

340220 - TMIN-E7P09 - Industrial Maintenance Techniques

Coordinating unit:	340 - EPSEVG - Vilanova i la Geltrú School of Engineering
Teaching unit:	709 - EE - Department of Electrical Engineering
Academic year:	2019
Degree:	BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional) BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Teaching unit Optional) BACHELOR'S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2009). (Teaching unit Optional) BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
ECTS credits:	6
Teaching languages:	Catalan, Spanish

Teaching staff

Coordinator: JOSE ANTONIO SANCHEZ LOPEZ

Degree competences to which the subject contributes

Specific:

1. CE33. Knowledge of different types of industrial maintenance and techniques of diagnosis of breakdowns.

Transversal:

2. SELF-DIRECTED LEARNING - Level 3. Applying the knowledge gained in completing a task according to its relevance and importance. Deciding how to carry out a task, the amount of time to be devoted to it and the most suitable information sources.
3. ENTREPRENEURSHIP AND INNOVATION - Level 3. Using knowledge and strategic skills to set up and manage projects. Applying systemic solutions to complex problems. Devising and managing innovation in organizations.

Teaching methodology

In the theory classes, expose and develop the theoretical concepts of the matters scheduled.

In the theoretical classes apart from the corresponding explanations will develop activities to encourage participation, discussion and critical analysis by students.

- In class exercises plan and solve problems relating to the matters addressed.
- Within hours of laboratory students perform practices that are required and delivered the related report of the activity along with appropriate calculations and critical considerations.
- There will be a group work during the year related to a specific topic of the course.

Learning objectives of the subject

It is intended that the student knows the importance of representing the industrial maintenance of production systems and support the different techniques that can be used to detect faults, besides the study of reliability of components, equipment and systems that form a production system .

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Study load

Total learning time: 150h	Hours large group:	45h	30.00%
	Hours medium group:	0h	0.00%
	Hours small group:	15h	10.00%
	Guided activities:	0h	0.00%
	Self study:	90h	60.00%

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Content

<p>Basic principles of the industrial maintenance</p>	<p>Learning time: 24h 30m Theory classes: 9h 30m Self study : 15h</p>
<p>Description:</p> <ul style="list-style-type: none"> 1.1 Introduction to the maintenance. 1.2 Type of maintenance. 1.3 Study of the lack. 1.4 Analysis of maintenance costs. 1.5 Data to gather. <p>Related activities: Theory classes 1, 2,3,4,5</p> <p>Specific objectives: To present the purpose the maintenance, the types of maintenance according to the characteristics of the industrial system and the tools for its control.</p>	
<p>Reliability</p>	<p>Learning time: 38h Theory classes: 6h Practical classes: 7h 30m Self study : 24h 30m</p>
<p>Description:</p> <ul style="list-style-type: none"> 2.1 Concepts of reliability. 2.2 Reliability with constant failure rate. Exponential model. 2.3 Reliability with nonconstant failure rate. Weibull model. 2.4 Reliability of systems. <p>Specific objectives: To apply the calculation of reliability in concepts of industrial maintenance.</p>	

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<p>Techniques of measurement</p>	<p>Learning time: 15h Theory classes: 6h Self study : 9h</p>
<p>Description: 3.1 Electronic equipment. 3.2 Equipment for the analysis of the isolation. 3.2 Transducers.</p> <p>Specific objectives: To know the different techniques to measure the most important parameters that they are used in the maintenance.</p>	
<p>Analysis of vibrations</p>	<p>Learning time: 35h Theory classes: 6h Laboratory classes: 8h Self study : 21h</p>
<p>Description: 4.1 Analysis of vibrations. 4.2 Analysis of the characteristics. 4.3 Interpretation of the data.</p> <p>Specific objectives: To introduce the techniques of the analysis of vibrations applied to the maintenance.</p>	

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Other techniques of maintenance	Learning time: 27h 30m Theory classes: 8h Practical classes: 4h Self study : 15h 30m
<p>Description:</p> <ul style="list-style-type: none"> 5.1 Thermography. 5.2 Analysis of currents. 5.3 Acoustics. <p>Specific objectives:</p> <p>To use the different techniques from maintenance that exist at the moment within the market, to be able to apply most suitable in each case.</p>	
Implantation of a maintenance system	Learning time: 6h Theory classes: 2h Self study : 4h
<p>Description:</p> <ul style="list-style-type: none"> 6.1 Description of the plant. 6.2 Steps to implement the system. 6.3 Selection of the techniques. 6.4 Organization of the implantation. 6.5 Valuation of the system. <p>Specific objectives:</p> <p>To plan the implantation of a system of maintenance from an example being followed the correct steps, so that their implantation is effective.</p>	

Qualification system

$$NF = 0.30 C1 + 0.5 C2 + 0.1 P + T$$

C1 = Note of the partial test.

C2 = Note of the final test.

P = Practical Note.

T = Work in group.

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Bibliography

Basic:

Griful, Eulàlia. Fiabilidad industrial [on line]. 2a ed. Barcelona: Edicions UPC, 2003 [Consultation: 01/11/2012]. Available on: <<http://hdl.handle.net/2099.3/36242> >. ISBN 8483017342.

Fernández Cabanas, Manés [et al.]. Técnicas para el mantenimiento y diagnóstico de máquinas eléctricas rotativas. Barcelona: Marcombo, 1998. ISBN 8426711669.

Complementary:

Vas, Peter. Parameter estimation, condition monitoring, and diagnosis of electrical machines. Oxford: Oxford University Press, 1993. ISBN 0198593759.