

Course guide

240503 - 240503 - Manufacturing Workshop

Last modified: 16/04/2024

Unit in charge: Barcelona School of Industrial Engineering
Teaching unit: 712 - EM - Department of Mechanical Engineering.

Degree: BACHELOR'S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Optional subject).

Academic year: 2024 **ECTS Credits:** 3.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: JOAQUIM MINGUELLA CANELA

Others: LLUÍS ANDREU GARBAYO
IRENE BUJ CORRAL

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

3. Knowledge applied to manufacturing systems and processes, metrology and quality control.

Transversal:

1. SELF-DIRECTED LEARNING. Detecting gaps in one's knowledge and overcoming them through critical self-appraisal. Choosing the best path for broadening one's knowledge.
2. EFFICIENT ORAL AND WRITTEN COMMUNICATION. Communicating verbally and in writing about learning outcomes, thought-building and decision-making. Taking part in debates about issues related to the own field of specialization.

TEACHING METHODOLOGY

Two hours of class are expected every week to all students, in order to introduce the different topics. There will be two groups of laboratory class, with two hours of laboratory class every three weeks.

Theory classes will alternate with classes of problems where students will solve practical exercises, as well as laboratory classes in the Manufacturing Technology Workshop, where students will see in situ operation of the machines and will be able to practice with the different measuring and verification elements of the manufactured parts in the machines.

Students will prepare a report about the manufacturing process of a workpiece in groups.

LEARNING OBJECTIVES OF THE SUBJECT

General goal:

Knowing and understanding the processes, components and basic equipment in a production workshop, related to the manufacturing and testing processes of parts.

Specific goals:

- Understanding specifications in the drawings of parts to be manufactured.
- Knowing how to verify manufactured parts, with different measuring instruments.
- Knowing basic machine tools, conventional and CNC, that are used to manufacture parts, different types of tools and types of operations they can perform.
- Learning Advanced Manufacturing Technologies.



STUDY LOAD

Type	Hours	Percentage
Hours medium group	20,0	26.67
Hours small group	10,0	13.33
Self study	45,0	60.00

Total learning time: 75 h

CONTENTS

1. Basic metrology

Description:

Definition of tolerances in the drawings according to the ISO system. Use of basic Metrology devices: caliper, micrometer, dial indicator, etc.

Specific objectives:

Identifying and interpreting dimensional tolerances according to ISO standard.

Selecting most appropriate measuring device in each case.

Related activities:

Laboratory class 1. Basic metrology.

Full-or-part-time: 15h

Theory classes: 2h

Practical classes: 2h

Laboratory classes: 2h

Self study : 9h

2. Computer assisted metrology

Description:

Use of computer assisted measuring machines: profilometer and roughness meter 2D and 3D, roundness measuring machine, profile projector and laser interferometer in order to check numerical control machines.

Specific objectives:

To select most appropriate measuring machine in each case.

Related activities:

Laboratory class 2. Computer assisted metrology.

Full-or-part-time: 15h

Theory classes: 2h

Practical classes: 2h

Laboratory classes: 2h

Self study : 9h

3.Manufacturing of parts by means of turning operations in a conventional or numerical control lathe machine. Grinding of cylindrical surfaces.

Description:

Operation of the lathe machine, operation of the cylindrical grinder, fixture of parts and tools, types of operations and types of tools, definition of phase sheets and list of operations.

Specific objectives:

Identifying, evaluating, selecting and comparing different manufacturing operations for revolution parts in the lathe and in the cylindrical grinding machine.

Related activities:

Laboratory class 3. Lathe.

Full-or-part-time: 15h

Theory classes: 4h

Laboratory classes: 2h

Self study : 9h

4.Manufacturing of parts by means of milling operations in a conventional or numerical control milling machine. Drilling. Grinding of flat surfaces.

Description:

Operation of the milling machine, operation of the drilling machine, operation of the surface grinder, fixture of parts and tools, types of operations and types of tools, definition of phase sheets and list of operations.

Specific objectives:

Identifying, evaluating, selecting and comparing different manufacturing operations of prismatic parts in the milling machine, the drilling machine and the grinding machine for flat surfaces.

Related activities:

Laboratory class 4. Milling machine.

Full-or-part-time: 15h

Theory classes: 4h

Laboratory classes: 2h

Self study : 9h

5.Other processes.

Description:

Study of other manufacturing processes such as casting, forging and metal sheet forming. Visit to CIM Centre-Advanced Manufacturing Technologies: rapid prototyping, multi-tasking machines, sinker electrical discharge machining, wire electrical discharge machining, etc.

Specific objectives:

Identifying, evaluating, selecting, and comparing manufacturing processes different than cutting processes.

Related activities:

Laboratory class 5. Casting process.

Full-or-part-time: 15h

Theory classes: 4h

Laboratory classes: 2h

Self study : 9h

GRADING SYSTEM

$$NF = 0,1 \cdot NLT + 0,1 \cdot NTC + 0,8 \text{Max}[NEF; 0,6NEF + 0,4NPP]$$

NF = Final mark

NEP = Mark of the partial exam

NEF = Mark of the final exam

NLT = Mark of laboratory + exercises

NTC = Mark of the report

EXAMINATION RULES.

In the theory part it is not possible to read anything. In the exercise part it is possible to read the metrology tables.

BIBLIOGRAPHY

Complementary:

- Vivancos Calvet, J., Buj Corral, I., Costa Herrero, Ll., Gomà Ayats, J.R.. Sistemas de Fabricación. Barcelona: Serveis Gràfics de Copisteria Imatge, 2013. ISBN 8469584014.