

## **COURSE: MANUFACTURING ENGINEERING**

**Code: 128212004**

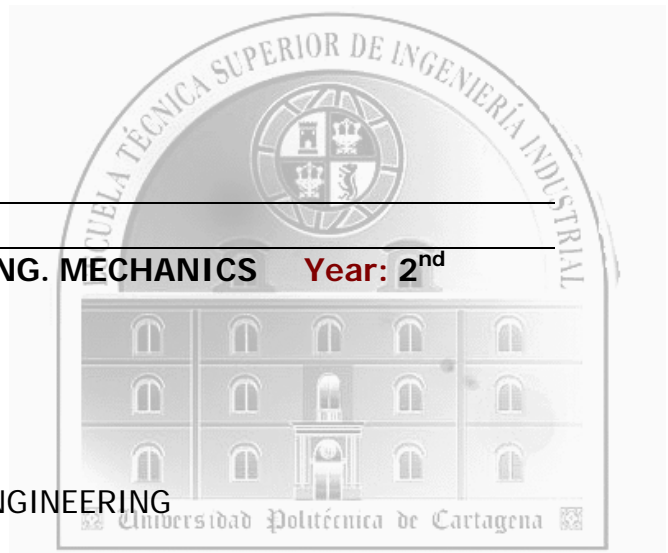
**Degree: GRADUATE INDUSTRIAL ENGINEERING. MECHANICS Year: 2<sup>nd</sup>**

**Lecturer(s):**

- HORACIO T. SÁNCHEZ REINOSO

**Department: MATERIALS AND MANUFACTURING ENGINEERING**

Type (Core / Compulsory / Optional): Co Credits (T+P): 4.5T+3P



### **Contents of the course according to official study plan:**

Computer aided manufacturing, Flexible manufacturing.

### **Course objectives:**

The student will acquire theoretical and practical knowledge related to machining processes. Process planning techniques will be studied and applied for manufacturing mechanical components. Finally, automation and integration of manufacturing systems will be taken into account, which will be specially focused on numerical control programming.

### **Prerequisites and/or co-requisites:**

- Mechanical technology
- Fundamentals of materials science
- Fundamentals of engineering physics
- Fundamentals of engineering mathematics

## **SYLLABUS**

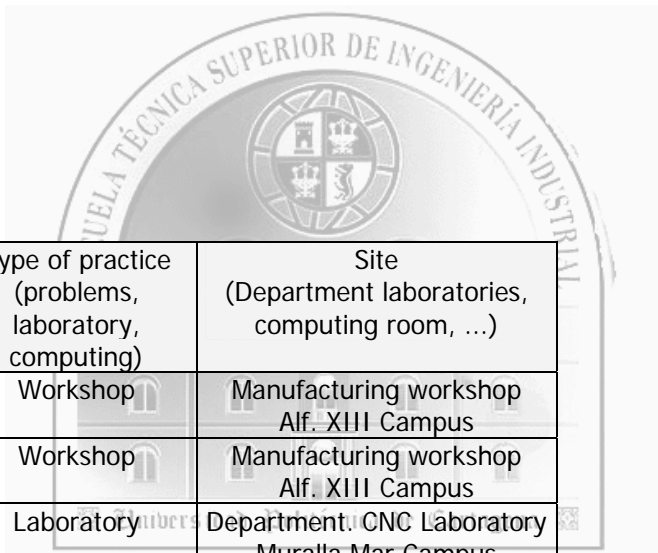
### **A. Theory:**

#### **PART 1: MACHINING PROCESSES**

- Lesson 1. Introduction to machining processes
- Lesson 2. Mechanics of metal cutting
- Lesson 3. Operations with single-point tools
- Lesson 4. Operations with multipoint tools
- Lesson 5. Grinding operations
- Lesson 6. Temperatures in metal cutting
- Lesson 7. Tool wear
- Lesson 8. Cutting fluids and surface roughness
- Lesson 9. Economics of metal-cutting operations
- Lesson 10. Nontraditional machining processes

#### **PART 2: MANUFACTURING SYSTEMS AND NUMERICAL CONTROL**

- Lesson 11. Manufacturing systems and automation
- Lesson 12. Numerical control



## **B. Practice:**

Description of the practice	Duration (h)	Type of practice (problems, laboratory, computing)	Site (Department laboratories, computing room, ...)
MH1-4. Machining processes (turning and milling)	8h	Workshop	Manufacturing workshop Alf. XIII Campus
ME. Nontraditional machining (EDM)	2h	Workshop	Manufacturing workshop Alf. XIII Campus
CN1-5. Numerical control programming (turning and milling)	10h	Laboratory	Department. CNC Laboratory Muralla Mar Campus
MCNI. CNC with industrial machine-tools	2h	Workshop	Manufacturing workshop Alf. XIII Campus
PP1-4. Manufacturing process planning	8h	Laboratory	Department. CNC Laboratory Muralla Mar Campus

## **C. References / Textbooks:**

1. G. Boothroyd, W.A. Knight, Fundamentals of Machining and Machine Tools, Marcel Dekker, New York, 1989.
2. S. Kalpakjian, S.R. Schmid, manufacturing engineering and technology, Pearson Education, New York, 2002.
3. L. Alting, Procesos para Ingeniería de Manufactura, Alfaomega, México, 1990.
4. J. D. Zamanillo, P. Rosado, Procesos de Fabricación. Tomo II (Planificación de procesos), SPUPV, Valencia, 1995.
5. M.A., Sebastián, C.J. Luis, Programación de máquinas-herramienta con control numérico, UNED, 1999.
6. J.D. Zamanillo, Máquinas-herramienta de control numérico, UPV, 1984.

## **D. Grading:**

- Exam type: written.
- Kind of questions: Theoretical questions, test items and problems.
- Weighting criteria over the areas: 50% theory and 50% practice in final grade.
- Minimum requirements for the areas: The final mark will be weighted up if the students will get a minimum of 3.5 of 10 at each exam area (theory and practice).
- Attendance to practice sessions. The student must attend to the whole practice sessions in order to get the final grade.
- Books, notes, form, tables, etc. are not allowed to be used because all the necessary information will be supplied by the professor during the exam.
- Programmable calculators are not allowed, as well.
- The exam mode (duration, beginning hour, place, etc.) will be shown by means of an official announcement on the notice board of the manufacturing processes engineering area (which is placed at the second floor of the "Hospital de Marina" building in the "Muralla del Mar" campus). This official announcement will be the only valid.

## **E. Observations:**

- Legal prerequisites: This subject is incompatible with the subject of Mechanical Technology of 1<sup>st</sup> year of the degree.
- Course Web page:
  - [www.upct.es](http://www.upct.es) (Tools/virtual classroom)
  - [www.etsii.upct.es](http://www.etsii.upct.es) (Academic ordination/Degree plan/Syllabus).