Spring 2020

EE430

Introduction to Systems Biology

Syllabus

Meeting times : Monday 13:30, 14:30, 15:30
Text : Uri Alon, "Introduction to Systems Biology: Design Principles of Biological Circuits," CRC Press, 2006
URL : http://web.iyte.edu.tr/~bilgekaracali/EE430/index.htm
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Summary:
This course will begin with a broad description of molecular organization of living cells. The signal transduction networks and the regulation of gene transcription will be studied with regards to molecular circuits modeled by kinetic equations. Mathematical aspects of the development of robustness and functionality will be overviewed.

Course Outline:
Week 1: Introduction to cell biology
Week 2: Molecules of life: Genes and proteins
Week 3: Transcription networks
Week 4: Regulation of gene transcription
Week 5: Network motifs in transcription regulation
Week 6: Network motifs in signaling networks
Week 7: Origins of biological robustness
Week 8: Optimal gene circuits
Week 9: Kinetic modeling of biochemical reactions
Week 10: Kinetic modeling of large scale biomolecular networks
Week 11: Integration of regulatory and metabolic networks
Week 12: Graph theoretic analysis of biological networks
Week 13: Biological networks and drug development
Week 14: Overview

Grading:

Midterm	20%
Final	30%
Homework	20%
Project	30%