



INCOBOTICS 5.0 – Ready for Industry 5.0

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CHALLENGE

CARTON BOX FEEDER

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1. THE CHALLENGE

From the company *United for the box*, they have contacted us, they have received a new machine for assembling boxes and they need our help.

In order to automate the process, they want to install a collaborative robot to feed the machine. They want work without operator and everything must be under control (when it starts, what happens if the carton finishes...)

The carton can be fed vertically or horizontally, depending on the program settings, and it must have signal lights to know the status of the machine

2. LEARNING OUTCOMES - EVALUATION CRITERIA

LO	EXPLANATION	VALUE
LO-1	Comprehend the CO-BOTS major brands available on the market	
LO-2	Configures Cobot systems, selecting and connecting the component elements.	5
LO-3	Programs Cobot systems, using programming and data processing techniques.	10
LO-4	Checks the operation of Cobot systems, adjusting the control devices and applying safety regulations.	5
LO-5	Configures Artificial Vision systems, selecting and connecting the component elements.	
LO-6	Programs Artificial Vision systems to use with Cobot systems, using programming and data processing techniques.	

3. REQUIREMENTS (SPECIFICATIONS)

Short description

1. GENERAL TECHNICAL CONDITIONS OF THE CHALLENGE	
1	Carry out the process using a collaborative robot
2	Use of external elements to start / stop the sequence (pushbuttons, sensors ...)
3	Use signal lights to identify machine status
2. CONDITIONS OF THE DOSSIER FORMAT	
1	It will be delivered in digital format.
2	The document must include the requirements of each module and will have the following structure: Cover, Index, Memory, and Bibliography.
3	Cover identifying Challenge, Photo, Members, Group No., Modules, and Year.
4	Index and numbered pages.





5	Normal spacing and line spacing and Calibri font size 12.
6	Well numbered and organized titles
7	Well defined bibliography.
3. CONDITIONS OF THE PRESENTATION	
1	The presentation is aimed at exposing, explaining and justifying the challenge as best as possible.
2	Each team will have a maximum of 10 minutes for the presentation.
3	The teaching staff will not say the order of intervention of the teams in advance.
4	The order of intervention of each member will be carried out by the teaching staff "in situ and live"
5	Team members must be able to explain the challenge in its entirety.
6	The use of correct and adequate technical expressions will be valued.
7	The use of good tone and fluency and the non-use of fillers will be valued
8	Not reading the contents, being well organized and making personal contributions will be valued.
9	If challenge questions are asked, all members should be able to answer.
10	Format for presentation is not specified. Being able to use at the choice of the working group.
11	It is suggested to reduce the use of text as much as possible
12	It is suggested to use visual resources; images, graphics, animations, etc.

4. BASIC CONTENTS

KNOWLEDGE AND SKILLS

LO-2	Configures Cobot systems, selecting and connecting the component elements.
Knowledge	TCP configuration
Knowledge	Characteristics of the input and output systems
Skills	Tool assembly and connection
Skills	Software installation
LO-3	Programs Cobot systems, using programming and data processing techniques.
Knowledge	Different types of movements
Knowledge	Force torque sensor
Knowledge	I/O system
Skills	Program GRAFCET
Skills	Use logic instructions
Skills	Use of variables
Skills	Use of I/O system
LO-4	Checks the operation of Cobot systems, adjusting the control devices and applying safety regulations.
Skills	Execution time reduction
Skills	Follow safety rules
Skills	Locate and recognize potential installation errors



SOFT SKILLS

In addition, the challenge will work on crosscutting aspects that teachers evaluate according to the corresponding rubric:

- ✓ Personal (Planning, Involvement.)
- ✓ Teamwork.
- ✓ Communication (written and oral).

In addition, the challenge will work on Soft Skills aspects that the students evaluate:

- ✓ Co-evaluation of teamwork (which includes valuing teammates at work).
- ✓ Self-evaluation of teamwork (which includes valuing oneself in the team).

5. GET THE INFORMATION (and seminars)

Resources

We have the following resources:

- Computers with Drive for shared work and completion of dossiers and presentations.
- Robotics laboratory.
- Robot manuals.
- Information from www.incobotics.eu
- Bibliography

Seminars

SEMINAR	I/O system
HOURS / SESSIONS	4 h
TEACHER / SPECIALIST	Xabier Ugarte
CONTENT	<ul style="list-style-type: none"> • I/O system configuration • Types of I/O • Use of I/O

SEMINAR	Logic functions
HOURS / SESSIONS	2 h
TEACHER / SPECIALIST	Xabier Ugarte
CONTENT	<ul style="list-style-type: none"> • IF-ELSE • Wait • Variables

SEMINAR	Force Torque sensor
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HOURS / SESSIONS	3 h
TEACHER / SPECIALIST	Xabier Ugarte
CONTENT	<ul style="list-style-type: none"> • Installation • Calibration • Main instructions

6. EVALUATION OF RESULTS

HOMOGENIZATION				TRANSVERSAL							TECNICAS						
SOFT SKILLS	SKILLS	KNOWLEDGE	TOTAL	SOFT SKILLS							SKILLS			KNOWLEDGE		MINIMUM	
				AUTONOMY	PLANNING	TEAMWORK	COMMUNICATION WRITTEN	COMMUNICATION ORAL	SELF-EVALUATION	CO-EVALUATION	DOSSIER	ACTIVITIES	FINAL PRODUCT	DEFENDING	EXAM	MINIMUM DOSSIER	MINIMUM EXAM
30	60	10	100	5	5	5	5	5	2	3	20	20	20	10	0	5	0

7. TIMING

Duration: 30 sessions			
1	sessions	1	Present the challenge to the student body
10	sessions	11	Obtaining the information includes visits to the facilities, giving seminars and training activities.
11	sessions	22	Offline programming, testing and assembly
5	sessions	27	Preparation of documentation until the completion of planned tasks. Completion of the "Dossier". During the execution, Feedback with the teams.
2	sessions	29	Presentation / defense and the co-evaluations & self-evaluation will be carried out.
1	sessions	30	Final Feedback



CONCLUSION

Complete once the whole challenge is finished



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