

EE-714

**Nonlinear signal modeling and prediction**

Vesin Jean-Marc

Cursus	Sem.	Type
Electrical Engineering		Obl.

Language of teaching	English
Credits	4
Session	
Exam	Multiple
Workload	120h
<b>Hours</b>	<b>56</b>
Courses	28
Exercises	28
<b>Number of positions</b>	<b>20</b>

**Frequency**

Every 2 years

**Remark**

Next time : Fall 2022

**Summary**

The literature on nonlinear signal processing has exploded, and it becomes more and more difficult to identify the most useful approaches for specific contexts. This course presents promising developments for the practical application of nonlinear signal models in various fields of engineering.

**Content**

1. Introduction
2. Summary of linear AR and ARMA modeling
3. Nonlinear AR and ARMA modeling, polynomial models and their estimation
4. Specific nonlinear models (threshold AR, ...)
5. Neural network based modeling and prediction
6. Model selection
7. Chaos theory and applications
8. Kernel-based approaches
9. Laboratory exercises: application of nonlinear modeling/prediction to synthetic and experimental data

**Keywords**

Signal modeling, Signal prediction, Nonlinear autoregression, Parameter estimation.

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

Statistical signal processing

**Assessment methods**

Multiple.