# T-61.5030 Advanced Course in Neural Computing
# EXAMINATION REQUIREMENTS, AUTUMN 2006

The requirements for the examination include the matters discussed on the lectures and exercises. The textbook is S. Haykin, "Neural Networks - A Comprehensive Foundation", Prentice-Hall 1998, 2nd ed. During the course, a lot of partly mathematically demanding matters have been discussed at a fairly quick pace. To keep the amount of work and difficulty of the course at a reasonable level, the matters discussed in the course from the book are divided into two major classes:

A) Basic matters that you should read from Haykin's book. It is not sufficient to read only the slides copied via Edita Prima. However, you need not remember more complicated algorithms etc. in detail, as well as not the derivations presented in Haykin's book.

B) Matters for which you need to know only the general principles and main points. It suffices to learn only the matters presented on the lecture slides. If you want to gain a deeper understanding, you can read also these matters from the book.

In the examination, you are allowed to have along with you a collection of general mathematical formulas (including derivation, integration, and trigonometric formulas etc.) and a function calculator, but neither the study material copied via Edita Prima nor Haykin's book or parts of it.

EXACT REQUIREMENTS FOR THE EXAMINATION

1) Exercise problems and their solutions. Copied via Edita Prima, available also on the home page of the course.

2) Lecture slides. Copied via Edita Prima.

3) Sections that you should read from Haykin's book:

- 2.13, 2.14.

- 7.1-7.7.

- 8.1, 8.3, 8.4 (not subsections 'Asymptotic stability theorem' and 'Stability analysis of the maximum eigenfilters'), 8.5 (to subsection 'Convergence considerations'), 8.6, 8.8-8.10.

- 10.1-10.4. After this, read the article A. Hyvärinen and E. Oja, "Independent component analysis: algorithms and applications" (Neural Networks, vol. 13, 2000, s. 411-430) instead of Haykin's discussion on ICA. Finally, read Haykin's sections 10.6-10.8 (to the beginning of p. 504: Modeling of a perceptual system).

- 11.1-11.5, 11.7.

- 12.1, 12.2, 12.6.

- 13.1, 13.2 (to subsection 'Gamma memory'), 13.3 (to subsection 'Time-delay neural network'), 13.4-13.6, 13.7 (to subsection 'Additive model'), 13.8, 13.10.

- 15.1-15.2, 15.3 (to subsection 'Controllability and observability'), 15.5-15.6, 15.11, 15.13.

4) It suffices to read merely from the lecture slides the following sections in Haykin's book:

- The matters repetited from Chapters 1, 2, and 9 on the first lecture.

- 7.8-7.14.

- 10.5, 10.11-10.15.

- 11.6, 11.8.

- 12.3-12.5, 12.7-12.10.

- 13.9.

- Subsection 'Controllability and observability' from Section 15.3, 15.7-15.10, 15.12.

Please ask for an English translation of the examination sheet at least a few days before the examination day.