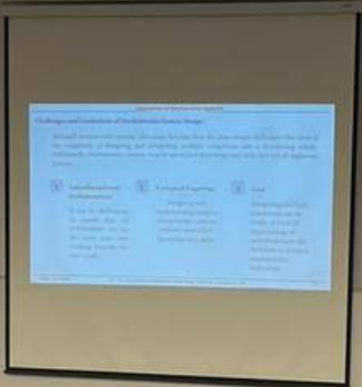












MECH 40001
Introduction to Mechatronics System Design
Lecture 1: Introduction to Mechatronics
Dr. [Name]
[Logos]



YILDIZ TEKNİK ÜNİVERSİTESİ
YÜKSEK İKTİSADİ VE İDARİ BİLİMLER FAKÜLTESİ
İKTİSADİ İSTATİSTİK ANABİLİM DALI
DOKÜMAN NO: İİB-İİS-2023-01
TARİH: 01.09.2023

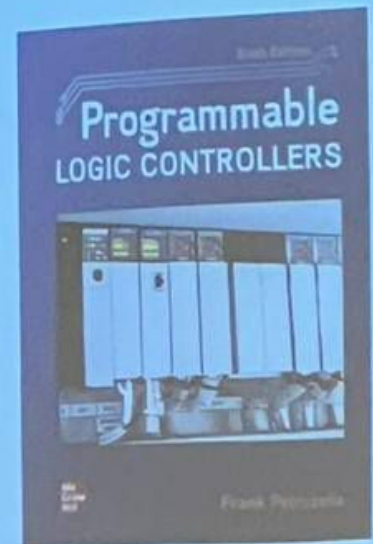
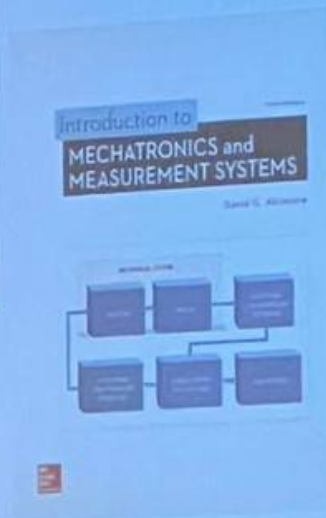
Introduction to Data Science & Analytics

Dr. Öğr. Üyesi
Yıldırım Kaya
yildirim.kaya@yildiz.edu.tr

Yıldırım Kaya



References



LU-FE1 Activities
IEEE / ASME / AI /Robotics Students Clubs

Introduction to Mechatronics System Design

Maher M. EL RAFEI

Associate Professor for Control Systems and Robotics - Director

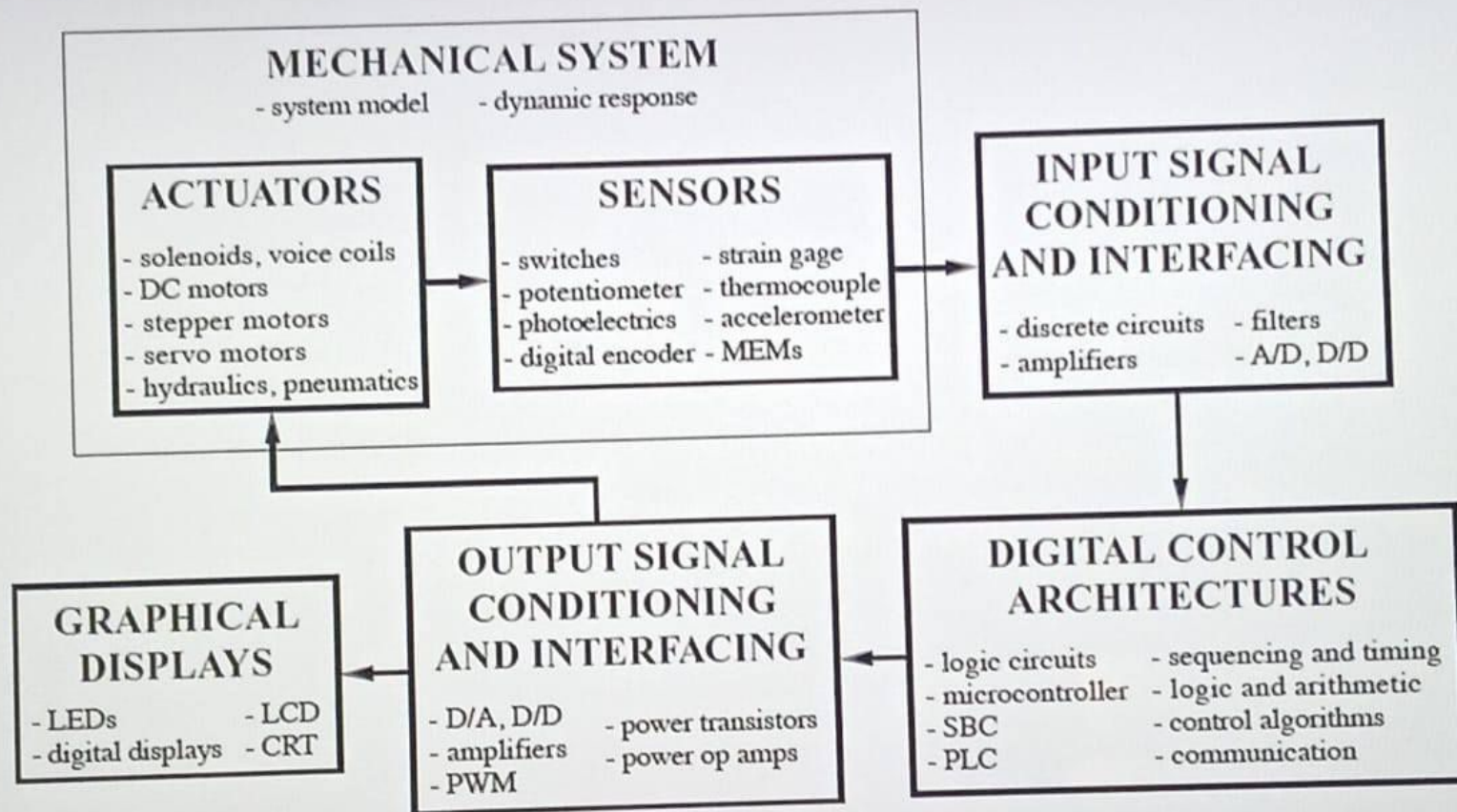
maher.elrafei@ul.edu.lb

Wednesday November 19, 2025

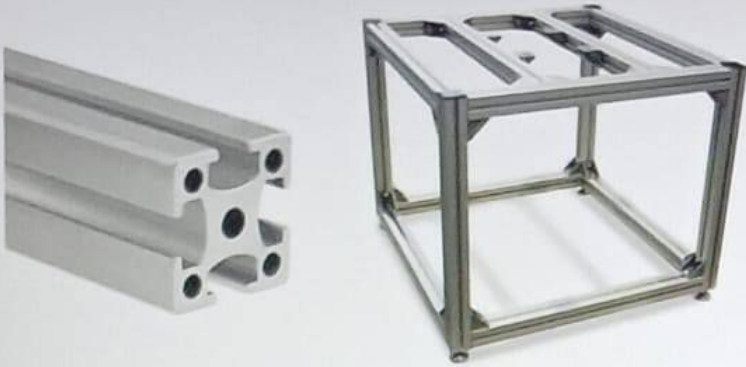


1. Mechatronics Definitions
2. Mechatronics System Components
3. Mechatronics Applications
4. Design Approaches
 - * Electromechanical System Design Approach
 - * Mechatronics System Design Approach (V-Model Approach)
5. References





Mechatronics System Components



Aluminum profiles are widely used as structural supports



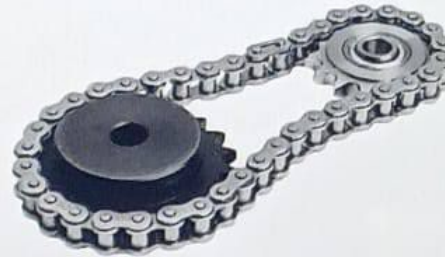
Load Bearing



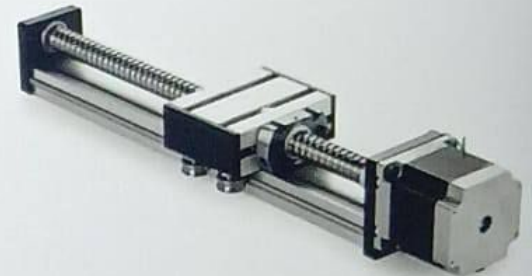
Belt Drives



Gears



Chain and sprocket drives



Lead Screw and Nut Drives

1. Microcontroller Boards: Arduino Controllers
2. SBC: Raspberry Pi Controllers
3. PLCs: Siemens, Schneider Electric, Allen Bradley ...



Application of Mechatronics Systems

The integration of mechanical, electrical, and software systems has led to the creation of complex machines that can perform a wide range of tasks. Mechatronics systems have many applications, from industrial automation to healthcare to entertainment and beyond.



Industrial Automation

Robotic systems that perform repetitive and dangerous tasks in industrial settings.



Healthcare

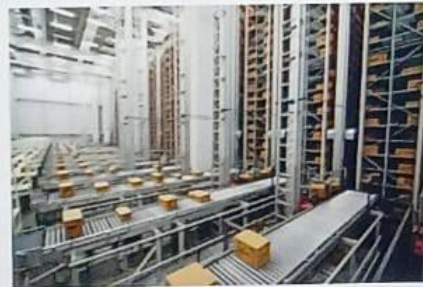
Advanced medical equipment that can perform precise and complex procedures with minimal human intervention.



Delivery Systems

Autonomous machines that can deliver goods and services to remote or hard-to-reach locations.

Applications of Mechatronics Systems



Case Studies of Mechatronics Systems



Tesla Autopilot: A self-driving system that includes ultrasonic sensors, cameras, and radar to detect and avoid collisions.



Robotic Surgery: A system that enables surgeons to operate on patients remotely, using a robot that has a high degree of control and dexterity.

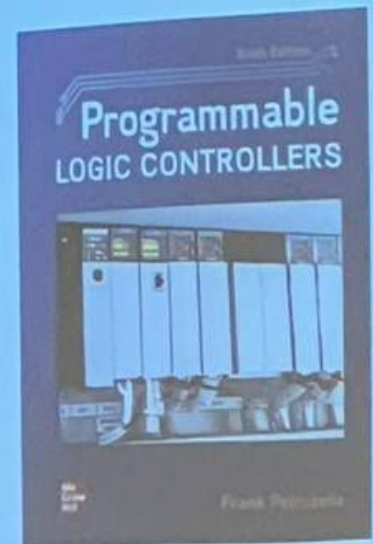
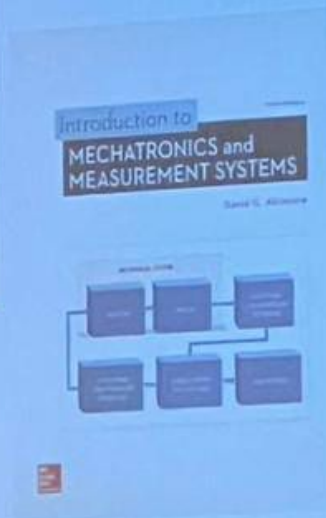


Smart Home Security: A system that combines sensors, cameras, and machine learning to identify potential security risks and alert homeowners of any issues.



Automated Warehouse: A system that uses robotics to move products around the warehouse, reducing human involvement and increasing efficiency.

References



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Presentation



Introduction to Mechatronics System Design

This session includes:

- *Mechatronics definitions*
- *Mechatronics system components*
- *Mechatronics Applications*
- *Design Approaches*



Dr. Maher El Rafei



Wednesday November 19



At 12:00 PM



Auditorium

Associate Professor for Control
Systems and Robotics – Director
Lebanese University, Faculty of
Engineering 1.



Maher El Rafei



Maher El Rafei

