

**Department of Industrial and Enterprise Systems Engineering**  
**Program in INDUSTRIAL ENGINEERING**

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**Course:** IE 360 – Facilities Planning and Design

**Instructor(s):** Lavanya Marla  
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**Credit and contact hours:** 3 credit hours, 2 lecture hours and 1 lab hours /week

**Time and Location :** Lecture 10:00 - 10:50am MW 101 Transportation Building  
Lab 4:00 – 5:50pm T/R 406 B1 Engineering Hall

**Textbook(s) and/or other required material:**

**Recommended reference text:** Facility Layout and Location – An Analytical Approach.  
Francis, McGinnis & White. 2<sup>nd</sup> edition, Prentice Hall. ISBN: 978-0132992312

Facilities Design. Heragu, Sunderesh S. 3<sup>rd</sup> edition, CRC Press.

**Course description:**

Facility planning, plant layout design, and materials handling analysis; determination of facilities requirements, site selection, materials flow, use of analytical and computerized techniques including simulation, and applications to areas such as manufacturing, warehousing, and office planning.

**Prerequisite(s):** IE 310

**Course outcomes (program outcomes in brackets):**

After successfully completing the course, students will be able to:

- 1) Design layouts within facilities, i.e, organize processes, departments and products within a facility using mathematical models, algorithms and heuristics
- 2) Use models, algorithms and heuristics to find locations for new facilities in a supply chain
- 3) Model inventory, storage and warehousing
- 4) Use software such as AMPL and CPLEX to model and solve formulations
- 5) Build simulation frameworks for realistic modeling and prediction

**List of topics:**

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|---|---------------|
| <b>1. Introduction</b>                                    | <b>2 hrs</b>  |
| a. Scope of facilities planning function                  |               |
| b. Relationship with product, process and schedule design |               |
| <b>2. Layout design problems:</b>                         | <b>22 hrs</b> |
| a. Introduction to designing layout                       |               |
| b. Group layout   |               |
| c. Assembly line balancing                                |               |
| d. Process-based and block layout                         |               |
| e. General layout problems                                |               |

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|---|-----------------------|
| <b>3. Location design problems:</b>                           | <b>14 hrs</b>         |
| a. Median location problems (Euclidean and rectilinear norms) |                       |
| b. Center location problems (Euclidean and rectilinear norms) |                       |
| <b>4. Storage and warehousing</b>                             | <b>4 hrs</b>          |
| a. Zoned vs. random storage                                   |                       |
| b. Storage and retrieval systems                              |                       |
| <b>5. Simulation Modeling for Uncertainty</b>                 | <b>2 hrs</b>          |
|   | <b>44 hrs (total)</b> |

### Grading

Homework and Labs(assigned regularly)	40%
Mid Term	25%
Final Exam	30%
Classroom Participation	5%

Based on progress, might introduce 10-min quizzes every 2-3 weeks. Final will then be 25% and 10-min tests will be 5%.

### Honour Code

It is assumed that the students follow UIUC Student code at all times i.e during homework , labs and exams. And you need to specify on homework the number of collaborators you worked with during the homework solving.

### Late Homework Policy

You can submit at most two Homeworks late, i.e., on the next lab session. For example, if you are in Tuesday lab, you have to submit the homework by the following Tuesday, but you can submit at most two Homeworks the following week. And if you know that your are going to miss a lab session, please turn in the homework in advance.