

### COURSE RECORD

Code	PA 522
Name	System Dynamics and Simulation
Hour per week	3 (3 + 0)
Credit	3
ECTS	7.5
Level/Year	MSc / 1
Semester	Fall, Spring
Type	Elective
Prerequisites	-
Description	This is an introductory course in computer simulation, which covers the use of simulation as a decision-making, comparison or estimation tool. The emphasis is on basic concepts and methods in developing system dynamics models for the analysis of policies and strategies. The contents include various subjects such as causal loop diagrams, stock and flow structure of the systems, and growth models. The students will also learn how to use Vensim software as well.
Objectives	Introducing the students to visualizing a complex organization in terms of the structures and policies that create dynamics Introducing the students to the fundamental methods and structures for non-linear and complex systems
Learning Outcomes	By the end of the course, the student will be able to LO1. Map the feedback structure of a system using causal loop diagrams LO2. Identify stocks and flows LO3. Model growth strategies LO4. Model diffusions, delays, and oscillations LO5. Validate system dynamics models LO6. Build system dynamics models using contemporary SD software

### CONTRIBUTION TO PROGRAMME OUTCOMES\*

	PO1	PO2	PO3	PO4	PO5	PO6
L01	2	2	0	1	3	0
L02	2	2	0	1	3	0
L03	2	2	0	1	3	0
L04	2	2	0	1	3	0
L05	2	2	0	2	3	4
L06	4	2	2	1	4	4

\* Contribution Level: 0: None, 1: Very Low, 2: Low, 3: Medium, 4: High, 5: Very High

### COURSE CONTENT DETAILS

Topic	Outcomes
Systems thinking and system dynamics, causal loop diagrams	L01
Stock and flow diagrams, positive and negative feedback systems	L02
Exponential, goal seeking, and S-Shaped growth dynamics	L03
Modelling delays, second order systems, oscillations, non-linear relationships	L03, L04
Supply chain models	L06
Model validation and policy design	L05
System archetypes	L06

### DERS BİLGİLERİ

Kodu	PA 522
Adı	Sistem Dinamikleri ve Benzetimi
Haftalık Saati	3 + 0
Kredi	3
AKTS	7,5
Seviye/Yıl	Yüksek lisans / 1
Dönem	Güz, Bahar
Dersin Dili	İngilizce
Tip	Seçmeli
Ön Şart	-
İçerik	Bu ders, benzetimin karar verme, karşılaştırma veya tahmin aracı olarak kullanımını üzerine giriş niteliğinde bir derstir. Özellikle, politika ve stratejilerin analizi için sistem dinamikleri modellerinin geliştirilmesinde temel kavramlar ve yöntemler üzerinde durulacaktır. Ders, nedensel döngü diyagramları, sistemlerin stok ve akış yapısı ve büyüme modelleri gibi çeşitli konuları içermektedir. Öğrenciler ayrıca sistem dinamikleri modelleri oluşturmak üzere Vensim yazılımının nasıl kullanılacağını da öğreneceklerdir.