efficiency.
8. Office Design for Improved Productivity.
9. Designing Modular Offices.

Warehouse Design:

10. Layout Techniques to Improve Warehouse Efficiency.
11. Fire Protection Systems in Warehouses.
12. Techniques to Maximize Space Utilization in Storage Systems.
13. Dock Design for Safety and Efficiency.
14. Use of Carousals to Improve Picking.
15. Applications of Automated and Robotic Palletizers.
16. Conveyor Sortation Systems.
17. Design and Implementation of Automated Storage and Retrieval Systems.
18. Techniques to Improve Warehouse Efficiency.
19. Small Parts Storage and Retrieval.

Materials Handling:

20. Incorporating Safety in Materials Handling.
21. Recent Trends in Palletization.
22. Strategies in Selecting Equipment for Small Parts Handling.
23. Applications of Robots in the Automotive Industry.
24. Trends and Developments in the Design of AGV Systems.

Specific Applications:

25. Use of Bar Coding for Baggage in Air Travel.
26. Airport Expansion for Handling Increased Passenger Volume.
27. Designing of Work Cells Using the Kaizan Approach.
28. Facilities Design in Lean Manufacturing.
29. Design of Library Facilities.
30. Factors to be Considered when Locating a Hotel.

Obtaining Notes for the Class

Prof. Houshyar has developed very extensive notes on the material which basically follows the same outline as the required textbook. These notes can be downloaded (124 pages) from his web page as follows:

http://tigger.cc.wmich.edu/~houshyar/

Teaching Material
IME 604
Notes on Facility Layout

NOTE: THE WEB PAGE NOTES ARE NOT A SUBSTITUTE FOR THE TEXTBOOK WHICH MUST BE PURCHASED.

Specifics on the Research Paper

1. You must use at least five current sources (since January 1996) for your paper. Additional sources are also preferred. Books are not included in the current sources.

2. You must reference all your sources appropriately in the body of the paper. Taking several sentences (even if put in your own words) from a source and not referencing them will be considered as plagiarizing.

3. Use margins of 1 inch on all four sides, Times New Roman or equivalent font in 12 point size, and double spaced text. Number the pages.

4. Assemble the paper as follows: Title page, abstract of no more than ½ page in length, table of contents (with page numbers), your written research paper, and a list of references. Attach your approved paper outline at the back. Bind the complete paper in a binder (do not use 3-ring binders). If the title page is not visible through the binder cover, attach a label to the front cover with the title of the paper and your name on it.