

# Inspire Create Transform



Renovación del Registro  
Calificado otorgado por el  
Ministerio de Educación  
Nacional por 7 años  
(2014 - 2021).  
Resolución Número 076  
3 Enero 2014

# Facts and Figures

## Academic Offering



**6**  
Schools offers

**6**

Doctorate

**33**

Master's degree

**57**

Graduate certificate

**21**

Undergraduate programs

## University community

More than  
**700**

Students Undergo internships every semester

**22.059** Undergraduate students (2017)

**2.600** Graduate Students

**367** Full-time professors

**669** Part-time professors

**98% Of professors hold a master's degree or PhD**

## Internationalization efforts

**260**

Agreements with institutions in  
**36 countries**

**8**

Languages courses offered in the Language Center

**1,198**

Students take part in  
**The Spanish for foreigners program**

# Move towards Excellence

Integrated Design of  
Technical Systems

PhD in  
Engineering

Master of  
Science

Master of  
Arts

Second  
semester  
(Postgraduate)

First semester  
(Minor)

Inspire Create Transform

UNIVERSIDAD  
**EAFIT**<sup>®</sup>



Graduate certificate (Minor)  
**Integrated Design of  
Technical Systems**

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SNIES Registry 54697



# Overviews

## Credits

24 UMES (Tuition Unit of EAFIT. Equivalent to 40 ECTS)

## Degree

Graduate certificate (Minor) in Integrated Design of Technical Systems

## Duration

1 academic year

## Program

Graduate program (Minor) Integrated Design of Technical Systems  
SNIES Registry 54697

## Modality

In-person classes.

## Coordinator

Alejandro Velásquez López - [avelasq9@eafit.edu.co](mailto:avelasq9@eafit.edu.co)

## Schedule

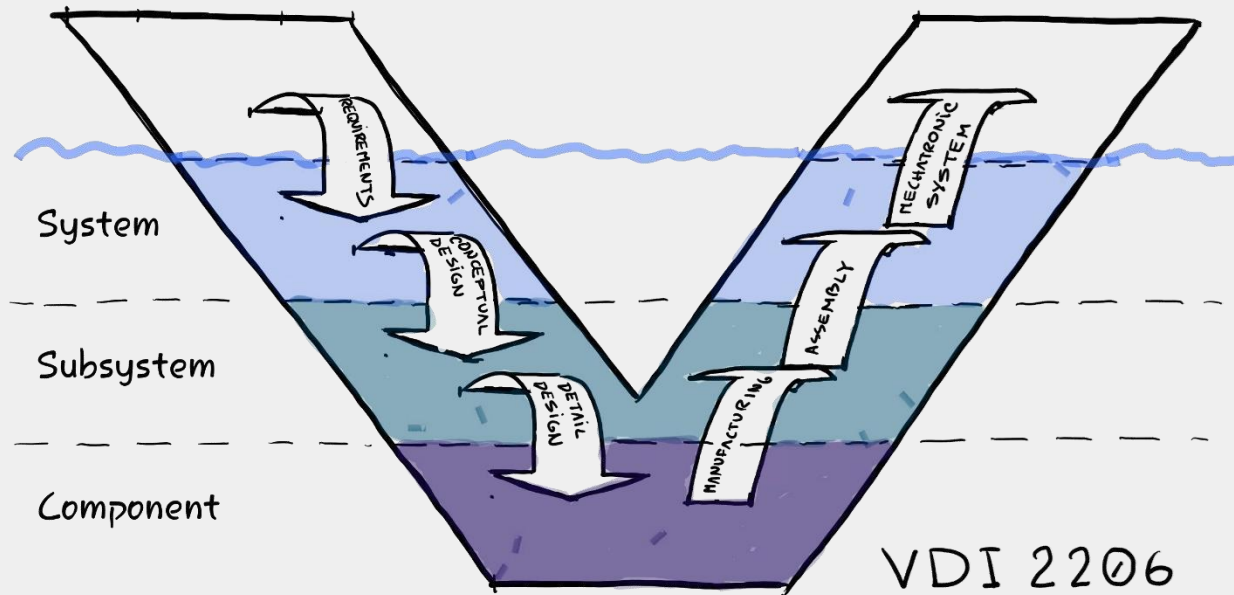
Four (two-hour) classes per week, from Monday through Friday - 17:00 to 21:00



Renewal of the Qualified Registry  
granted by the Ministry of  
National Education  
for 7 years (2014 - 2021).

# Objectives

# 1



To foment the implementation of design methodologies in order to solve multidisciplinary problems.

# 2



**Mechanics**



**Informatics**



**Electronics**



**Electric**

To distinguish the potential of different areas in order to solve specific problems.

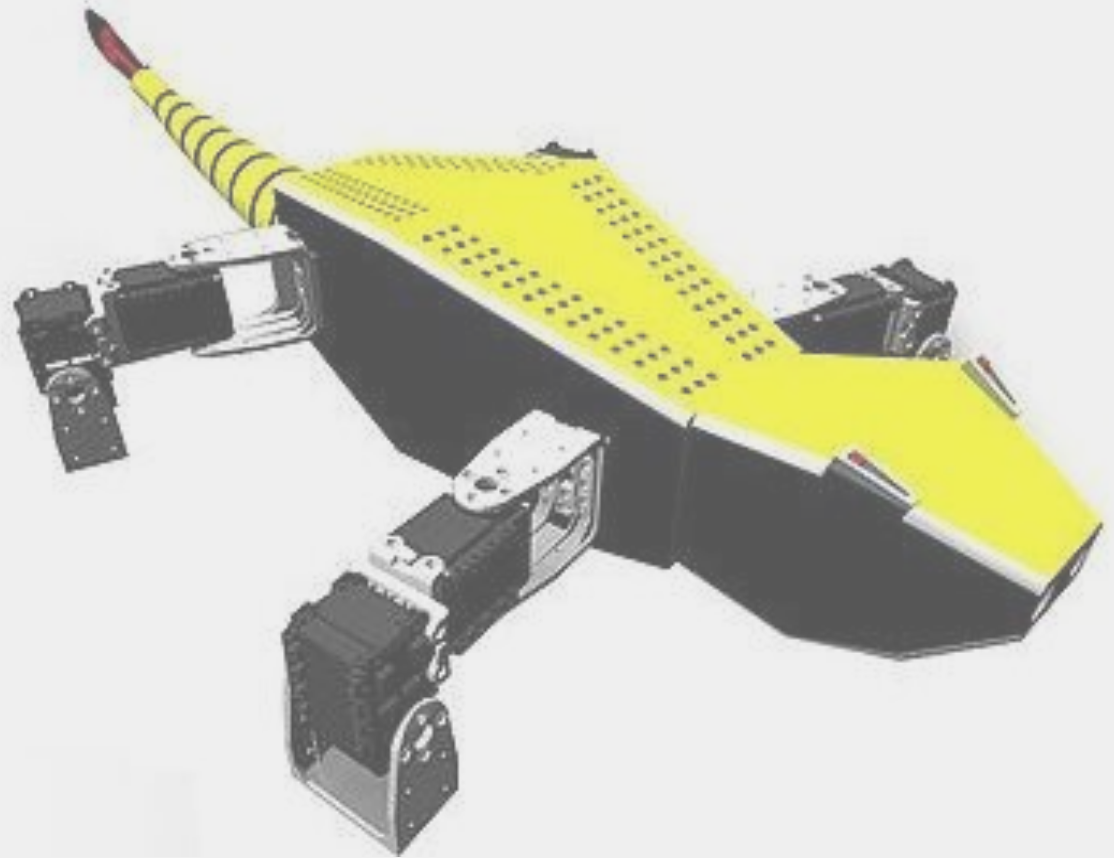
# 3

To emphasize the knowledge integration and teamwork



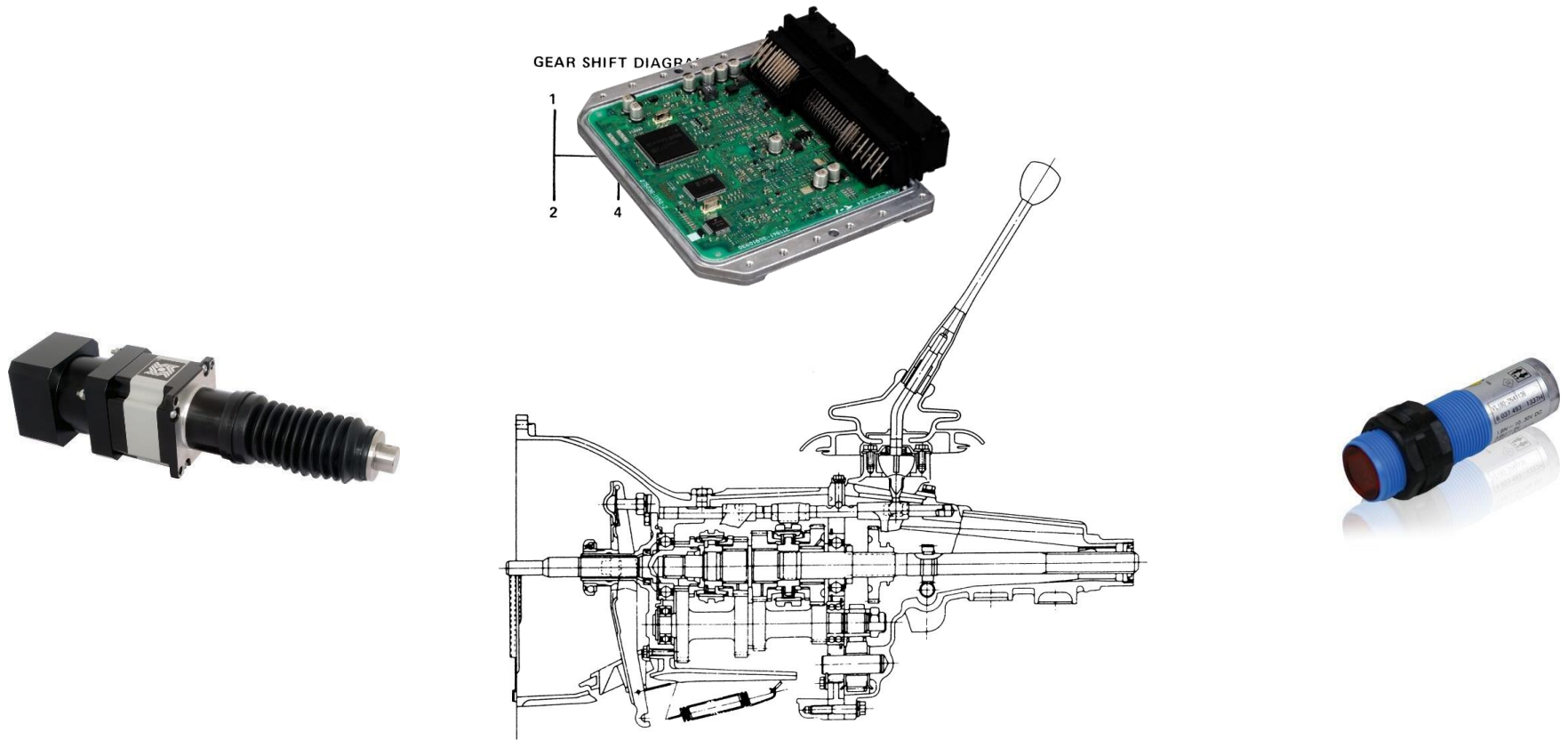


# 4



To appropriate new technologies “to use state of the art technology for new products development”

# Example – Automotive Industry



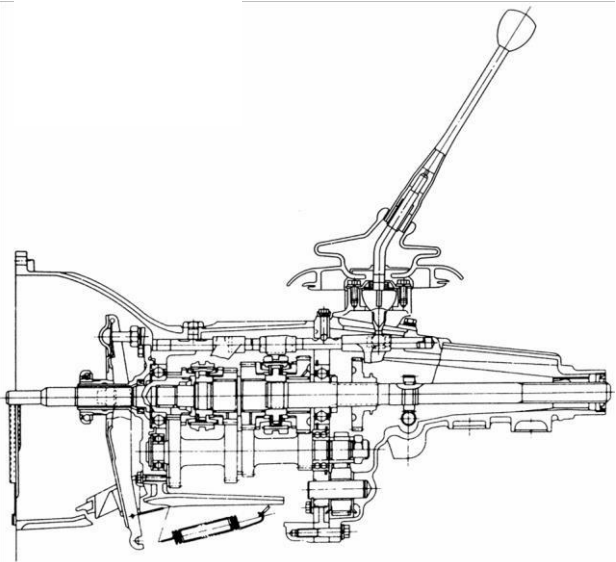
[http://www.autozone.com/repairguides/ISUZU-Amigo-Pick-ups-Rodeo-Trooper-1981-1996/MANUAL-TRANSMISSION/Identification/\\_/P-0900c152800628c6](http://www.autozone.com/repairguides/ISUZU-Amigo-Pick-ups-Rodeo-Trooper-1981-1996/MANUAL-TRANSMISSION/Identification/_/P-0900c152800628c6)

<http://www.haydonkerk.com/LinearActuatorProducts/StepperMotorLinearActuators/CustomActuatorAssemblies/tabid/202/Default.aspx>

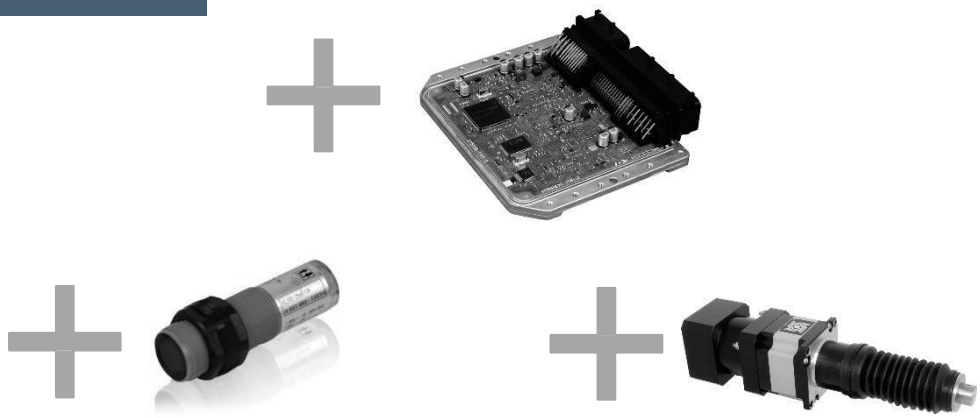
[http://www.directindustry.es/prod/nidec-shimpo/product-11663-1664619.html?utm\\_source=ProductDetail&utm\\_medium=Web&utm\\_content=SimilarProduct&utm\\_campaign=CA](http://www.directindustry.es/prod/nidec-shimpo/product-11663-1664619.html?utm_source=ProductDetail&utm_medium=Web&utm_content=SimilarProduct&utm_campaign=CA)

[https://www.google.com.co/search?q=automatic+manual+transmission&source=lnms&tbn=isch&sa=X&ved=0ahUKewjR7KjT4sLTAhUJ2SYKHWF2BE0Q\\_AUICGgB&biw=1152&bih=635#tbm=isch&q=automated+manual+transmission&imgsrc=-kOhSEoQEj4CJM:](https://www.google.com.co/search?q=automatic+manual+transmission&source=lnms&tbn=isch&sa=X&ved=0ahUKewjR7KjT4sLTAhUJ2SYKHWF2BE0Q_AUICGgB&biw=1152&bih=635#tbm=isch&q=automated+manual+transmission&imgsrc=-kOhSEoQEj4CJM:)

# Example – Automotive Industry



Basic System  
(Manual Transmission)



=



**Mechatronic Systems  
(Automatic Transmission)**

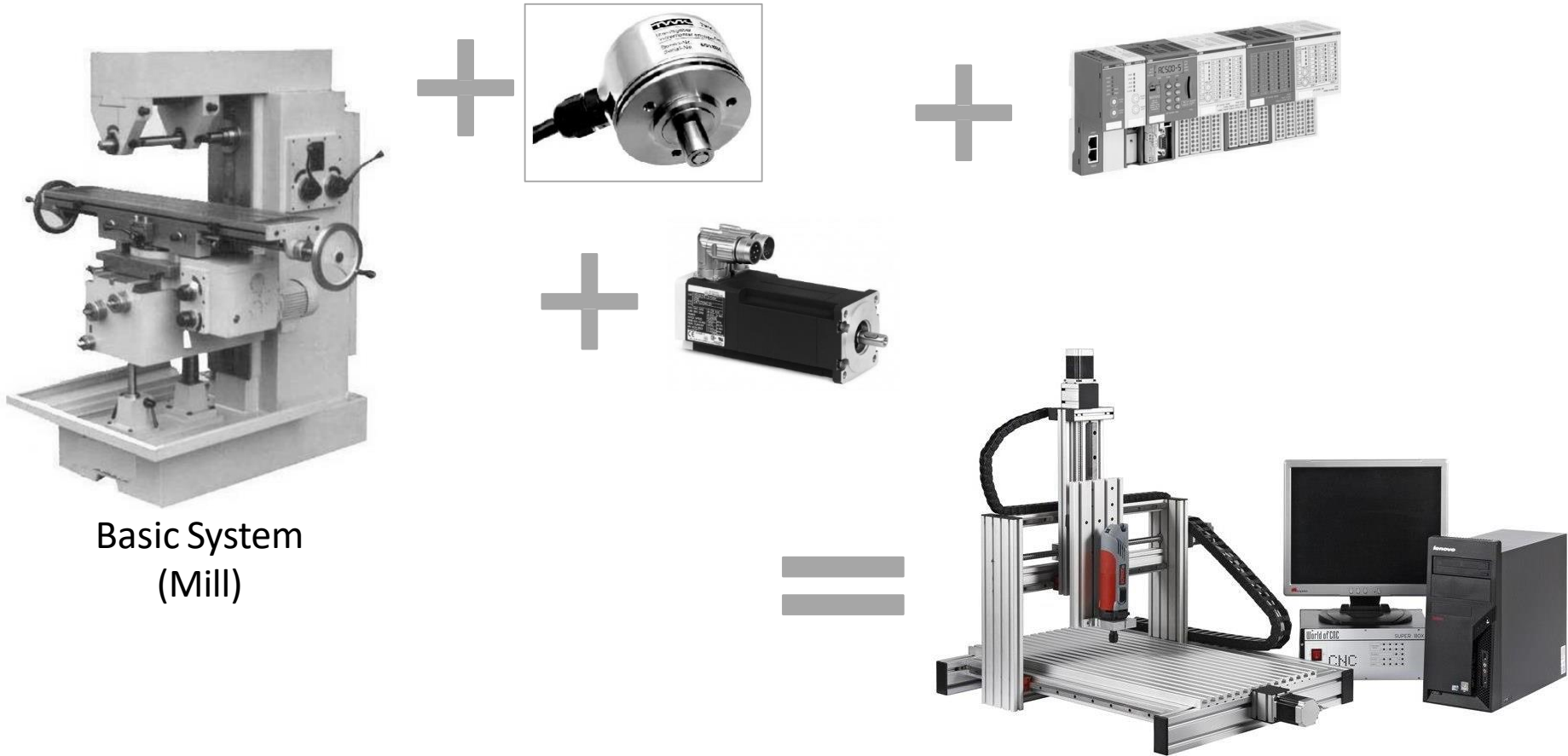
# Example – Manufacturing Industry



<http://linearencoders.yolasite.com/>  
<https://dir.indiamart.com/impcat/universal-milling-machine.html>  
<http://www.generaldrivermotor.com/servomotores/>  
<http://new.abb.com/plc/es/automatas-programables-plc/plc-seguridad-ac500s>



# Example – Manufacturing Industry

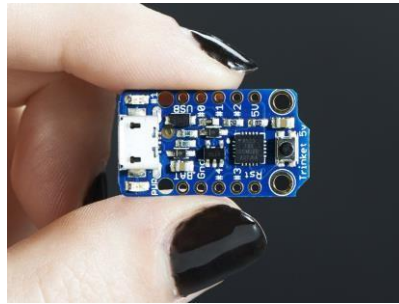


Basic System  
(Mill)

Mechatronic System  
(CNC Machining center)

- <http://linearencoders.yolasite.com/>
- <https://dir.indiamart.com/impcat/universal-milling-machine.html>
- <http://www.generaldrivermotor.com/servomotores/>
- <http://new.abb.com/plc/es/automatas-programables-plc/plc-seguridad-ac500s>

# Example – Health Industry

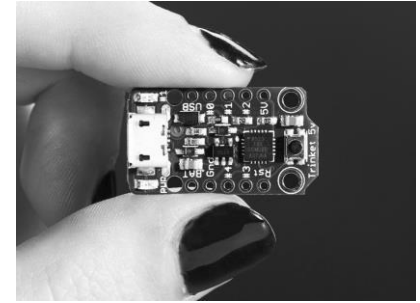
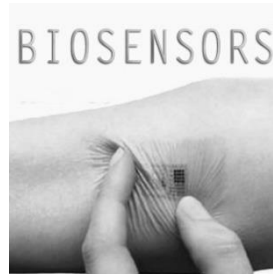


- <http://stronghandtools.com/stronghandtools/products/sharkclamps.php>
- <https://www.adafruit.com/product/1501>
- <http://science.dodlive.mil/2014/04/18/the-science-of-sweat-skin-biosensors/>
- <https://www.medital.com/collections/servo-motors/products/pittman-motors-servo-motors>

# Example – Health Industry

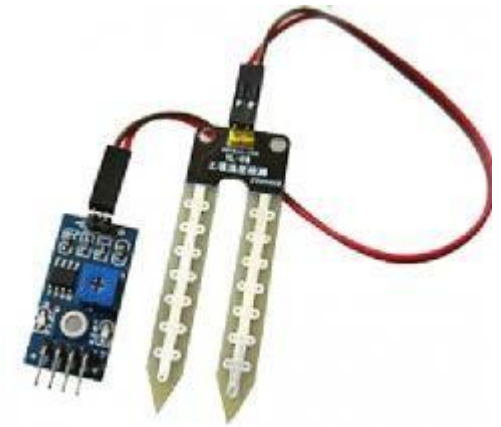


Basic System  
(Clamp)



Mechatronic System  
(Hand Prosthesis)

# Example – Agriculture



<http://kingofwallpapers.com/plant.html>

[http://www.yourduino.com/sunshop/index.php?l=product\\_detail&p=366](http://www.yourduino.com/sunshop/index.php?l=product_detail&p=366)

<http://www.tested.com/tech/robots/456466-know-your-arduino-guide-most-common-boards/>

<http://www.espressotec.com/rancilio-tsc-steam-wand-solenoid-electro-valve.html>

## Inspira Crea Transforma

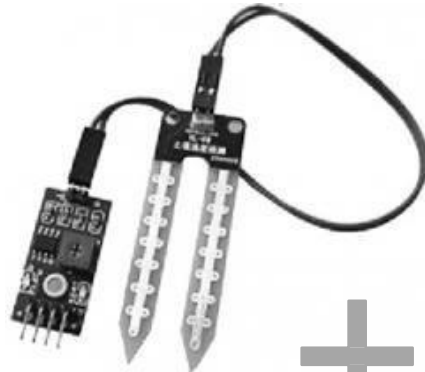
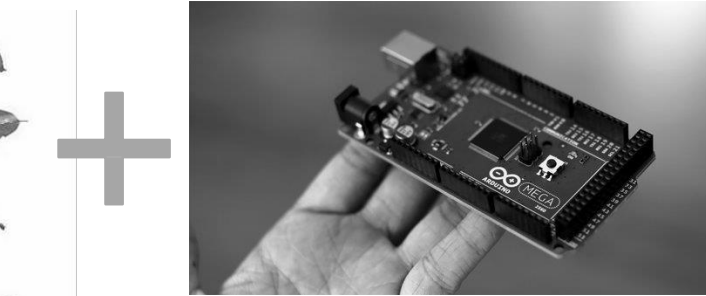
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# Example – Agriculture



Basic System  
(Plant)

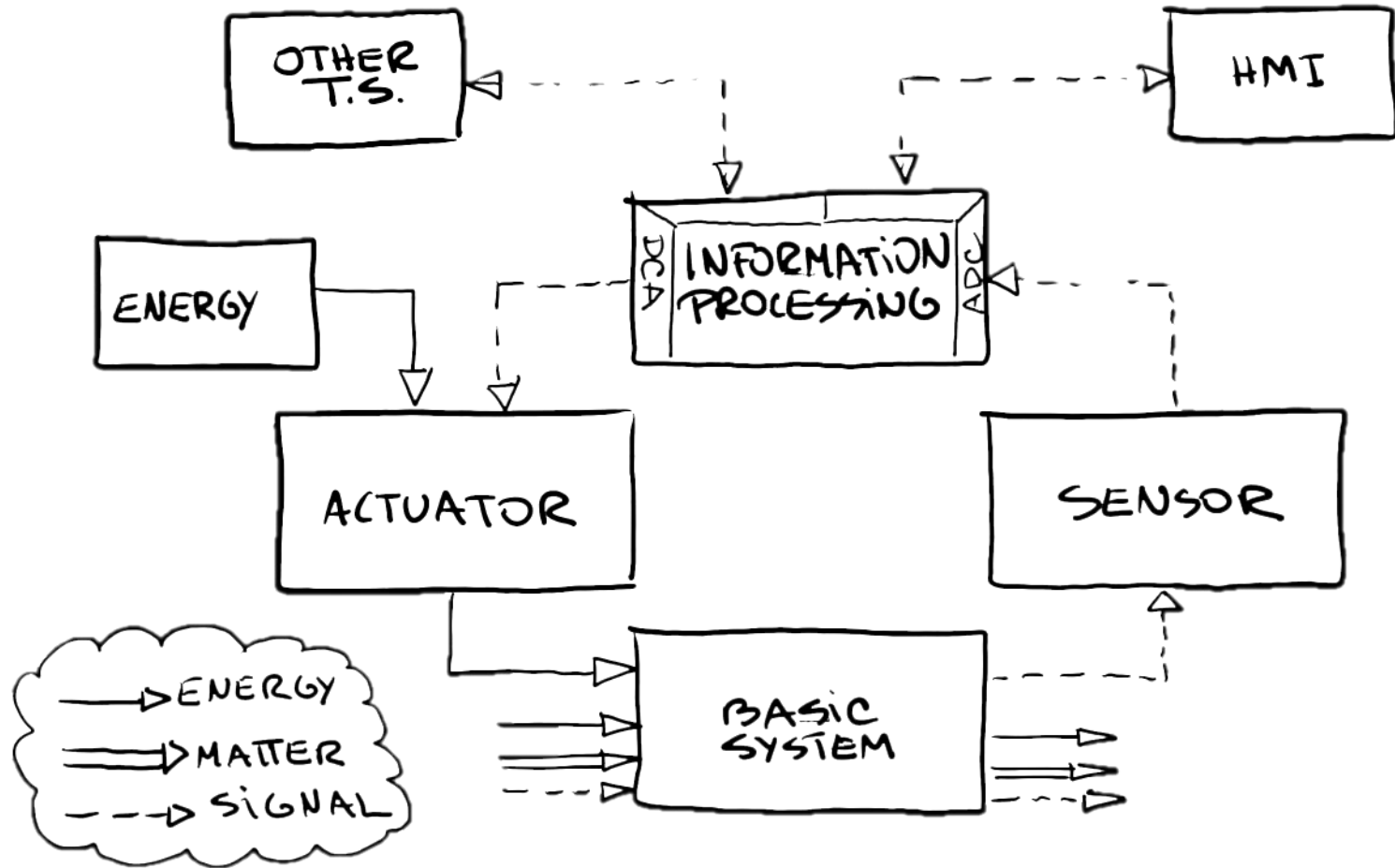


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Mechatronic System  
(Automated Farm)

# Technical system architecture



# Professional profile

Graduates from

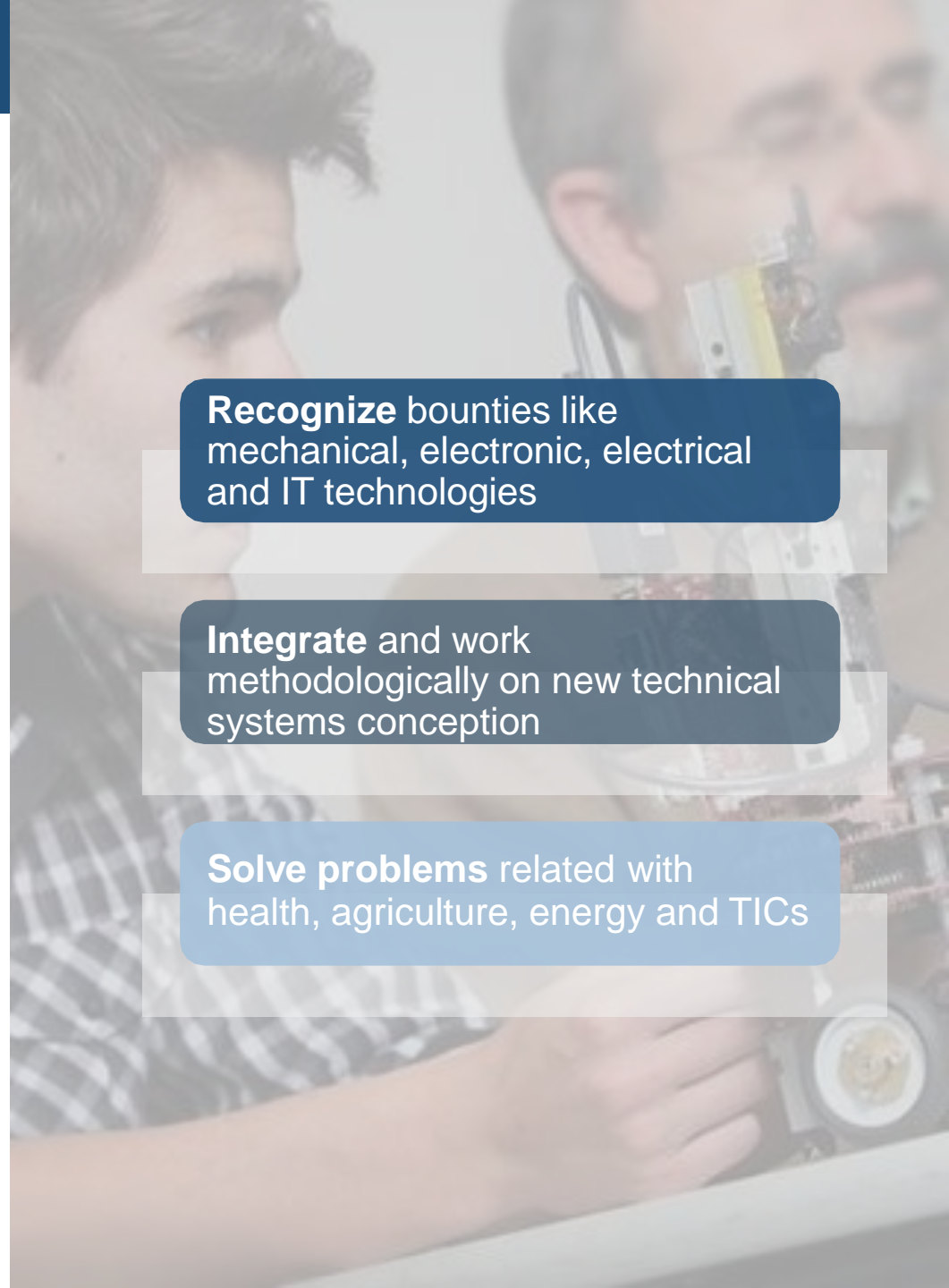
## Integrated Design of Technical Systems

are leaders capable to :

**Recognize** bounties like  
mechanical, electronic, electrical  
and IT technologies

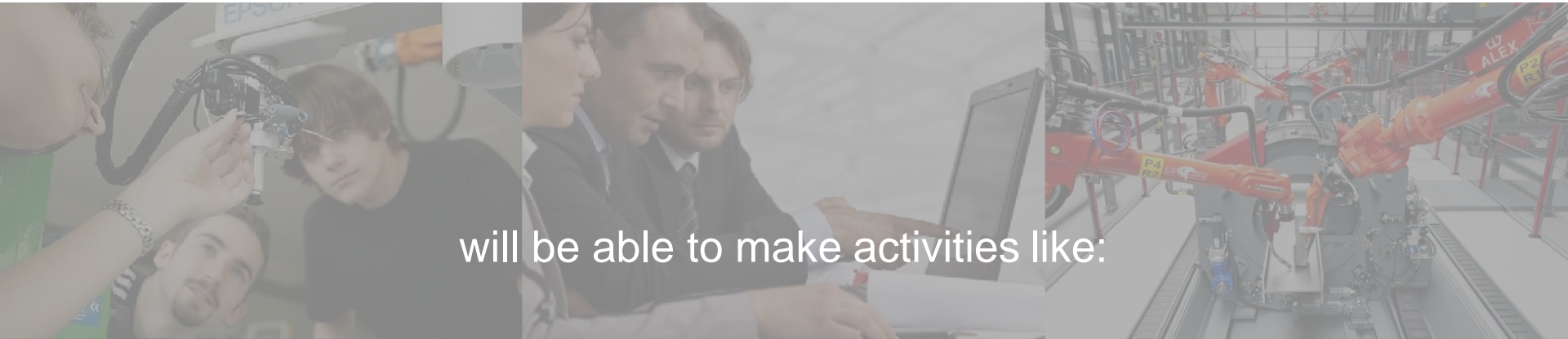
**Integrate** and work  
methodologically on new technical  
systems conception

**Solve problems** related with  
health, agriculture, energy and TICs



# Career Opportunities

## Graduates from Integrated Design of Technical Systems



will be able to make activities like:

Research and development of mechatronic systems.

Consultancy of product design and process automation.

Productive processes automation.



# Trends of the program demand

More than 140 students have taken the program

Since 2011



Our students work on **companies** such as: EPM, Coltabaco, Dometal, and Haceb.



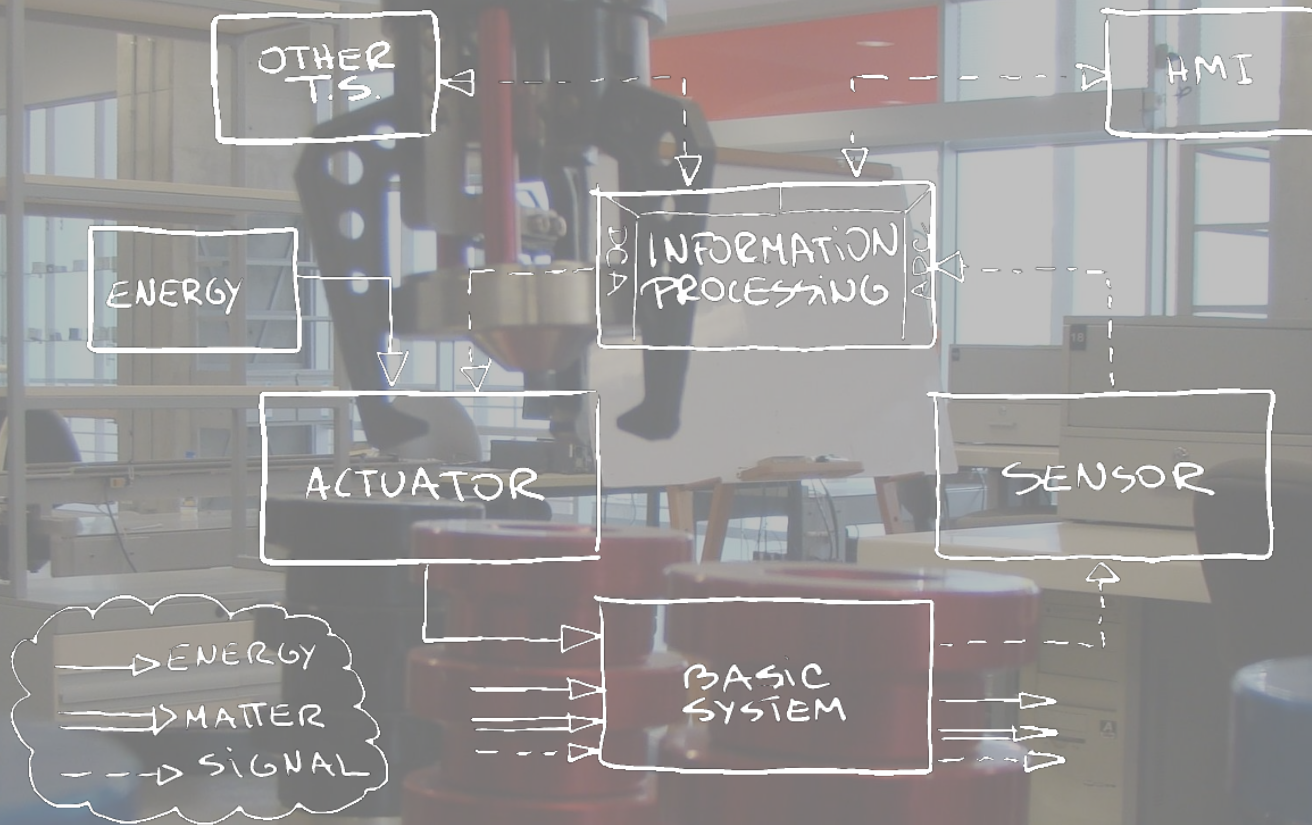
Students from different **backgrounds**

- 50% Mechanical Eng.
- 25% Product Design Eng.
- 12.5% Industrial Eng.
- 12.5% other



89%

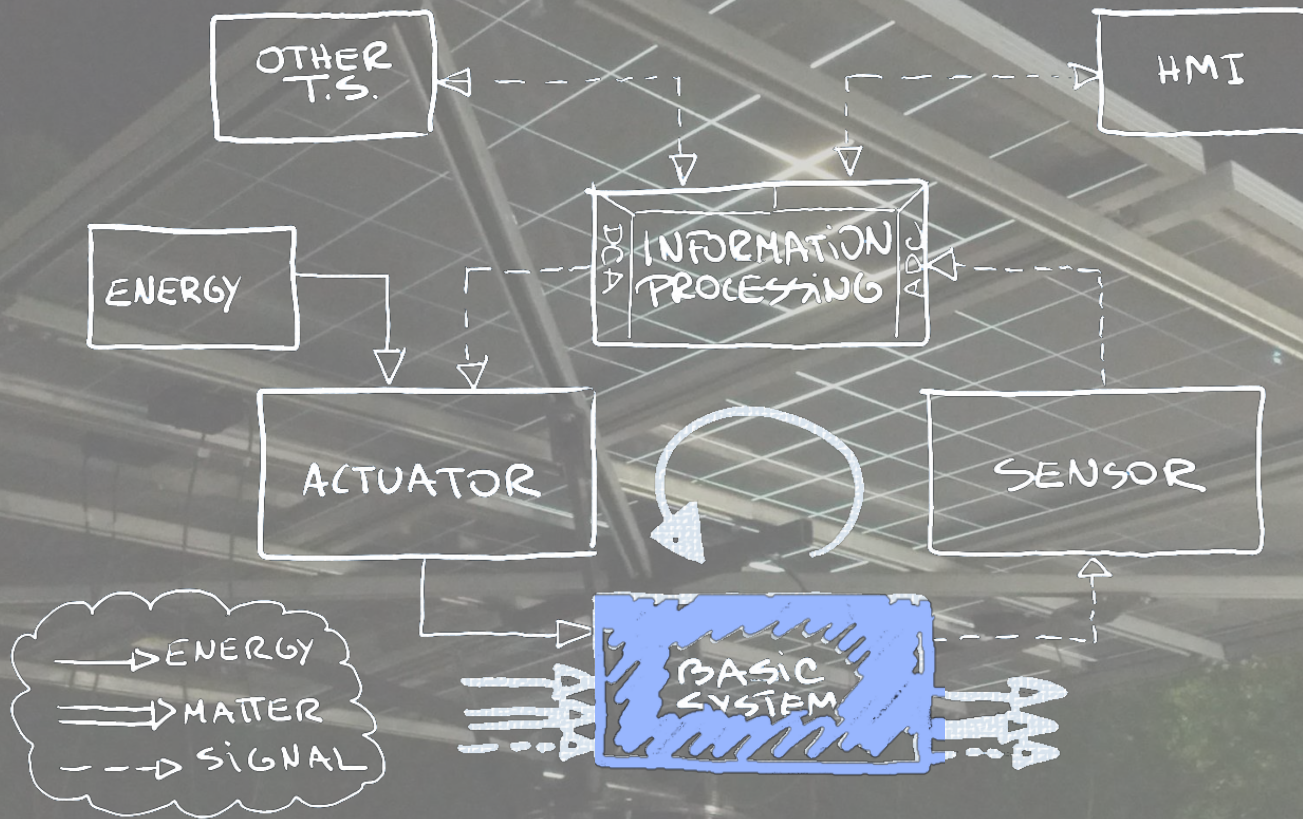
Professors hold a doctorate or master's degree



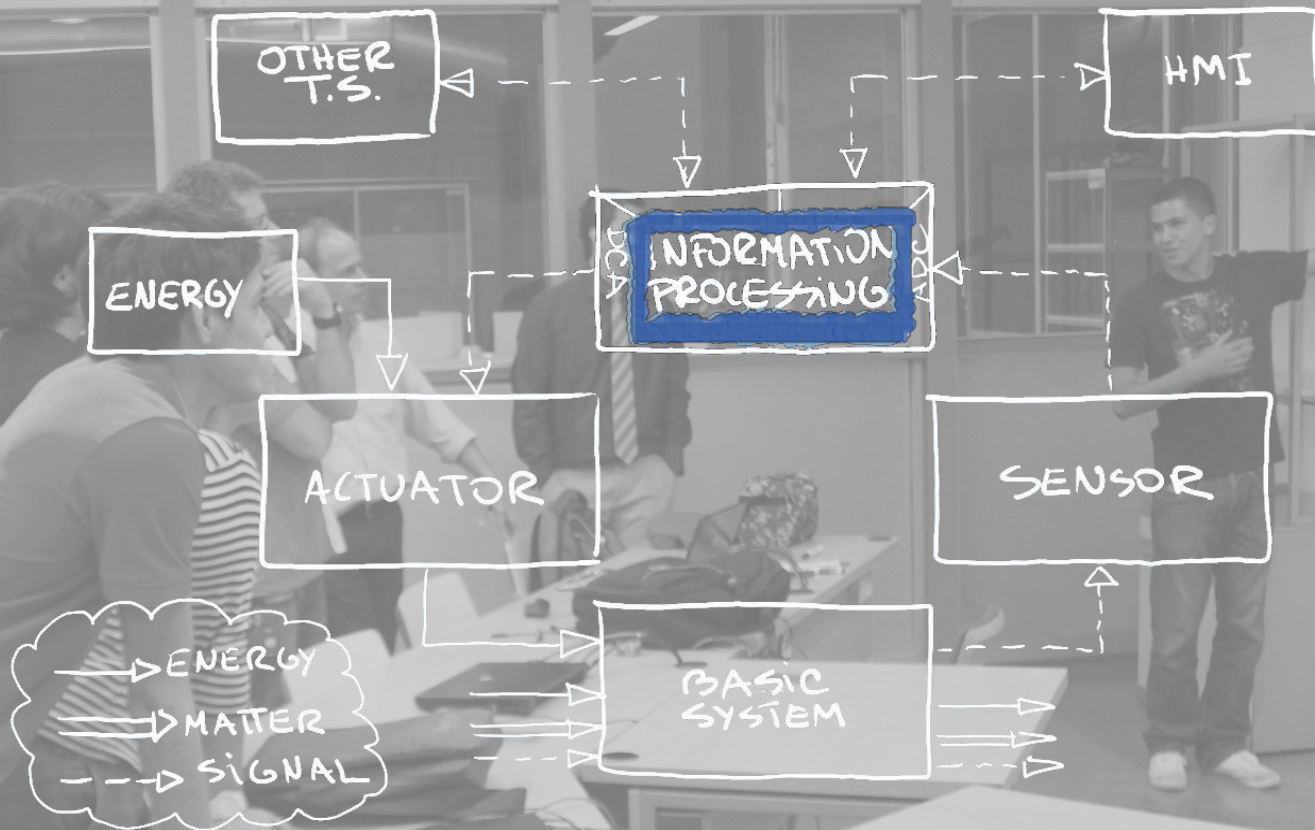
# 1 Academic semester

- ID0615 MECHATRONIC CONCEPTUAL DESIGN
- ID0616 TECHNICAL PROGRAMMING LANGUAGES
- ID0617 ACTUATORS AND SENSORS
- ID0618 PROCESS INTERFACE EQUIPMENT

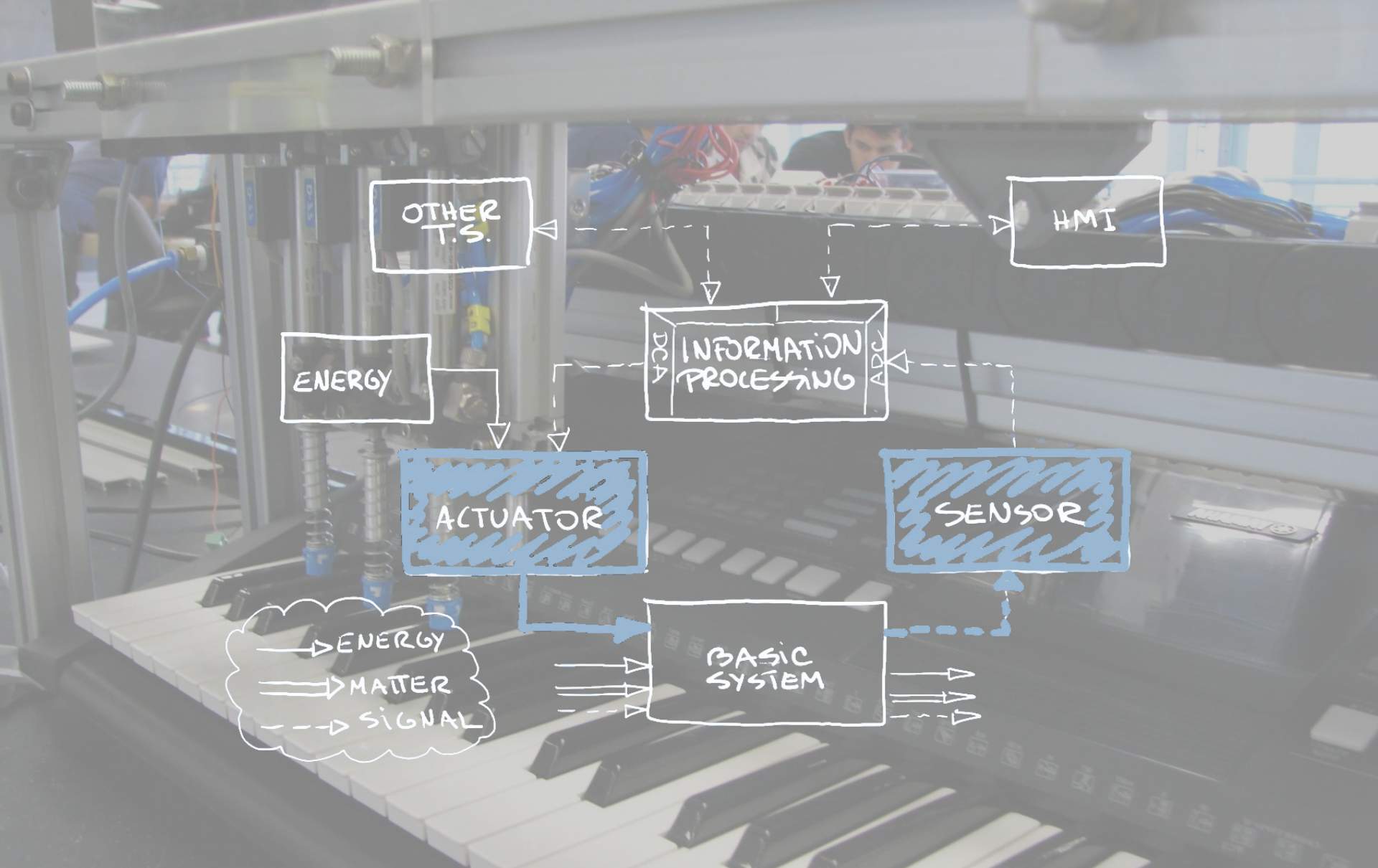










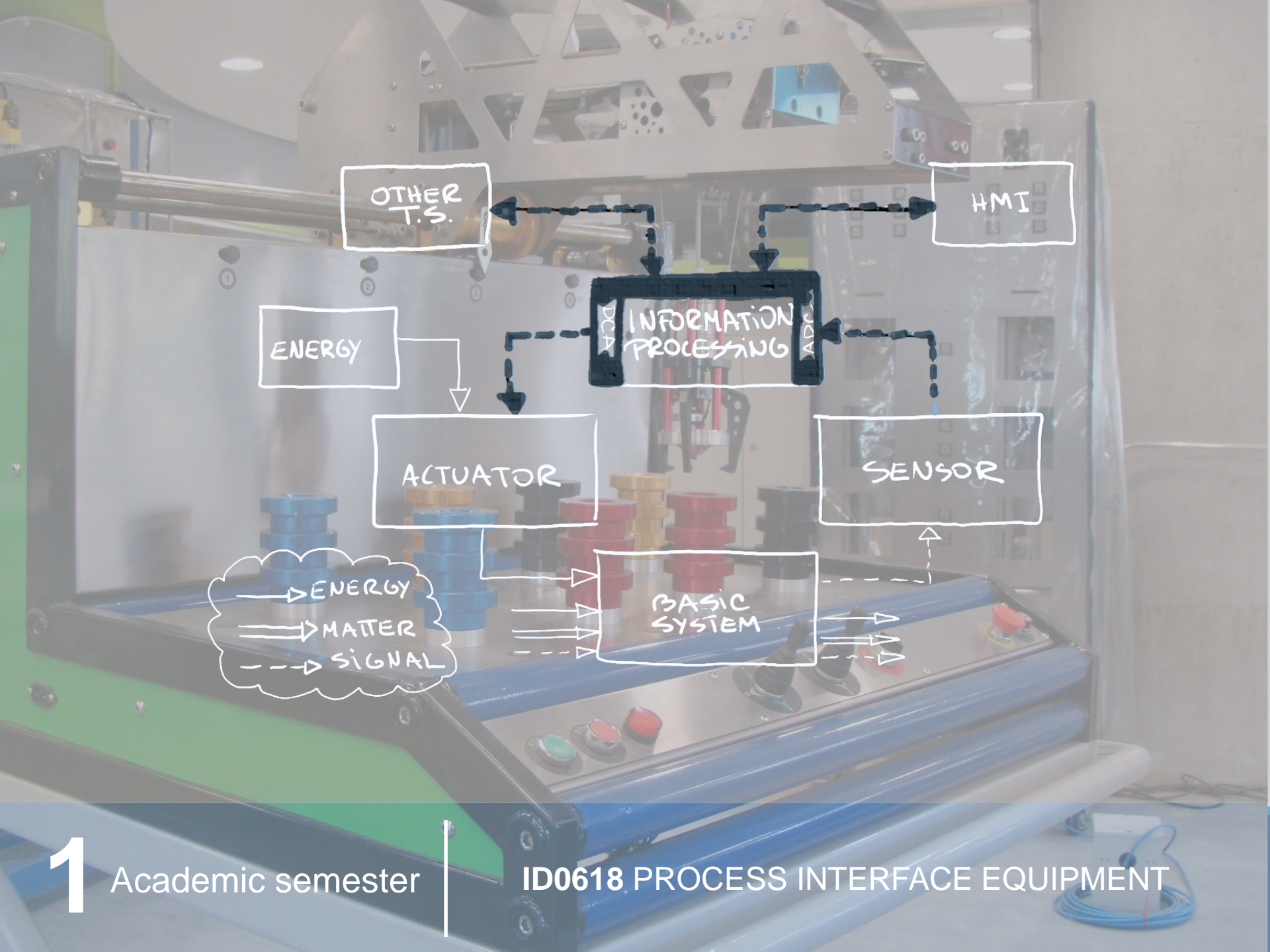


1

Academic semester

ID0617 ACTUATORS AND SENSORS





OTHER T.S.

HMI

ENERGY

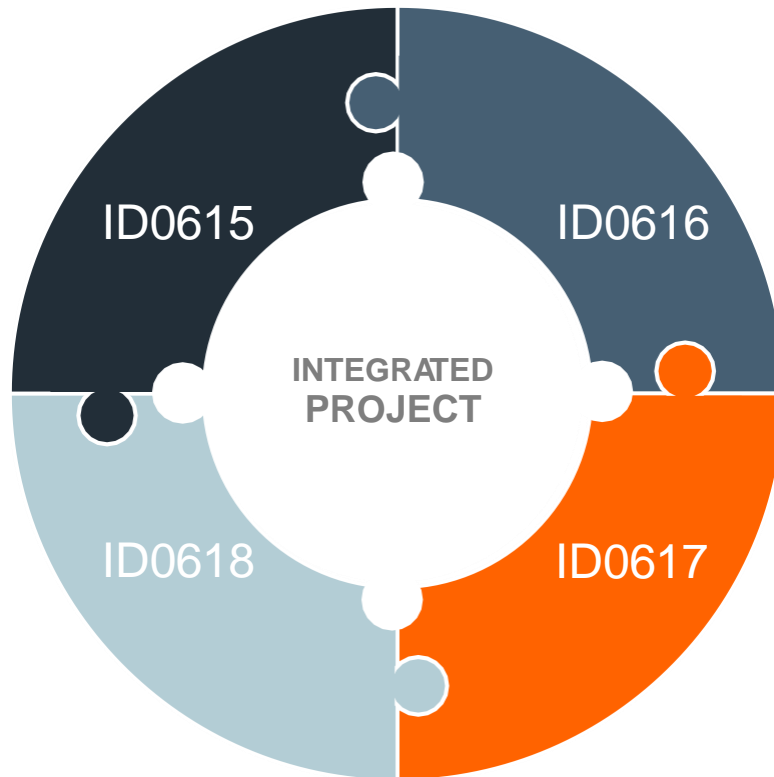
INFORMATION PROCESSING  
DAC ADC

ACTUATOR

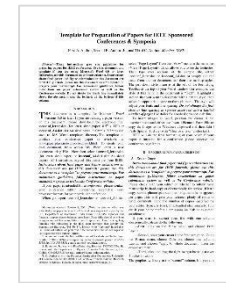
SENSOR

→ ENERGY  
==> MATTER  
- - -> SIGNAL

BASIC SYSTEM



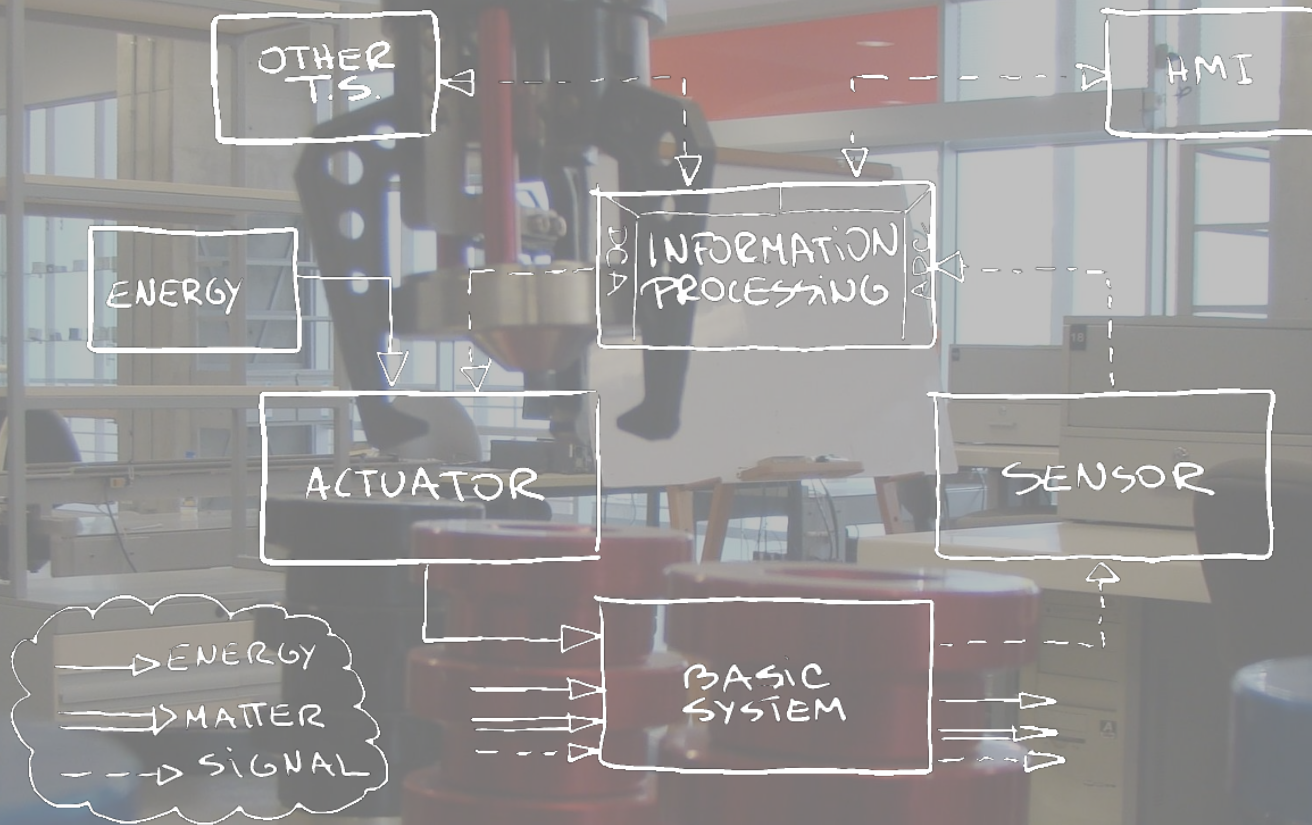
Prototype  
Mechatronic lizard



Paper

- Technical Programming Languages
- Actuators and Sensors
- Process Interface Equipment
- Mechatronic Conceptual Design

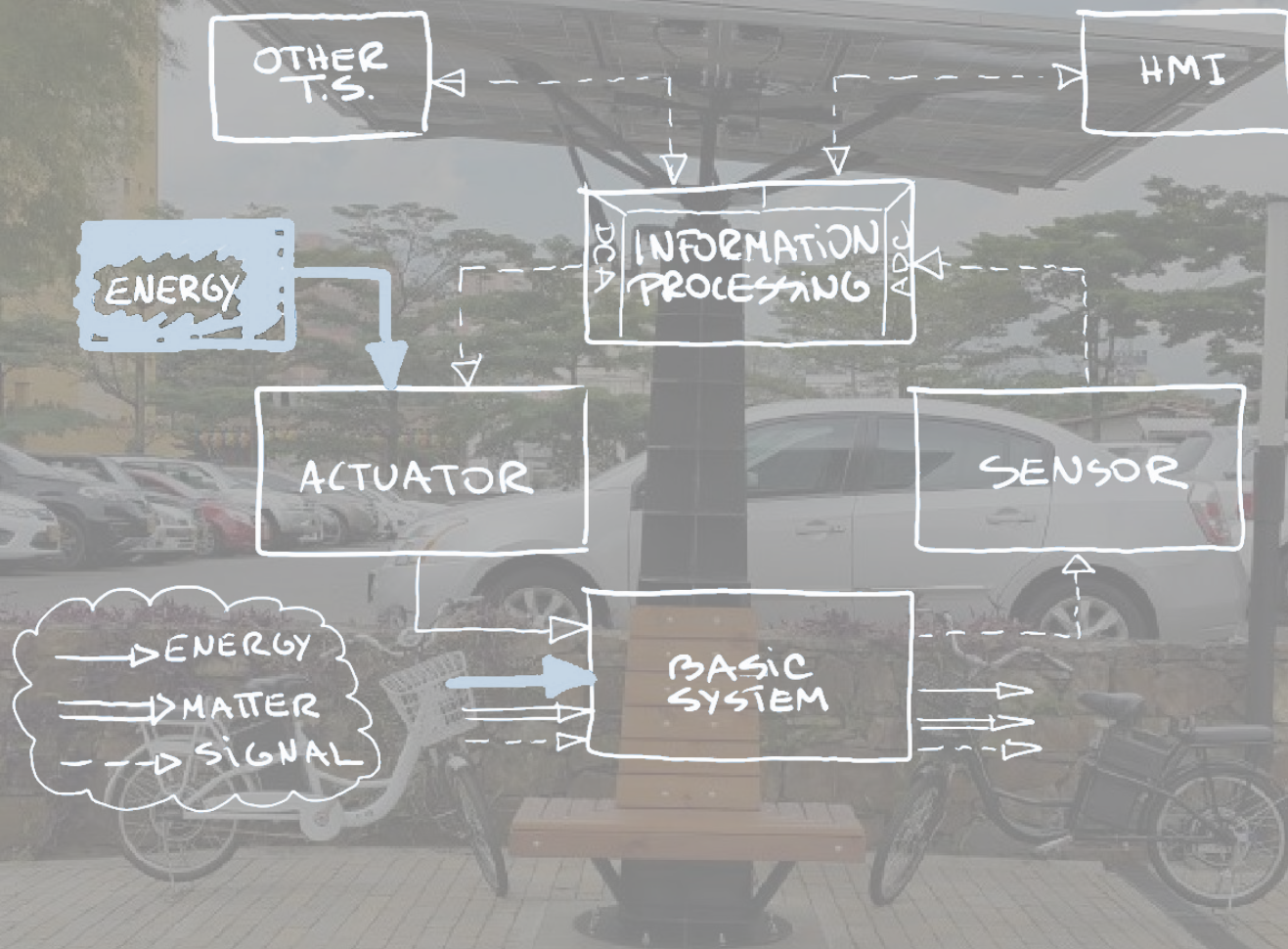




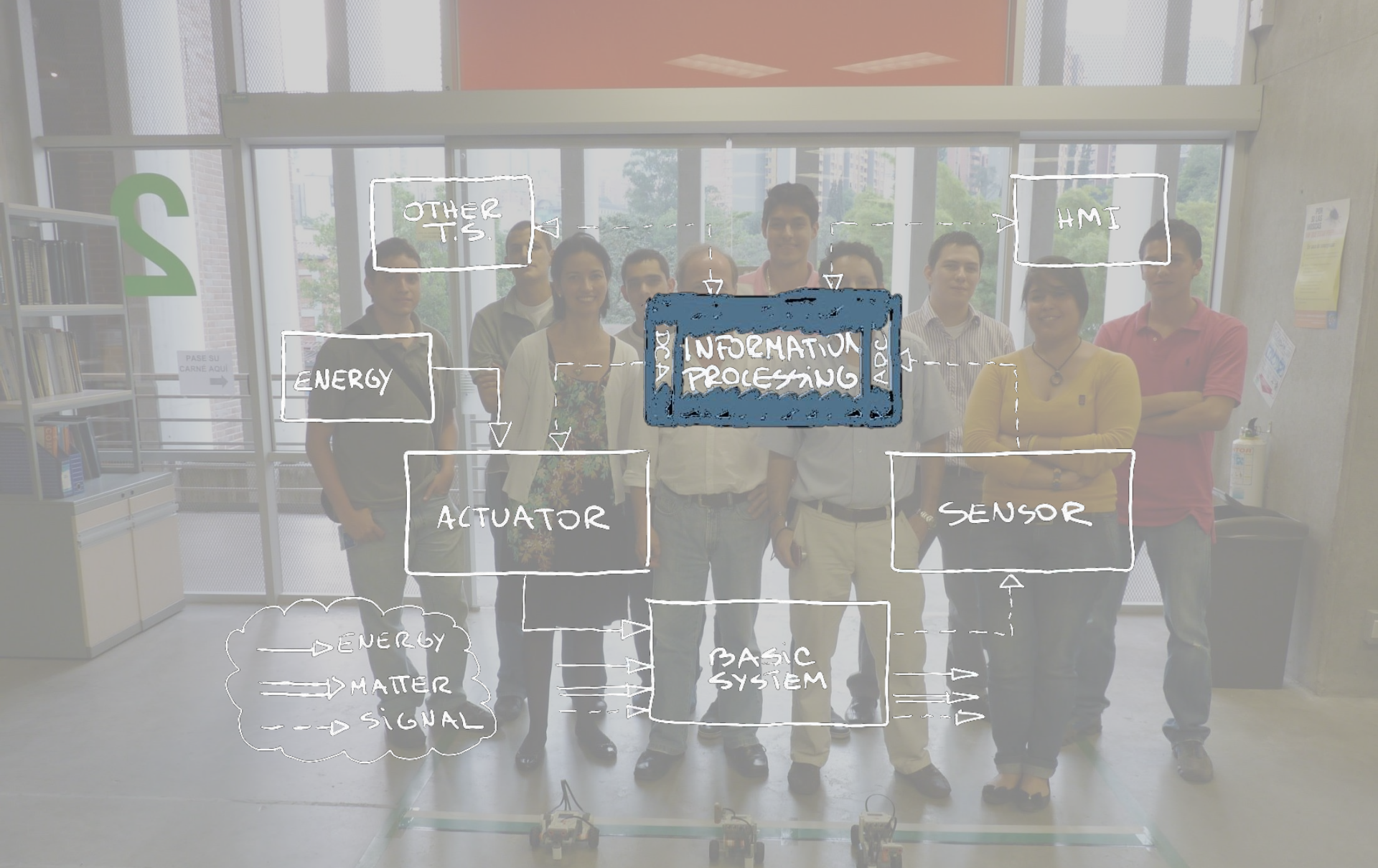
# 2 Academic semester

- ID0620 POWER ELECTRONICS
- ID0621 ADVANCED DIGITAL SYSTEMS
- ID0623 MECHATRONIC PRODUCT CONTROL
- IM0607 TECHNICAL SYSTEM DESIGN









OTHER T.S.

HMI

ENERGY

INFORMATION PROCESSING  
D/A A/D

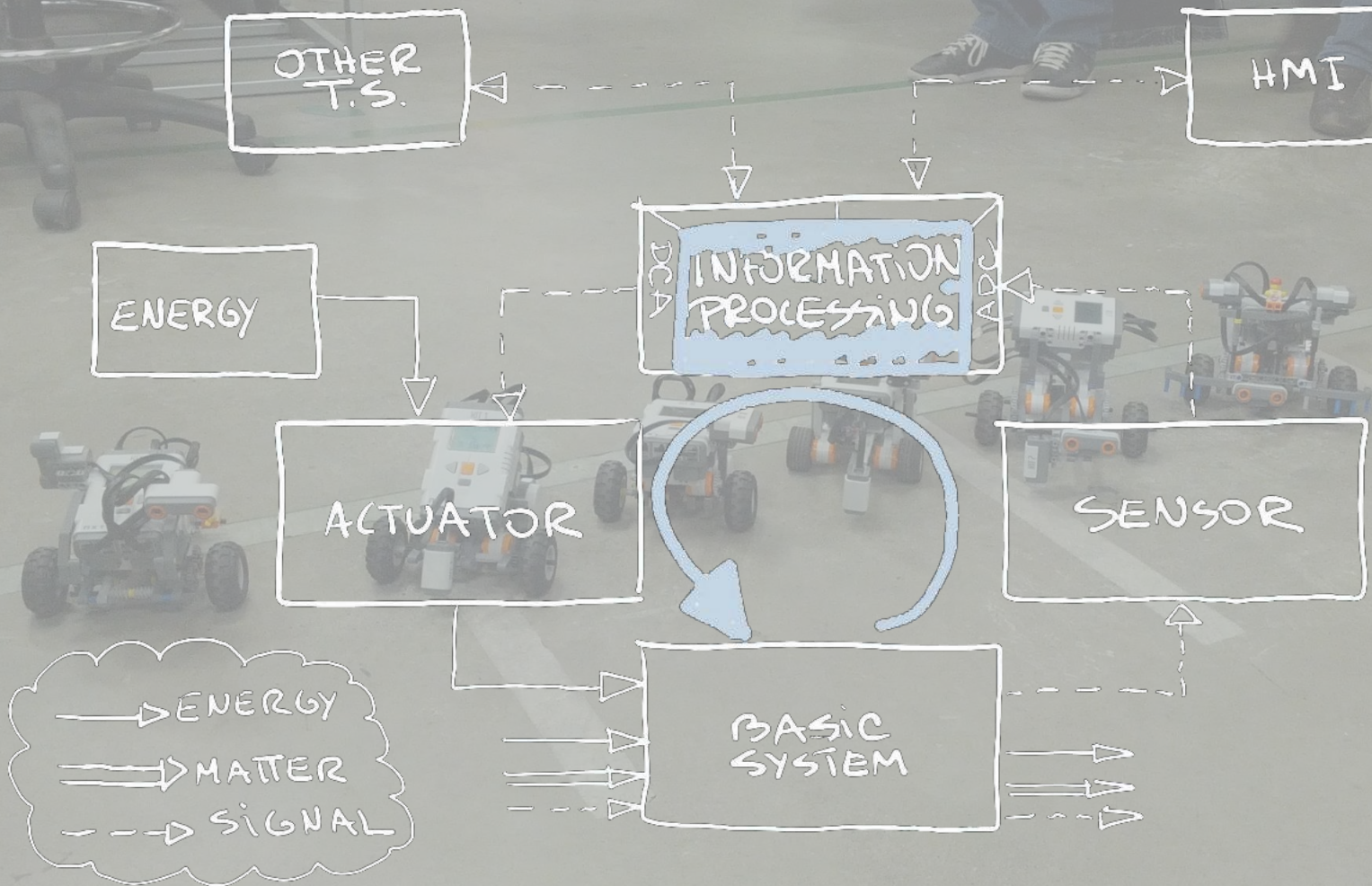
ACTUATOR

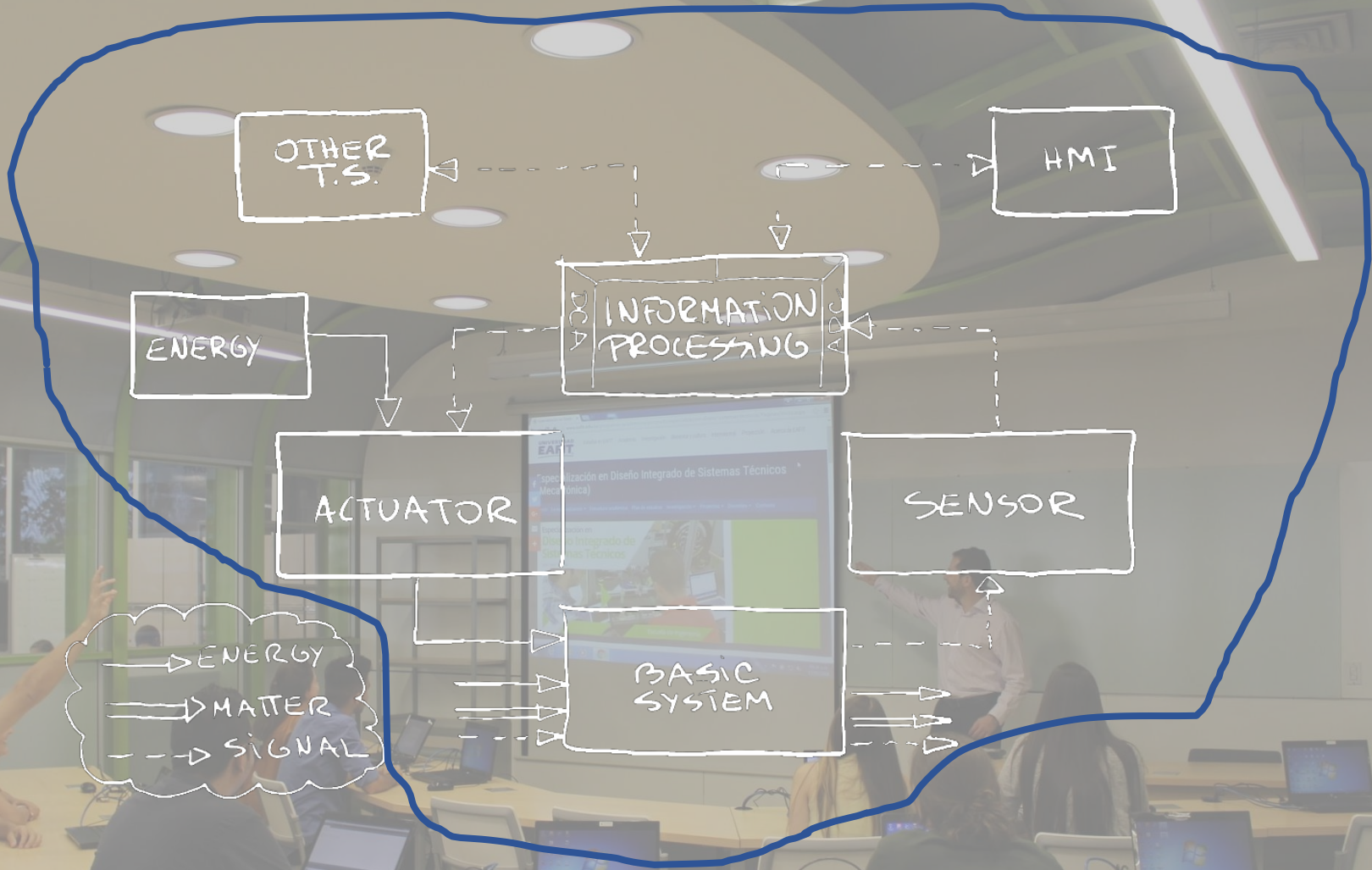
SENSOR

→ ENERGY  
⇒ MATTER  
- - - SIGNAL

BASIC SYSTEM

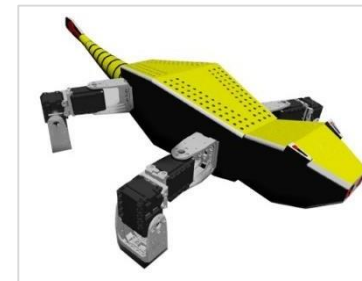
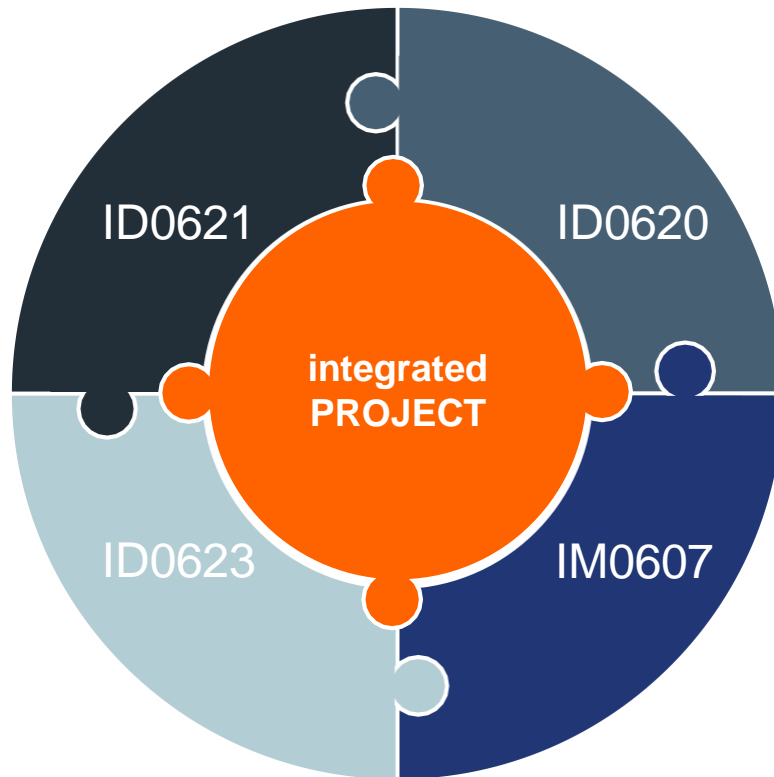




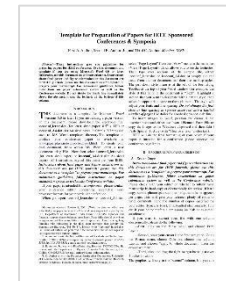




# Subjects



Prototype



Paper

- Power Electronics
- Technical System Design
- Mechatronic Product Control
- Advanced Digital Systems

# Inquiries



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Postgraduate Assistant  
Departamento Mercadeo Institucional  
Office Number (57 4) 261 9500, extension 9930  
[lmontoya@eafit.edu.co](mailto:lmontoya@eafit.edu.co)

More information is available in: <http://www.eafit.edu.co/programas-academicos/posgrado/especializacion-diseno-sistemas-tecnicos/Paginas/inicio.aspx>