

Syllabus for
cmpe59e Evolutionary Dynamics

(3+0+0) ECTS 6

2016 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 123 @BM B5
PS Schedule:	none

Grading

Midterm:	25 %
Final (Project):	40 %
Student evaluations:	10 %
Attendance and Contributions:	10 %
Questions:	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; Boccarda; *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

Important Dates (Tentative)

Week	Due	Action
5	19.10.2016/09:00	project proposal v1
6	25.10.2016/13:00	project proposal final
7	31.10.2016/09:00	mt 1: (take home)
8	07.11.2016/13:00	mt 1: (submit)
-	TBA	final: project paper and presentation