

# Neural Networks for Health Technology Applications

## Exam Topics

- Basic structure of fully-connected (Dense) neural networks
  - input, output and hidden layers
  - hyperparameters vs. trainable parameters
  - activation function
- Training neural networks for supervised learning
  - problem type: classification (binary/multiclass), regression
  - loss function
  - gradient descent / backpropagation
  - mini-batches
  - optimizer
  - overfitting / underfitting
  - regularization methods
- Convolutional neural networks
  - filters
  - depth, stride, zero padding
  - pooling layers
  - data augmentation
  - 2D for image data, 1D for sequential data (time series)
- Processing text with neural networks
  - tokenization
  - dictionary (word index)
  - word embeddings and word vectors
  - basic structure of RNN (state)
  - vanishing gradient problem, LSTM
- Evaluating the solution
  - train / validation / test
  - accuracy
  - also: sensitivity, specificity, precision/recall
  - confusion matrix