

Southern Illinois University

Facilities Planning

IT 392/Syllabus

- I. COURSE NUMBER AND TITLE: IT 392 Facilities Planning
- II. CREDIT HOURS: 4 credit hours
- III. PREREQUISITE: NONE.
- IV. DESCRIPTION OF COURSE: Planning and preparing facilities layouts/plans to help and organization achieve effective and efficient supply chain processes. It includes topics in process improvement, flow/space/activity relationships, personnel requirements, and warehouse operations.
- V. TEXTBOOK: Facilities Planning, 3rd Edition, by Tompkins, J., White, J., Bozer, Y., and Tanchoco, J.M., John Wiley & Sons, Inc., Hoboken, NJ, 2003 ISBN 0-471-41389-5
(Reference) Meyers, Fred E., & Stephens, Matthew P., Manufacturing Facilities Design and Material Handling, Prentice-Hall, Inc., 2nd ed.
(Reference) Sule, D.R., Manufacturing Facilities: Location, Planning, and Design, PWS Publishing Co., 2nd ed
- VI. COURSE OBJECTIVE:

The objective of this course is to provide students with the skills necessary to develop a facilities plan. The engineering design process includes plant layout and material handling principles. Various methods and techniques will be introduced and utilized to analyze the flow efficiency of a proposed plant layout.

At the completion of this course the student should or will demonstrate the following:

1. design an efficient plant layout based on material flow and material handling equipment.
2. make recommendations on improvements to existing plant layouts utilizing design flexibility to accommodate changes in product volume or product line.
3. understand and be able to complete the following charts with regard to a specific product: e.g. assembly chart, route sheet, operations process chart, from-to chart & activity relationship chart.
4. understand the information to determine the overall plant rate based on production volumes.
5. know how to calculate equipment requirements for a specific process.
understand the benefit of an efficient material handling system and understand what effect process layout has on the material handling system.
6. determine the storage and warehousing requirements based on the type of product and demand characteristics for that product.

VII. STUDENT RESPONSIBILITIES:

- a) All examinations must be taken at the scheduled time. If not, there will be an immediate 10% penalty and an additional penalty of 10% per week for every week they are late. Exceptions to this policy will be considered on a case-by-case basis. Please let the instructor know in advance (if possible) of any absences.
- b) All work submitted late **MUST HAVE ATTACHED DOCUMENTATION** to support why it's being considered for "late - excused" status. Failure to submit said documentation will be grounds for refusing such status by the instructor. Talking to the instructor in the hallway during break, etc. does not constitute "documentation".
- c) Students are expected to attend all scheduled classes. Students who are absent or late are responsible for arranging to make up for missed materials (i.e.: lecture notes, instructor handouts, etc.)
- d) Assigned class readings are required **prior** to attending class. Lectures will supplement, but not replace, assigned readings. Homework for each day includes reading the assigned chapters AND answering 5 questions about each chapter. All questions will be covered during lectures. All questions will become the database for each exam.
- e) Students are expected to conduct themselves professionally and courteously at all times in the classroom. Students are expected to show respect for all others, and dysfunctional behavior will not be tolerated. All classroom disruptions will be handled in accordance with school policies.

VIII. INCOMPLETES:

It is the policy of the professor not to give Incomplete grades. Occasionally, one realizes that events do occur which may merit the awarding of an Incomplete. In accordance with written university policy, an Incomplete grade will not be granted for any reason in a case where the student would not pass the course if all unfinished assignments were converted to zero points. Effectively, this means that you have to have completed around 75% of the course to even be considered for an Incomplete. In the event that the student feels an incomplete is applicable in their case, it is their responsibility to document the reason in writing and to secure it's approval. If you fail to complete this step, an Incomplete will not be granted. Talking to the instructor on the phone, or in the hallway, does not constitute "in writing".

IX. STUDENT EVALUATION:

- a) Two examinations will be given at the times indicated under the "Schedule of Activities". Examinations will cover the reading assignment (theory), material presented outside the text material (supplemental material), and in-class problems.
- b) Grading will be based on the assignments noted above. The final grade will be based on the following:

Homework	100 pts	A	90 - 100%
Exam 1	100 pts	B	80 - 89%
Exam 2	100 pts	C	70 - 79%
Project	<u>100 pts</u>	D	60 - 69%
	400 pts total	F	< 60%

X. INSTRUCTOR: Dr. Earl W. Godt, II

309-333-1577 (Cell - Call before 9PM)
godterry@macomb.com (Usually check every evening.)

- XI. INSTRUCTOR AVAILABILITY: Your instructor is available to meet before, during, and after scheduled class periods or at a mutually-agreed upon time and place.
- XII. SCHEDULE OF ACTIVITIES:

<u>SESSION</u>	<u>DAY</u>	<u>SUBJECT</u>	<u>CHAPTER</u>
I	Sat.	Introduction	1
		Product, Process, & Scheduling Design	2
		Flow, Space, & Activity Relationships	3
	Sun.	Personnel Requirements	4
		Preparing, Presenting, Implementing, and maintaining the facilities planning	12
		Facility, Machine, and Storage Models	10
Project Selection and Assignment			
II	Sat.	Exam 1 (2 hours)	
		Material Handling	5
		Layout Planning Models and Design Algorithms	6
		Warehouse Operations	7
		Project In-class Team Meeting	
	Sun.	Manufacturing Systems	8
Facilities Systems		9	
Evaluating and Selecting the Facility Plan		11	
Project In-class Team Meeting			
III	Sat.	Exam II (2 hours)	
		Project In-class Team Meeting	
	Presentations Begin		
Sun.	Presentations		
		Project turn-in	

The instructor reserves the right to make deviations from the course schedule as needed. **Before taking a makeup exam, be sure you're studying the correct material.**

Project Requirements

Each group should select a product that contains at least five parts that will be manufactured in the facility. Annual production should be at least 50,000. If this volume does not necessitate at least two machines/process to meet demand using one 8-hour shift, then increase the production volume.

Note:

List of design objectives

- Detailed component part drawings, including part specifications, dimensions and enough information to fabricate part
- Assembly chart
- Parts list
- Make-or-buy decisions and justifications
- Route sheet
- Operations process chart

Calculation of the number of machines/operation, based on efficiency (E) and reliability (R) values. If it is possible to obtain time standards based on real-world data, that is preferable; otherwise, use $E = 80\%$ and $R = 90\%$. In addition, use 250 working days/year with one 8-hour shift.

- From-to chart
- Activity relationship chart
- Material handling requirements/material handling system
- Receiving, shipping, storage and warehousing requirements
- Site location rationale/site plan
- Plot Plan
- Facility Layout Plan - This plan should have the capability of showing all that is required to make a decision by upper management to go ahead with the details of the project. Conclusions and recommendations with should be reflected in the recommendations section of the report.

FACILITIES PLANNING REPORT GUIDELINES

GENERAL REQUIREMENTS:

12-point type

Double space

Margins: left- 1.00"
 right- 1.00"

top- 1.00"
bottom- 1.00"

Major headings - use ALL CAPS
Figures - place caption below figure
Tables - place caption above table

Major headings

TITLE PAGE

ABSTRACT

TABLE OF CONTENTS

INTRODUCTION

Company name define product: why it was selected, market need design objectives site location - rationale

PRODUCT DESIGN

Detailed component design (dimensions, material, other instructions)
Final part drawing - optional (no dimensions)

PROCESS DESIGN

- Make-or-buy decision and justifications
- Parts list
- Assembly chart
- Route sheet
- Operations process chart

PROCESS REQUIREMENTS

Product volume: marketing info., etc.
Process requirements: machine fraction calculations

FACILITIES PLANNING

- Activity relationships
- From-to chart
- Nodal Diagram
- Plot Plan
- Space requirements - define total departmental space requirements detailed layout for each department - 1 page per department [manufacturing, receiving, shipping, personnel facilities, and production support] (use one of the quantitative Machine Layout Models)

MATERIAL HANDLING SYSTEM

- Receiving and storage facility requirements spreadsheet (use one of the quantitative models for the warehouse layout and storage layout)
- Establish reorder parameters for receiving (quantity and time)

FUTURE PLANNING

Accommodations for changes in product demand
Expected increase in volume, expansion of product line, etc. 1 to 2 pages

CONCLUSIONS/RECOMMENDATIONS

APPENDIX (IF NEEDED)

BIBLIOGRAPHY

Facilities Planning Project Point Assignment

1. Design objectives- 5 pts.
2. Detailed component design - 5 pts.
3. Assembly chart - 5 pts.
4. Parts list- 5 pts.
5. Make-or-buy decisions/justifications- 5 pts.
6. Route sheet - 5 pts.
7. Operations process chart - 5 pts.
8. Machine fraction calculations- 5 pts.
9. From-to chart - 5 pts.
10. Activity relationship chart - 5 pts.
11. Facility layouts - 5 pts.
12. Detailed layout for each department - 5 pts.
13. Material handling system- 5 pts.
14. Establish reorder parameters – 5 pts.
15. Plot Plan - 5 pts.
16. Receiving and storage spreadsheet (warehouse and storage model) - 5 pts.
17. Site location rationale (1-2 pages) - 5 pts.
18. Accommodations for changes in product demand (1-2 pages) - 5 pts.
19. Nodel Diagram - 5pts
20. Space requirements – 5 pts (production, receiving, shipping, personnel facilities, production support)

TOTAL: 100 PTS

Peer and instructor evaluations will be used to determine grade of individual team members.