SERVICE DE METROLOGIE NUCLEAIRE
RELIABILITY AND SAFETY OF POWER SYSTEMS

MASTER THESES

Academic year **2020-2021**

*The topics listed below correspond more to **themes** in which master theses can be realized, than to a detailed description of topics. Depending on the interest of the students, more theoretical or instead industry-related topics will be developed. Some of the proposed themes are more convenient for an internship, to be made before the master thesis.*
*The themes proposed are preferably **accessible mainly to students in engineering physics and in electromechanical engineering**.*

Forecasting the impacts of an epidemic outbreak and propagation on pharma/medical supply network resilience

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The COVID-19 outbreak has put supply networks under tense pressure what revealed their many critical fragilities and the urgent need to address them.

The objective of the master thesis is, as an exploratory step:

(1) to revisit the concept of supply network resilience (in the light of recent advances in networks' risk, reliability, viability, agility, etc. and performance analyses)
and

(2) to develop a dynamic simulation model which could help to forecast the impacts of an epidemic outbreak and propagation, such as COVID-19, on supply network resilience. The pharmaceutical/medical supply network will serve as a case study.

Prerequisites:
- Course GEST-H501: Logistics & Quality Engineering
- Course GEST-H502: Supply Chain Operations Performance Analytics
- Course PHYS-H524: Reliability and Risk Analysis of industrial installations
- A good knowledge of neural networks, game-theoretic modelling, network theory and quantitative forecasting methodologies.
- A good command of Python programming is a plus.

Some references:
- Wang J., Dou R., Dou, Muddada, R.R., W. Zhang (2018). Management of a holistic supply chain network for proactive resilience: Theory and case study. Computers and Industrial Engineering, 125, 668-677.
- Zhao K., Zuo Z., Blackhurst J.V. (2019). Modelling supply chain adaptation for disruptions: An empirically grounded complex adaptive systems approach. Journal of Operations Management, 65(2), 190-212.