Syllabus for

cmpe59e Evolutionary Dynamics

(3+0+0) ECTS 6

2018 Fall

Catalog Definition

Evolution, population dynamics, logistic equation, evolutionary games, Nash equilibrium, evolutionary stable strategy, n-player games, predator-prey models, the Lotka-Volterra equation, evolutionary graph theory, spatial games, cooperation, disease spreading, epidemiological dynamics, evolutionary dynamics of cancer, evolution of language.

Web Site

http://www.cmpe.boun.edu.tr/courses/cmpe59e.

General Information

Instructor:	Haluk O. Bingol
TA:	none
Student TA:	none
Course Schedule:	WWW 345 @BM A6
PS Schedule:	none

Grading

Midterm:	35 %
Final (Project):	50 %
Attendance and Contributions:	15 %

Text Book

- Evolutionary Dynamics; Nowak; *Harvard University Press*, 2006; [QH371.3.M37 N69 2006].

Reference Books

- The Computational Beauty of Nature; Flake; *MIT Press*, 1998; [QA76.6 .F557 1998].
- Modeling Complex Systems; Boccara; *Springer*, 2004; [Q295 .B59 2004].

- Nonlinear Dynamics and Chaos, 2e ; Strogatz; *Westview*, 2014; [Q172.5.C45 S767 2015].

Weekly Program (Tentative)

week	**Subject**
1.	Recap of difference equations, differential equations, nonlinearity
2.	Evolution, mutation, natural selection, logistic equation, deterministic chaos
3.	Population dynamics
4.	Evolution of language
5.	Evolutionary games
6.	Finite populations
7.	Games in finite populations
8.	Evolutionary graph theory
9.	Spatial games
10.	Disease spreading