

EE-621

**Adaptation and learning**

Sayed Ali H.

<b>Cursus</b>	<b>Sem.</b>	<b>Type</b>
Electrical Engineering		Obl.
Electrical and Electronical Engineering	MA2, MA4	Obl.

Language of teaching	English
Credits	4
Session	
Semester	
Exam	Multiple
Workload	120h
Weeks	
<b>Hours</b>	<b>56 weekly</b>
Courses	42 weekly
TP	14 weekly
<b>Number of positions</b>	

**Frequency**

Every year

**Remark**

ROOM: DIA 004. On Monday (18.02 to 27.05) from 11.15 to 13.00 and from 14.15 to 16.00 Next time : Spring 2020

**Summary**

In this course, students learn to master tools, algorithms, and core concepts related to inference from data, data analysis, and adaptation and learning theories.

**Content**

The course covers the fundamentals of inference and learning from data, with emphasis on online and adaptive schemes. Students learn about the foundations of adaptive and machine learning techniques in a unified treatment. In particular, the course covers topics related to optimal inference, linear estimation theory, least-squares theory, regularization methods, proximal methods, online and batch methods, stochastic-gradient learning, adaptive filters, generalization theory, Bayes and naive classifiers, nearest-neighbor rules, self-organizing maps, decision trees, logistic regression, discriminant analysis, Perceptron, support vector machines, kernel methods, bagging, boosting, random forests, cross-validation, principal component analysis, neural networks, and adaptive networks. Design projects usually selected from topics related to channel estimation and equalization, echo cancellation, SVM and kernel machines, discriminant analysis, hidden Markov models, deep learning, convolutional networks, and reinforcement learning.

**Learning Prerequisites****Recommended courses**

Prior exposure to probability theory, random processes, and linear algebra is recommended.