

CONTROL FOR GREEN MECHATRONICS (GREEM)

INTERNATIONAL MASTER

A SPECIALITY OF "CONTROL & ROBOTICS" OF THE FRENCH MINISTRY OF HIGHER EDUCATION & RESEARCH

www.greem-ubfc.fr ; www.ubfc.fr

Besançon France, November 27, 2018

Object: Information

To students: M1 and M2 GREEM

Course title: Mechatronics (Modeling of Mechatronic Systems)

Time: Thursday the 6th of December 2018, 8am – 9:30am,

Place: Room-206B, Building-B, UFR-ST, 16 route de Gray, 25000 Besançon

By: DR Mohammad AL JANAIDEH, Assistant Professor, MEMORIAL UNIVERSITY, ST JOHN'S, NEWFOUNDLAND, CANADA

Bio: <https://www.mun.ca/engineering/about/people/MohammadAlJanaideh.php>



Dr. Mohammad Al Janaideh received the MSc. and Ph.D. degrees in Mechanical Engineering with concentration in controls and mechatronics from Concordia University, Montreal, in 2005 and 2010, respectively. His primary research interests include: design and control of nano-positioning stages for sensitive and fast mechatronic applications, control of cyber-physical mechatronic systems, and control systems for smart materials-based actuators. Between 2010 and 2013, he held research and teaching positions at the University of Bologna, University of Jordan, Concordia University, and the Institute of Mathematics at the Academy of Sciences of the Czech Republic. In 2013, he joined the Department of Aerospace Engineering at the University of Michigan, Ann Arbor as a post-doctoral fellow. At the University of Michigan, his research work focused on adaptive control for nonlinear mechatronic systems based on shape-memory-alloy, piezo and magnetostrictive actuators. In 2015, he joined the Department of Electrical and Computer Engineering at the University of Toronto as

a post-doctoral fellow. At University of Toronto, his primary research work aimed to grapple with adaptive control for mitigating attacks on cyber-physical mechatronic systems. Specifically, mitigating attacks with nonlinear dynamics on actuators in cyber-physical mechatronic systems. At the University of Toronto, he also conducted a research to explore the design of low-noise read-out circuit for sensitive MEMS accelerometers. Recently, before joining Memorial University of Newfoundland, he worked as a senior Mechatronics Engineer at ASML (Advanced Semi-Conductor Manufacturing for Lithography) in the United States.

Abstract of the course:

This lecture discusses about accelerometers with at mechatronics point of view, with a focus on MEMS capacitive accelerometers. After an introduction, modeling and design of capacitive accelerometers are overviewed. Then, interface and signal processing that can be used for them are presented. The lecture includes:

- (i) Introduction on accelerometers,
- (ii) Capacitive accelerometers: principle and applications,
- (iii) Mechanical modeling,
- (iv) Electrical modeling
- (v) Design of capacitive accelerometers,
- (vi) Interface circuit,
- (vii) Case study.