

American University of Beirut
Faculty of Engineering and Architecture
Industrial Engineering and Management Department

INDE 402: Facilities Planning and Material Handling

Spring 2024: 5:00 pm – 6:15 pm, Monday & Wednesday, **Annex 101**

Instructor

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Office Hours : M 3:00 - 4:45 pm & Th: 2:45 pm - 3:45 pm

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Catalog Course Description

Inter-relationships between facilities, process design, systematic layout procedures, computer-aided layout, location analysis models, material handling analysis and concepts, warehousing storage, and retrieval systems.

Prerequisite

INDE 302 and INDE 303

Learning Outcomes

By the end of the course, students will be able to:

1. Explain the facility layout design process.
2. Apply algorithms and analytical procedures for facilities layout planning.
3. Apply fundamental principles of material flow and handling.
4. Design layouts incorporating product, process, and personnel requirements.
5. Describe the interactions between product, process, schedule, and facilities design.
6. Calculate the number of machines required to meet a desired production capacity.
7. Explain the various material handling equipment.
8. Determine space requirements for equipment, materials, and people.
9. Construct from-to charts to measure and analyze quantitative flow requirements.
10. Construct relationship charts to analyze qualitative relationships between departments.
11. Complete a project using facilities planning techniques and algorithms.

Textbook

Tompkins, J.A., White, J.A., Bozer, Y.A., and Tanchoco, J.M.A. (2010). Facilities Planning. Fourth Edition, Hoboken, NJ: John Wiley & Sons, Inc.

Course Masterplan

1. Setting the basic requirements and constraints
 - 1.1. Understand the process/cycle and importance of facility planning
 - 1.2. Understand the problem to generate facility planning design parameters
 - 1.3. Define flow between departments
 - 1.4. Personnel requirements of the facility
2. Start Designing
 - 2.1. Material handling design and optimization to define material flow requirements
 - 2.2. Developing/Optimizing facility layout using multiple techniques
3. Design characteristics based on facility type
 - 3.1. Facility for Warehouse Operations
 - 3.2. Facility for Manufacturing Systems
 - 3.3. Facility designs other constraints

Final grade is weighted as follows

Participation	5%
Homeworks	15%
Exam 1	20%
Exam 2	20%
Project	40%

Project

After the middle of the semester, groups will be formed to complete a project that implements facilities planning tools and techniques. The deliverables of the project will be a formal report and a presentation. The project requirements will be presented with all basic data. More details and a protocol will be announced later during class. Groups are encouraged to collect as much data to make sure they come up with the best solution. All groups will be competing against each other to present a smart facility plan, layout, and budget. Solution creativity will be highly rewarded.

Exams

There will be 2 exams in this course. The nature of the exam will be discussed later during the semester. By signing up for this course, you confirm that you have read and accepted the terms and provisions of AUB's [Privacy Statement](#).

Course Milestones & Tentative Schedule

January					February								March							April							May				
22	24	29	31	3	5	7	12	14	17	19	21	26	28	4	6	11	13	18	20	25	27	1	3	8	10	15	17	22	24	29	1
												E1	P1				P2							E2				P4	P3		

<u>Description</u>	<u>Remarks</u>
H Homework Submittal	Homework will generally be assigned one week prior to the deadline. The date will be announced in class and posted on Moodle.
E Exam	Exam
P Project Milestone	P1: Teams formed P2: Project Proposal P3 & P4: Project Presentations
R Report	Project Report Due in Early May. The deadline will be announced by early April.

Late Submissions/Penalty

As future engineers, it is critical to learn to be prompt and take responsibility for assigned deadlines. Therefore, late assignments will be penalized 20% for each day they are delayed and will not be accepted more than 3 days past the deadline.

Grade Checking Policy

Discussing solutions takes plenty of time in class and will not be given primary focus after a homework/exam/quiz. Solutions will only be mentioned at a high level in class, therefore any student wanting to check their grade should schedule a time to meet or come during office hours within 10 business days of the grades being released at the latest.

Makeup policy

University-approved excuses with tangible evidence should be discussed with me on a case-by-case basis to address any missed assignments/exams. You are responsible for informing me of any significant issues that come up at your earliest and no later than 1 week after the missed deadline.

Attendance Policy

Class attendance and participation are the student's responsibility. Students are expected to attend every class and complete all assignments. Graded in-class exercises/pop quizzes and bonus points may be given in class at any time throughout the semester.

Honor Code

All material submitted for this course should be a student's own original work. Assignments are to be done individually and collaboration will be considered a violation of the Honor Code.

Accommodation for Disability

AUB strives to make learning experiences accessible for all. If you anticipate or experience academic barriers due to a disability (such as ADHD, learning difficulties, mental health conditions, chronic or temporary medical conditions), please do not hesitate to inform the Accessible Education Office. To ensure that you receive the support you need and to facilitate a smooth accommodations process, you must register with the Accessible Education Office (AEO) as soon as possible: accessibility@aub.edu.lb; +961-1-350000, x3246; West Hall, 314.