

ELECTRICAL MAINTENANCE 2016-2017

Bachelor Degree:	Electrical engineering	804G
Course title:	Electrical maintenance	630
Year/Semester:	4º Year/ First Half	ECTS Credits: 4.50

DEPARTMENT

Department of Electrical Engineering (DIE)					
Address:	C/ San José de Calasanz, 31				
City:	Logroño	Province:	La Rioja	Postal code:	26004
Phone number:	34 941 299477	Email address:			

ENGLISH-FRIENDLY FACULTY

Name:	Pedro María Lara Santillán				
Phone number:	34 941 299491	Email address:	pedro.lara@unirioja.es		
Office:	D112	Building:	Departamental		

CONTENTS

UNIT 1. Introduction

- Introduction to the electrical maintenance
- General terminology of maintenance
- Aims of the maintenance.
- Functions of the maintenance.
- Mechanisms of failure and reliability

UNIT 2. Actions of maintenance.

- Introduction
- Types of maintenance
- Corrective Maintenance
- Preventive Maintenance
- Predictive Maintenance
- Proactive Maintenance

UNIT 3. Instrumentation for electrical maintenance.

- Introduction and terminology of measurement
- Ground resistance tester
- Isolation tester
- Meters of Dielectric breakdown
- Networks Analyzers. Advanced functions.
- Amperimetric clamp.
- Protection checkers.
- Termography camera.
- Basic on Calibration.
- Virtual Instrumentation: basic design.

UNIT 4. Spanish basic regulation of Electrical Maintenance.

- Electrical Regulation of Low Tension (REBT) and Technical Complementary Instructions (ITC)
- Regulation of Low Voltage Station (RCE)
- Regulation of High Voltage networks (RLAT) and Technical Complementary Instructions (ITC)
- Technical Code of Building (CTE)

UNIT 5. Other regulations of interest.

- Power Quality of electrical supply
- Documents related to maintenance

UNIT 6. Maintenance on electromechanical systems.

- Transformers and associate elements
- Electrical motors and generators, circuits and switchings elements, Star and variable speed motors.

UNIT 7. Maintenance on renewable energy systems.

- Energy accumulators
- Inverters
- Solar Systems
- Wind Systems
- Other power generation systems

In the lab practices they will work the contents and abilities related with:

Inventories of maintenance

Arrange of work Instrumentation used in tasks of maintenance

Virtual Instrumentation applied to the maintenance.

REFERENCES

Title	
Integrated Maintenance Planning in Manufacturing Systems [Recurso electrónico] / by Umar M. Al-Turki, Tahir Ayar, Bekir Sami Yilbas, Ahmet Ziyaettin Sahin.— SpringerLink [2014] ISBN: 9783319062907 Acceso al texto completo a través de SpringerLink (sólo ordenadores con IP-Universidad de La Rioja) http://dx.doi.org/10.1007/978-3-319-06290-7	
Use, Operation and Maintenance of Renewable Energy Systems [Recurso electrónico] :] Experiences and Future Approaches / edited by Miguel A. Sanz-Bobi. -- Springer eBooks CATA [2014] ISBN: 9783319032245 Acceso al texto completo a través de SpringerLink (sólo ordenadores con IP-Universidad de La Rioja) http://dx.doi.org/10.1007/978-3-319-03224-5	
Reliability, Maintainability and Risk [Recurso electrónico] :] Practical Methods for Engineers including Reliability Centred Maintenance and Safety-Related Systems./ by Smith, David J. -- Burlington : Elsevier Science, [2011] ISBN:9780080969022 (electronic bk.) Acceso al texto completo a través de ScienceDirect (sólo ordenadores con IP-Universidad de La Rioja) http://www.sciencedirect.com/science/book/9780080969022	
RCM [Recurso electrónico] :] gateway to world class maintenance / Anthony M. Smith and Glenn R. Hinchcliffe -- Amsterdam ; Boston : Elsevier Butterworth-Heinemann, [2004] ISBN: 9780750674614 Acceso al texto completo a través de ScienceDirect (sólo ordenadores con IP-Universidad de La Rioja) http://www.sciencedirect.com/science/book/9780750674614	
Major process equipment maintenance and repair [Recurso electrónico] / Heinz P. Bloch, Fred K. Geitner. -- Houston, Tex. : Gulf Pub. Co., [1997]	

ISBN: 9780884156635

Acceso al texto completo a través de ScienceDirect (sólo ordenadores con IP-Universidad de La Rioja) <http://www.sciencedirect.com/science/book/9780884156635>

An introduction to predictive maintenance [Recurso electrónico] /R. Keith Mobley. -- Amsterdam ; New York : Butterworth-Heinemann, [2002]

ISBN: 9780750675314

Acceso al texto completo a través de ScienceDirect (sólo ordenadores con IP-Universidad de La Rioja) <http://www.sciencedirect.com/science/book/9780750675314>

Electrical Distribution Maintenance Services Guide/ Schneider Electric

<http://www.schneider-electric.be/documents/services/distribution-electrique/maintenance/32VP350EN.pdf>

Complete Guide to Predictive and Preventive Maintenance/Joel Levitt –New York Industrial Press [2011]

ISBN 13: 9780831190392

EVALUATION SYSTEM

EVALUATION SYSTEM	Recuperable	No Recoverable
Técnicas de observación		10%
Exams	60%	
Works and Projects	5%	5%
Reports and memories of lab	10%	
Oral evidences		10%
Total	100%	

Critical points to overcome the subject

To approve the subject will be necessary to reach at least 35 % of the punctuation of the exams. To overcome the subject in the first call will be necessary the assistance to the lab practices, as well as to deliver all the reports of lab practices in time.

To overcome the subject in the second call, the student who have not overcome the lab practices (independently that is for lacks of assistance, for delay in delivery of reports or for deficiencies in the same ones), they will have to overcome a practical test where they demonstrate to have a few minimal knowledge associated with the practical accomplishments; overcoming the punctuation for the calculation of the final note will be the reached one in the first summons with the associate correction the improvements on the recoverable part.

All the works and projects will have to be delivered in time to be able to reach the maximum qualification.

To overcome the subject is indispensable to overcome 40 % the part of practices and to deliver all the works, and to overcome 30 % of the qualification of works

In case of not to pass itself one of the critical criteria, the numerical final qualification it will not be able to rise above 4 points over 10.