



SYSTEMS AND FACILITIES PLANNING 0303 – 422

Winter 2008

Lectures: MTW 2-3 pm (MW:09-1149, T:70-2455)

Labs: Thursdays 9-10, 11-12 and 2-3 (09-1550)

- Instructor** Dr. Andres L. Carrano
- Office** James E. Gleason Building (09), Office 09-1595
- Office Hours** Mondays 4-5 pm and Wednesdays 10-11 am. (or by appointment)
- Telephone** (585) 475-6062
- E-mail** andres.carrano@rit.edu
- Website** <http://mycourses.rit.edu/> (Course website)
<http://people.rit.edu/alceie/facilities.htm> (Resources website)
- Computer proficiency** MS Excel and MS Access
Drawing package (preferably Autocad)
- Prerequisites** Operations Research (0303-401)
Working knowledge of matrix algebra (1016-331)
- Text** No textbook is required for this class.
- Readings** Some required readings / study cases will be either handed out or referenced in class
- Reference texts** Facilities Planning. Third Edition. John Wiley and Sons. Tompkins, White, Bozer, Tanchoco. ISBN 0-471-41389-5
Facilities Design. Sunderesh Heragu. PWS Publishing Co. 1997. ISBN 053495183
Factory Physics. Second edition. Hopp, W.J., Spearman, M.L. McGraw-Hill. ISBN 0-256-24795-1

Evaluation

Homework /case studies /Quiz	10%	On a weekly basis
Midterm Exam	20%	Tuesday, Jan 20 th . (week # 6)
Project	25%	Wednesday, Feb 11 th (week # 9)
Laboratory	20%	On a weekly basis
Final Exam	25%	Thursday, February 26 th 8-10 am

A ∈[90-100]; B ∈[80-89.9]; C ∈[70-79.9]; D ∈[60-69.9]; F < 60



Teaching Assistants:

There will be two teaching assistants for the class. The office hours will be posted later in the week. Both are located in the Toyota Production Systems Lab (09-1550), across from the main office.

Ainoa Mazeika	axm8717@rit.edu
Keshav Simhadri	kks8469@rit.edu

General guidelines and expectations

- Teamwork** Teamwork is encouraged in most activities (and mandatory in some others). You must work in the same team of 3-4 people throughout the quarter. For the term project, reading discussions, and cases, teamwork is mandatory. Discussion of the assignments should be limited to the members of your group. Teamwork is allowed in homeworks, however, everyone is expected to solve and master all problems in these sets. All exams are individual and no teamwork is allowed.
- Homework** Homework usually consists of a problem set aimed to reinforce the material delivered during class and off-class activities. They are due one week after distributed unless stated otherwise. Late homework (up to one class late) is accepted but graded up to 85% of the full scale. Late case studies are not accepted as they may be discussed on class. Teamwork is expected and encouraged on homework (write all team member names on reports).
- Quizzes and Exams** There will be one midterm exams and a final examination during the course. Format will be specified close to the examination dates
- Attendance Policy** Attendance is expected for every lecture. However, if you miss a class, you still are responsible for obtaining / learning the material. If you miss a significant portion of the course, (15% = 3 lectures or more), it will be reflected in your grade. Missing 25% of the lectures automatically represent a failing grade in the course. Please come and see me in advance if you anticipate any of these scenarios.
- Academic Dishonesty** Rochester Institute of Technology does not condone any form of academic dishonesty. Any act of improperly representing another person's work as one's own (or allowing someone else to represent your work as their own) is construed as an act of academic dishonesty. These acts include, but are not limited to, plagiarism in any form, cheating, collusion (the unauthorized collaboration with another person in preparing written work or computer work), or use of information and materials not authorized by the instructor during an examination or for any assignment. When there is any doubt, a student should consult the instructor (not another student) as to whether some action is considered academic dishonesty.

Please also read the KGC OE Academic Honesty policy posted in mycourses.



SYLLABUS

Instructional Objectives:

The purpose of this course is to provide the student with knowledge of the fundamental principles and practices in facility layout, material handling, storage and warehousing, and facility location for industrial and service facilities. At the end of the quarter, the student will be able to understand and quantify the relationships between flow, space and activities; develop facilities layout; as well as identify and select material handling equipment for a given application.

- WAREHOUSING (5 weeks)
 - Introduction
 - Operations and elements
 - Types of warehouses
 - Warehousing terminology
 - Implications of SKU proliferation
 - Order picking
 - Anatomy of a pick list
 - Pick paths
 - Discrete, zone and batch picking area
 - Sortation and Consolidation
 - Strategies
 - Carton pick area
 - Forward (fast) picking area
 - Storage
 - Storage and handling equipment
 - Storage media: racks and shelves
 - Automation: A-frames, Carousels and AS/RS
 - Storage/retrieval policies
 - Storage density, cubic utilization and honeycomb losses
 - Slotting
 - Dedicate Storage Assignment Problem (DSAP)
 - Warehouse Activity Profiling
- FACILITY LAYOUT (3 weeks)
 - Material flow and space requirements
 - Total Cost of Material Flow
 - Departmental layout
 - Traditional flow patterns and layouts
 - Location of shipping and receiving
 - Cross-Docking
 - Systematic Layout Planning (SLP)
 - Machine layout and Quadratic assignment problem (QAP)



- MATERIAL HANDLING SYSTEMS (2 weeks)
 - Unit load design
 - Taxonomy of material handling equipment
 - Material handling equipment selection (ILP Model)

- OTHER (*)
 - Intermodal freight transportation
 - Green facilities design
 - RFID
 - Container and track loading

(*) Time permitting

LABORATORY CONTENT

There will be 10 laboratory sessions:

- Factory CAD / Factory Flow Software (5 sessions)
- Warehouse activity profiling / data mining (1 session)
- Lean Warehouse (Order picking) and A3 Problem Solving (2 sessions)
- Layout IQ Software (2 sessions)

