

Course number and name	END 201 / Industrial Engineering Applications in Python
Credits, contact hours, categorization of credits	2 credits / 28 hours / Engineering topic
Instructor or course coordinator	Mehmet Ali ERGÜN, Mehmet Yasin ULUKUŞ
Text book and other supplemental materials	<ul style="list-style-type: none"> • Engelbrecht, Andries P. (2019). <i>Computational Intelligence: An Introduction</i>, 2th ed. Wiley • VanderPlas, Jake (2017). <i>Python Data Science Hand Book</i>, 2th ed. USA: O'Reilly Media. • Anaconda for Python

Course information	
Content	Programming and algorithm development necessary for Industrial Engineers, Implementing some of the algorithms used in Industrial Engineering Subjects, Forecasting methods, Heuristic Optimization Methods, Scheduling Algorithms, Classification and Clustering Methods, Monte-Carlo Simulations.
Prerequisites	BIL 110E Intr.to Prog.Languages (C) / BIL 100E Intr.to Prog.Languages (Python)
Type	Required

Course learning outcomes
<p>Students who pass the course will:</p> <ol style="list-style-type: none"> I. Know concepts of Industrial Engineering problems. II. Learn algorithms used in Industrial Engineering. III. Learn to develop algorithms to solve Industrial Engineering Problems. IV. Learn to solve Industrial Engineering Problems using a programming languages.

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.	Not applicable
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.	Little
SO6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	High
SO7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	Partial

Week	Topics	Learning outcome(s)
1	Review of Programming Basics	I, IV
2	NumPy Library	I, IV
3	Pandas Library	I, IV
4	Forecasting Methods	II-IV
5	Scheduling Methods - Single Server	II-IV
6	Scheduling Methods – Multiple Servers	II-IV
7	Path Optimization – Travelling Salesman Problem	II-IV
8	Simulated Annealing	II-IV
9	Heuristic Optimization – Genetic Algorithm	II-IV
10	Least Square and Gradient Descent	II-IV
11	Inventory Control	II-IV
12	Classification with Naïve Bayes Method	II-IV
13	Classification with K-Nearest Neighbors	II-IV
14	Clustering with K-Means	II-IV