

## An Introduction to Neural Networks

### Tentative Course Schedule

**Instructor :** Ömer Morgül

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**Office Hours :** Thurs. 13:30, 15:30.

**TA's :** N. Çiçek, O. Günay.

**Class Time :** Tue. 10:40-11:30 (EB 104)  
Fri. 8:40-10:30 (EB 104)

This is an introductory course on Artificial Neural Networks for senior undergraduate and graduate students. Prerequisites are linear algebra, ordinary differential equations and computer programming. There will be 3-4 term projects and some homework (not on a regular basis).

#### Course Policy :

**1 :** Students are required to check the course web site frequently for course related announcements. For course web page, see :[www.ee.bilkent.edu.tr/~eee443/](http://www.ee.bilkent.edu.tr/~eee443/)

**2 :** All assignments must be prepared individually. Disciplinary action will be taken for those who copy from each other.

#### Topics :

- 1- Introduction.
- 2- Neuron model, neural network structures.
- 3- Learning rules and tasks.
- 4- Perceptron, single layer feedforward networks.
- 5- Multilayer feedforward networks, least mean square algorithm, error back-propagation.
- 6- Recurrent (Hopfield) networks.
- 7- Associative memory, analysis and design.
- 8- Self-organizing networks.
- 9- Radial basis functions.
- 10- Applications.

We will closely follow the following book :

J. M. Zurada, *Introduction to Artificial Neural Systems*, West Pub. Co., S. Paul, 1992.

#### Supplementary Books :

S. Haykin, *Neural Networks, A Comprehensive Foundation*, 2nd ed. Macmillan, New York, 1999.

N. K. Bose, P. Liang *Neural Network Fundamentals*.. McGraw-Hill, 1996.

E. Davalo, D. Naim, *Neural Networks*, Macmillan, 1991 (textbook).

A. Cichocki, R. Unbehauen, *Neural Networks for Optimization and Signal Processing*, J. Wiley, 1993 (textbook).

T. Khanna, *Foundations of Neural Networks*, Addison Wesley, 1990 (textbook).

D. P. Morgan, C. L. Scofield, *Neural Networks and Speech Processing*, Kluwer, 1991 (textbook).

Y. Kamp, M. Hasler, *Recursive Neural Networks for Associative Memory*, J. Wiley, 1990 (textbook).

R. J. Mammone, *Artificial Neural Networks for Speech and Vision*, Chapman and Hall, 1994 (edited book).

T. McKenna, J. Davies, S. F. Zornetzer, *Single Neuron Computation*, 1992 (edited book).