Course number and name	END 432 / Facility Layout
Credits, contact hours, categorization of credits	3 credits / 42 hours / Engineering topic
Instructor or course coordinator	Ufuk CEBECİ
Text book and other supplemental materials	• Francis, R. L., White, J.A., *Facility Layout and Location, An Analytical Approach*, PEARSON INDIA; 2nd edition 2015. • Singh, N., Rajamani, D., *Cellular Manufacturing Systems, Design, Planning and Control,* Chapman & Hall, 1996. • *Facilities Design*, Heragu, S., PWS Publishing, Boston, 1997. • *Modeling and Analysis of Manufacturing Systems*, Wiley, 1993. • Erkut, H., Baskak, M., *Tesis Tasarımı*, İrfan Yayıncılık, Yönetim Bilimleri Dizisi:3, 1996. • Tompkins, J.A., *Facilities Planning*, New York, John Wiley and Sons, 1984.

Course information	
Content	To give the ability to determine the appropriate layout so that the resources (labor, machine and equipment etc.) can be used effectively. To discuss the methods which represent the flow of production and service resources numerically. To teach lean manufacturing philosophy and fundamental techniques. To discuss the techniques for a plant location selection.
Prerequisites	None
Type	Selected elective

Course learning outcomes
Students who pass the course will be able: I. Determine the flow intensity via MAG calculation II. Organize machine and plant layout III. Apply at least one clustering method IV. Solve the multi-criteria plant layout selection problem V. Design lean manufacturing system (SMED, Poka Yoke, 5S).

Student outcomes	Level of contribution
SO1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	Not applicable
SO2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	High
SO3. An ability to communicate effectively with a range of audiences.	Partial
SO4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	Not applicable
SO5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	High
SO6. An ability to develop and conduct appropriate experimentation, analyse and interpret data, and use engineering judgment to draw conclusions.	Partial
SO7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	Not applicable

Week	Topics	Learning outcome(s)
1	Introduction & Fundamentals of Facility Planning	I-V
2	Product & Equipment Analysis; Capacity Planning	II
3	Manufacturing Systems & Material Flow Analysis	I, II
4	Traditional Approaches to Facility Layout	I, II
5	Algorithms for Layout Problem	I, II
6	Design of Process-Based Production Systems	I, II
7	Design of Serial Production Systems	I, II
8	Lean Manufacturing and Design of Cellular Production Systems	II, III, V
9	7 S (5 S) and Layout Design in Lean Manufacturing	II, III, V
10	Design of Storage Systems	II, III, V
11	Design of Material Handling Systems	II, III, V
12	Facility Location Problems and Solution Methods	IV
13	Facility Location Problems and Solution Methods	IV
14	Presentation of Student Projects	I-V