Production and manufacturing systems

Academic Year: (2020 / 2021) **Review date: 09-07-2020**

Department assigned to the subject: Systems Engineering and Automation Department

Coordinating teacher: RODRIGUEZ URBANO, FRANCISCO JOSE

Type: Compulsory ECTS Credits : 3.0

Year : 2 Semester : 2

OBJECTIVES

By the end of this subject, students will be able to :

1. Have a knowledge and understanding of the key aspect related to automated manufacturing systems.
2. Be aware of the multidisciplinary context of automated production systems.
3. Have the ability to model and analyze manufacturing systems in a computer program whith discrete event simulation programs.
4. Have the ability to search for literature related to a real visit to a production system.
5. Have the ability to combine theory and practice in the programing of the simulation of a manufacturing systems example.
6. Have the ability of working in group to visit a real production system and to relate that visit to the theoretical sessions.
7. Have and understanding about the aspects related to environmental impact and sustainable production, and to relate these aspects with the group work.

DESCRIPTION OF CONTENTS: PROGRAMME

1.- Introduction.
1.1.- Introduction.
1.2.- Automated machinery.
1.3.- Sensors.
1.4.- Robotized systems.
1.5.- Flexible manufacturing systems.
2.- Materials management.
2.1.- Kanban and JIT.
2.2.- Computer based material planning systems (ERP).
2.3.- Identification systems.
2.4.- Transport elements.
2.5.- Traceability and warehouse management.
3.- Information management.
3.1.- Arquitectures of CIM systems.
3.2.- Industrial communications.
3.3.- SCADA software and flexible manufacturing systems simulation products.
4.- Introduction to manufacturing processes.
4.1.- Forming processes.
4.2.- Machining processes.
4.3.- Surface finishing processes.
4.4.- Element joining processes.
4.5.- Thermal processes.
4.6.- Finishing processes.
5.- Sustainable production.
5.1.- Sustainable development.
5.2.- Environmental impact.
5.3.- Sustainable design.
6.- Manufacturing trends.
6.1.- Product or service.
6.2.- Market scenarios.
6.3.- Knowledge based enterprise.
6.4.- New enterprise logistics and organization.
6.5.- Logistics: direct and inverse logistics.

7.- Production systems case studies.
7.1.- Process plans.
7.2.- Food industry.
7.3.- Automobile industry.
7.4.- Stainless steel production.
8.- Manufacturing systems simulation.
8.1.- Introduction to discrete events software simulation packages.
8.2.- Implementation of a manufacturing systems model on a simulation package.

LEARNING ACTIVITIES AND METHODOLOGY

- Theoretical lectures oriented for the acquisition of theoretical knowledge.
- Classes of problems in small groups for case studies.
- Individual tutorials and students' personal work, aimed at the acquisition of skills related to the subject program.
- Laboratory practices: 4 sessions of 1'5 hours. During the lab sessions students will learn to analyze a production process by means of a simulator. Students submit an assignment that will be marked.

ASSESSMENT SYSTEM

The breakdown of the course final grade is as follows:
- Assignment Work: Work and practice exercise: 40%
- Final Exam: 60%.

% end-of-term-examination:	60
% of continuous assessment (assigments, laboratory, practicals…):	40

BASIC BIBLIOGRAPHY

- James A. Regh Computer Integrated Manufacturing (third edition), Prentice Hall, 204
- SINGH, N. Systems Approach to Computer-Integrated Design and Manufacturing., Ed. John Wiley & Sons., 1996.
- Serope Kalpakjian. Manufacturing Engineering And Technology. , Addison-Wesley Pub., 2001.

ADDITIONAL BIBLIOGRAPHY

- REMBOLD, U. Computer-Integrated Manufacturing Technology and Systems. , Marker Dekker., 1985.
- REMBOLD, U., NNAJI, B.O., STORR, A. Computer Integrated Manufacturing and Engineering., Addison-Wesley., 1993.
- SCHEER, A.W. CIM-Toward the Factory of the Future. , Springer Verlag., 1991.