

Course number and name	END 316 / Group Technology and Flexible Manufacturing Systems
Credits, contact hours, categorization of credits	3 credits / 42 hours / Engineering topic
Instructor or course coordinator	M. Bülent DURMUŞOĞLU
Text book and other supplemental materials	<ul style="list-style-type: none"> • Black, JT. and Hunter, S. L. (2003) <i>Lean Manufacturing Systems and Cell Design</i>, Society of Manufacturing Systems. • Nicholas, J. M. (2018) <i>Competitive Manufacturing Management</i>, Taylor & Francis Group • Durmuşoğlu, M. B. (2020) <i>Journey to Lean Transformation</i>, (in Turkish), Optimist Publisher

Course information	
Content	Present complex, dynamic and stochastic nature of manufacturing systems, provide the set of skills to design effective manufacturing systems, introduce modern approaches in the design of production systems.
Prerequisites	None
Type	Selected elective

Course learning outcomes
<p>Students who pass the course will be able to:</p> <ol style="list-style-type: none"> I. Apply Group Technology principles to production system design II. Design Flexible manufacturing systems III. Design manufacturing cells and cellular organization IV. Develop Material requirement plan, apply periodic batch and Kanban control approaches V. Conversion to Cellular/Flexible Manufacturing Systems from Conventional Manufacturing Systems

Student outcomes	Level of contribution
SO1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	Partial
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.	Partial
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.	Little
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.	Partial
SO6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	Little
SO7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	High

Week	Topics	Learning outcome(s)
1	Introduction – Waste elimination in Manufacturing Systems	I, II
2	Waste elimination in Manufacturing Systems (continued) – Lean Thinking and Lean Manufacturing	I, II
3	Design of Manufacturing Systems – Group Technology and Cellular Manufacturing 1	I, III
4	Group Technology and Cellular Manufacturing 2 –Analysis of Team Work by Cellular Manufacturing – Office Cells – Examples from Real Life Cellular Manufacturing	I, III
5	Group Technology Clustering Methods – 1	I
6	Group Technology Clustering Methods – 2	I
7	Cell Layout Design	I
8	A mathematical model for exceptional element elimination	I, III
9	Parts classification and coding	IV
10	Material Requirements Planning and Periodic Batch Control	IV
11	Value Stream Management and Kanban Production Control - 1	I, III, IV
12	Term Project Presentations 1	I, III, V
13	Value Stream Management and Kanban Production Control - 1	I, III, IV
14	Applied Team Project Presentation	I, III, V