29749 - Manufacturing Systems

Información del Plan Docente

Academic Year	2017/18
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	434 - Bachelor's Degree in Mechanical Engineering
ECTS	6.0
Year	4
Semester	First semester
Subject Type	Optional
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

4.1.Assessment tasks (description of tasks, marking system and assessment criteria)

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives. It is based on participation and the active role of the student favors the development of communication and decision-making skills. A wide range of teaching and learning tasks are implemented, such as lectures, guided assignments, laboratory sessions, autonomous work, and tutorials.

Students are expected to participate actively in the class throughout the semester.

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Classroom materials will be available via Moodle. These include a repository of the lecture notes used in class, the course syllabus, as well as other course-specific learning materials.

Further information regarding the course will be provided on the first day of class.

5.2.Learning tasks

The course includes 6 ECTS organized according to:

- Lectures (1.04 ECTS): 26 hours.

- Laboratory sessions (0.72 ECTS): 18 hours.

- Guided assignments (0.48 ECTS): 12 hours.

- Visits to companies: (0.16 ECTS): 4 hours.

- Autonomous work (3.6 ECTS): 90 hours.

- Tutorials.

Lectures: the professor will explain the theoretical contents of the course and solve illustrative applied problems. These problems and exercises can be found in the problem set provided at the beginning of the semester. Lectures run for 3 weekly hours. Although it is not a mandatory activity, regular attendance is highly recommended.

Laboratory sessions: sessions will take place every 2 weeks (6 sessions in total) and last 3 hours each. Students will work together in groups actively doing tasks such as practical demonstrations, measurements, calculations, and the use of graphical and analytical methods.

Guided assignments: students will complete assignments, problems and exercises related to concepts seen in laboratory sessions and lectures. They will be submitted at the beginning of every laboratory sessions to be discussed and analyzed. If assignments are submitted later, students will not be able to take the assessment test.

Autonomous work: students are expected to spend about 90 hours to study theory, solve problems, prepare lab sessions, and take exams.

Tutorials: the professor's office hours will be posted on Moodle and the degree website to assist students with questions and doubts. It is beneficial for the student to come with clear and specific questions.

5.3.Syllabus

1) Cellular manufacturing systems

- Basic Components
- Manufacturing systems characterization

- Group technology and cellular manufacturing
- Flexible and transfer manufacturing systems.

2) Material handling:

- Workpiece carrier.
- Warehouse.
- Transport system.
- Part feeders.
- Handling equipment, positioning units and robots.
- Transfer systems.
- Process units. Package, packaging and palletizing.

3) Assembly workstations and cells

- Manual workstations.
- Automatic workstation components.
- Grippers and fixture design.
- Calculation and selection of components.
- Analytical techniques. Functional, geometric, resistant and economic analysis.
- Planning, configuration and evaluation of automatic assembly systems.

4) Monitoring and control systems:

- Data record automatic system.
- Fixed sequence automatic mechanism.
- PLC/PC control.; surveillance; HMI.
- Robot and automaton programming.
- DNC and industrial nets.

5) Design for assembly

5.4.Course planning and calendar

For further details concerning the timetable, classroom and further information regarding this course please refer to the "Escuela de Ingeniería y Arquitectura " website (https://eina.unizar.es/)

5.5.Bibliography and recommended resources

[BB: Basic Bibliography / BC: Additional Bibliography]

- [BB] Balcells Sendra, Josep. Autómatas programables / Josep Balcells, José Luis Romeral . Barcelona : Marcombo Boixareu, D.L. 1997
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- [BB] Mulcahy, David E.. Materials handling handbook / David E. Mulcahy . New York [etc.] : McGraw-Hill, cop. 1999
- [BB] Rehg, James A.. Introduction to robotics in CIM systems / James A. Rehg . - 5th ed Upper Saddle River, New Jersey : Prentice Hall, cop. 2003
- [BC] Asfahl, C.R. Robots and Manufacturing Automation / Asfahl, C.R Ed. Wiley, 1992.
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