

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

---

**Course:** IE360 – Facilities Planning and Design

**Instructor:** Avinash Gupta  
[avinashg@illinois.edu](mailto:avinashg@illinois.edu)

**TA(s):** Emre Eraslan, Ze-Xuan Liu  
[emree2@illinois.edu](mailto:emree2@illinois.edu), [zexuan15@illinois.edu](mailto:zexuan15@illinois.edu)

**Credit and contact hours:** 3 credit hours, 2 lecture hours and 2 lab hours /week

**Time & Location:**

Lecture 10:00 - 10:50am Mon, Wed, 218 Ceramics Building  
Lab AB1 4:00 – 5:50pm Wed, 4101 Materials Science & Eng Building  
Lab AB2 4:00 – 5:50pm Thu, 136 Burrill Hall  
Lab AB3 1:00 – 2:50pm Fri, 4101 Materials Science & Eng Building

**Instructor Office Hour:** Mondays, 1 – 2 PM, Room 1206, Online, Zoom Link:  
<https://illinois.zoom.us/j/5067870838?pwd=TWdoMXlpWlFwUGtpYnhQajJwMmVaQT09>

**TA Office Hours:** Wednesday 5-5:50 PM and Friday, 4101 Materials Science & Eng  
Thursday, 5-5:50 PM, 136 Burrill Hall

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

**Recommended reference text:** Facility Layout and Location – An Analytical Approach.  
Francis, McGinnis & White. 2nd edition, Prentice Hall. ISBN: 978-0132992312  
Facilities Design. Heragu, Sunderesh S. 3rd 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 optimization packages like CVXPY with Python to model and solve formulations

**List of topics:**

<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>23 hrs</b>
a. Introduction to designing layout	
b. Group layout	
c. Assembly line balancing	
d. Process-based and block layout	
e. General layout problems	
<b>3. Location design problems:</b>	<b>15 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>44 hrs (total)</b>

**Grading**

Homework and Labs (assigned regularly)	36%
Mid Term 1	24%
Mid Term 2	24%
Team Project	6%
Quiz (Best 2 out of 3)	4%
Classroom Participation Quiz (attend any 6 out of 7 or 8)	6%

**Tentative Dates**

**Quiz 1 – Sept 24th**  
**Midterm 1 – Oct 15th**  
**Quiz 2 – Nov 3rd**  
**Quiz 3 – Nov 19th**  
**Midterm 2 – Dec 10th**

**Honor Code**

It is assumed that the students follow UIUC Student code at all times i.e during homework, labs and exams.

**Lab Policy**

- Labs every week (~2 hours).
- Total 13 lab sessions (tentative)
- Lab recording will be provided on producing legitimate excuse for not being able to attend the lab.

## Homework Policy

- Homework due every Monday of the next week.
- Late homework policy (**2 late submissions allowed**)
  - Due the following Monday after the original deadline
- Recommend starting homework (at least reading the problems) before the lab
- Submission format: (On canvas)
  - pdf with code snippets and all answers.
  - Attach all program files separately in zip.
  - No code-snippets = no-grade.
- Solutions released after the late submission deadline

## Academic Integrity

The University of Illinois at Urbana-Champaign *Student Code* should also be considered as a part of this syllabus. Students should pay particular attention to Article 1, Part 4: Academic Integrity. Read the Code at the following URL: <http://studentcode.illinois.edu/>.

Academic dishonesty may result in a failing grade. Every student is expected to review and abide by the Academic Integrity Policy: <http://studentcode.illinois.edu/>. Ignorance is not an excuse for any academic dishonesty. It is your responsibility to read this policy to avoid any misunderstanding. Do not hesitate to ask the instructor(s) if you are ever in doubt about what constitutes plagiarism, cheating, or any other breach of academic integrity.

## Student Resources:

### Course Website:

*A course website is available for this course at [canvas.illinois.edu](https://canvas.illinois.edu)*

Relevant materials including the syllabus, links to websites, and other information will be posted on the website. Students are responsible for checking the website regularly for announcements.

## Request for Accommodations:

We are committed to providing a positive learning environment where our students can succeed. If you require special accommodations, please contact Disability Resources and Educational Services (DRES) and see the instructor in private as soon as possible. If you need accommodations for any sort of disability, please speak to me after class, or make an appointment to see me, or see me during my office hours. DRES provides students with academic accommodations, access, and support services. To contact DRES you may visit 1207 S. Oak St., Champaign, call 333-4603 (V/TDD), or e-mail a message to [disability@uiuc.edu](mailto:disability@uiuc.edu). <http://www.disability.illinois.edu/>. DRES' mission is to provide students with academic accommodations, access, and support services in creating an accessible community where students with disabilities have an equal opportunity to participate fully in their educational experience at the University of Illinois. Please note that accommodations are not retroactive to the beginning of the semester, but begin the day you contact me with a letter of accommodation from DRES.

**Counseling Services:**

The Counseling Center is committed to providing a range of services intended to help students develop improved coping skills to address emotional, interpersonal, and academic concerns. The Counseling Center provides individual, couples, and group counseling. All of these services are paid for through the health services fee. The Counseling Center offers primarily short-term counseling, as well as referrals to the community when students could benefit from longer term services. <https://counselingcenter.illinois.edu/>

**Food and Housing Insecurity**

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support ([odos.illinois.edu](mailto:odos.illinois.edu)). Furthermore, please notify me if you are comfortable in doing so. This will enable me to provide information about resources.

**Safety/ Security Information:**

The Department of Homeland Security and the University of Illinois at Urbana-Champaign Office of Campus Emergency Planning recommend the following three responses to any emergency on campus: RUN > HIDE > FIGHT. Only follow these actions if safe to do so. When in doubt, follow your instincts—you are your own best advocate! If you sign up for emergency text messages at [emergency.illinois.edu](http://emergency.illinois.edu), you will receive information from the police and administration during these types of situations. If you have any questions, go to [police.illinois.edu](http://police.illinois.edu), or call 217-333-1216. For more information: <http://police.illinois.edu/emergency-preparedness/run-hide-fight/>

**Emergency Response Recommendations:**

Emergency response recommendations can be found at the following website: <http://police.illinois.edu/emergency/>. I encourage you to review this website and the campus building floor plans website within the first 10 days of class. <http://police.illinois.edu/emergency/floorplans/>.

**Family Educational Rights and Privacy Act (FERPA):**

Any student who has suppressed their directory information pursuant to *Family Educational Rights and Privacy Act* (FERPA) should self-identify to the instructor to ensure protection of the privacy of their attendance in this course. See <http://registrar.illinois.edu/ferpa> for more information on FERPA.