Last update: 12-04-2019

340242 - SDIN-K7P07 - Distributed Industrial Systems

Coordinating unit: 340 - EPSEVG - Vilanova i la Geltrú School of Engineering

Teaching unit: 707 - ESAII - Department of Automatic Control

Academic year: 2019

Degree: BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Teaching unit Optional)

ECTS credits: 6 Teaching languages: Catalan, Spanish

Teaching staff

Coordinator: Samà Monsonís, Albert

Prior skills

It is recomended that students took Industrial Informatics lectures

Degree competences to which the subject contributes

Specific:

1. CE28. Applied knowledge of industrial and communication computing.
2. CE21. Knowledge of basics and application of digital electronics and microprocessors.

Teaching methodology

The teaching methodologies include classes, problem solving, lab sessions, autonomous learning and supervised activities

Learning objectives of the subject

Objectives
1. Charactetistics of the industrial distributed systems
2. Analysis of the computation and communication systems in industrial distributed systems
3. Design and implement device-level communications under different environments: CAN, ETHERNET and OPC

Study load

Total learning time: 150h	Hours large group:	30h	20.00%
	Hours medium group:	0h	0.00%
	Hours small group:	30h	20.00%
	Guided activities:	0h	0.00%
	Self study:	90h	60.00%

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340242 - SDIN-K7P07 - Distributed Industrial Systems

Content

Introduction to distributed industrial systems

Learning time: 13h

Theory classes: 1h
Guided activities: 3h
Self study : 9h

Description:

1. Architecture of industrial distributed systems. Functionalities and problems.
2. OSI model
3. Point-to-point communications and field bus
4. Buses and industrial networks, middlewares for industrial applications
5. CAN - Controller Area Network
6. Ehternet
7. OPC - OLE for Process Control

Controller Area Network

Learning time: 63h

Theory classes: 7h
Laboratory classes: 17h
Self study : 39h

Description:

1. CAN characteristics
2. Physical layer
3. Media access
4. Use of CAN in the industry
5. CAN i Arduino UNO

Related activities:

Lab: sessions working with an Arduino UNO development board

Ethernet and OPC

Learning time: 74h

Theory classes: 7h
Laboratory classes: 28h
Self study : 39h

Description:

1. Ethernet characteristics
2. Physical layer and media acess. Transport layer.
3. OPC protocol characteristics
4. Use of OPC and Ethernet in the industry
5. Ethernet, OPC and Raspberry

Related activities:

Lab: sessions with Raspberry and OPC servers

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Qualification system

Bibliography

Basic:

Etschberger, Konrad. Controller area network: basics, protocols, chips and applications. 2001. Weingarten: IXXAT Automation GmbH, 2001. ISBN 3000073760.

Castro Gil, Manuel-Alonso; Fuertes, J. M. Comunicaciones industriales: sistemas distribuidos y aplicaciones. Madrid: UNED, 2007. ISBN 9788436254679.

Kurose, James F; Ross, Keith W. Computer networking : a top-down approach. 6th ed. Harlow: Addison-Wesley, 2012. ISBN 9780273768968.

Tanenbaum, Andrew S. Computer networks. 5th ed. Harlow: Pearson Education, 2013. ISBN 9781292024226.