# Check Points: Neural Systems: Basics

If you are not able to answer some of these questions, first check the slides and lecture notes. If you still do not understand the question, send me an e-mail at Dario.Floreano@epfl.ch

- What are the advantages of nervous systems?
- Describe main elements of a biological neuron
- Describe membrane dynamics
- Describe types of biological neurons
- What is firing rate and firing time?
- What are the principles of synaptic plasticity in biology (Hebb and STDP)?
- What are hidden units?
- Describe McCulloch-Pitts neuron
- Different types of output functions
- What does a neuron signal? Why?
- Describe the separation of input space
- What is a bias unit?
- Describe types of neural architectures
- What is local and distributed encoding?
- What do convolution filters detect in input?
- What is a receptive field?
- What is learning in an artificial neural network?
- What does Oja's rule do?
- What is pattern of interconnection weights in Self-Organising Maps?
- Describe the delta rule
- What is an error function?
- Why is linear separability important?
- What is a multi-layer perceptron (MLP)?
- What functions should we use for hidden and output units of MLP?
- What is Back-Propagation of error?
- Describe the main steps of activating the network and modifying the weights
- What is learning rate and momentum? How can we prevent over-fitting?
- Describe different architectures for processing time-series data
- What type of temporal encoding does NetTalk use?
- Does the network for odor discrimination use local or distributed encoding of the input?