Advanced Control Theory

SCHOOL
Polytech Graduate School of Engineering

CAMPUS
Belle-Beille

LEVEL
Engineering 5th year

OPEN TO EXCHANGE STUDENTS
Yes

SEMESTER
Fall (S1)

- **Degree course:** Graduate School of Engineering - Automation and Computer Engineering
- **Teaching unit:** UE 9.4.1 Voie d'approfondissement systèmes cyber physiques
- **Course language:** English
- **Duration (hours):** 20
- **ECTS:** 2
- **Teacher(s):** Laurent Autrique

Assessment:

- [x] Continuous assessment
- [ ] Final exam

Teaching methods:

[ ] Lecture course		hours	[ ] Case study
[ ] Tutorial course		hours	[ ] Project
[x] Practical work	20	hours	

COURSE DESCRİPTİON

Complex systems will be studied during this lecture dedicated to advanced control. Teacher will present in several parts considered as a whole:

- the investigated process
- the mathematical model
- the theoretical developments for controller design
- an implementation based on Matlab simulink - Sliding mode controller, robust and optimal control, predictive control, non linear systems will be highlighted. Physical systems such as heat exchangers, submarine torpedo, hot air balloon, will be investigated. -

OBJECTİVES

Lectures on control theory for complex dynamic systems

PREREQUİSİTES

Control theory (UE 6-3) , Process control (UE 8-2)

SELECTİVE BİBLİOGRAPHY

E.F. Camacho, C. Bordons, Model predictive control in the process industry, ed. Spinger, 239 pages, 1995.
J.P. Corriou, Process control: theory and applications, Editions Springer, Londres, 752 pages, 2004.
L. Jaulin, Représentation d'état pour la modélisation et la commande des systèmes, ed. Hermès Lavoisier, Paris, 199 pages, 2005.
I.D. Landau, Identification et commande des systèmes, ed. Hermès, 306 pages, 1988.
W.S. Levine, The control handbook, ed. by CRC Press and IEEE Press, 1548 pages, 1996.
P. Lopez, A.S. Nouri, Théorie élémentaire et pratique de la commande par les régimes glissants, Springer, 336 pages, 2000.
K. Zhou, J.C. Doyle, K. Glover, Robust and optimal control, ed. Prentice Hall, 596 pages, 1996. -