



Guías docentes UJA

Horarios de tutorías

Llamamientos PEVAU

## Syllabus 2023-24 - 13413014 - Applied technologies to production (Tecnologías aplicadas a la fabricación)

### Caption

- Level 1: Tutorial support sessions, materials and exams in this language
- Level 2: Tutorial support sessions, materials, exams and seminars in this language
- Level 3: Tutorial support sessions, materials, exams, seminars and regular lectures in this language

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DEGREE:	Grado en Ingeniería mecánica (13413014)
FACULTY:	SCHOOL OF ENGINEERING OF JAÉN
DEGREE:	Doble grado en Ingeniería eléctrica e Ingeniería mecánica (13613017)
FACULTY:	SCHOOL OF ENGINEERING OF JAÉN
DEGREE:	Doble Grado en Ingeniería mecánica e Ingeniería electrónica industrial (13913004)
FACULTY:	SCHOOL OF ENGINEERING OF JAÉN
DEGREE:	Doble grado en Ingeniería mecánica e Ingeniería de organización industrial (13813004)
FACULTY:	SCHOOL OF ENGINEERING OF JAÉN
ACADEMIC YEAR:	2023-24
COURSE:	Applied technologies to production

### SYLLABUS

#### 1. COURSE BASIC INFORMATION

NAME: Applied technologies to production

CODE: 13413014 (\*)

ACADEMIC YEAR: 2023-24

LANGUAGE: English

LEVEL: 1

ECTS CREDITS: 6.0

YEAR: 4

SEMESTER: SC

#### 2. LECTURER BASIC INFORMATION

NAME: MEDINA SÁNCHEZ, GUSTAVO

DEPARTMENT: U121 - INGENIERÍA MECÁNICA Y MINERA

FIELD OF STUDY: 515 - INGENIERIA DE LOS PROCESOS DE FABRICACIÓN

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ORCID: <https://orcid.org/0000-0003-4925-2818>

LANGUAGE: English

LEVEL: 1

#### 3. CONTENT DESCRIPTION

##### 1. Concurrent Engineering

Introduction: product development, product life cycle

Concurrent engineering

Guidelines for the implementation of concurrent engineering

##### 2. Design for manufacturing and Assembly (DFMA).

DFMA definitions and techniques

General DFM guides.

DFM specific guides. Injection molding guide.

Design for assembly: Assembly systems, Boothroyd-Dewhurst method.

##### 3. Computer Integrated Manufacturing (CIM).

Digital manufacturing: CIM models, computer aided manufacturing, industrial automation, industrial control systems.

Manufacturing execution system

Production planning

Design, manufacturing (digital and execution systems) and production planning.

#### **4. Rapid prototyping**

Introduction: definitions, applications and types.

Additive Manufacturing AM processes and technologies.

AM main stages.

Fused Deposition Modeling FDM.

Cost analysis.

Resource efficiency in additive manufacturing.

Other applications and the future of AM processes.

#### **5. Simulation of Manufacturing Processes**

Finite Element Method (FEM) and Finite Element Analysis (FEA).

Contact, Friction and Fracture.

Modeling of metal forming.

Modeling of machining processes.

Soft-computing Techniques.

#### **6. Statistical process control in manufacturing**

Monitoring and control in manufacturing processes.

Measurement systems in conventional manufacturing processes.

Fundamentals of Design of Experiments DoE method.

Statistical process control.

#### Practical sessions.

**P1. Rapid prototyping.**

**P2. Introduction to numerical simulation.**

**P3. Numerical simulation of a forming process.**

**P4. Design of Experiments DoE method.**

**P5. Calibration of an electronic measuring device.**

### **4. COURSE DESCRIPTION AND TEACHING METHODOLOGY**

#### **A1. Theoretical lectures led by multimedia presentations.**

M1 and M4. Theoretical presentations aided by audiovisual media, explaining the necessary concepts to understand the different theoretical contents of the subject (CEM 8). The presentations will be available on Ilias as well as other technical sources so that CB3R and CB5R competences can be developed.

M2.Exercicies and cases will be presented (photos and videos of applications, examples of good and bad practice, computer simulations, etc.), fostering as much as possible the participation and the students critical skills.

Some of the practical cases will be solved by the students individually or in groups in order to accomplish CT1, CT2, CT4 and CB2R.

Learning outcomes 5,6,7,8 and 9 are evaluated

#### **A2R. Small group sessions for learning practical contents.**

M6R, MR7, M9R, M10R. Workshops, laboratory and computer room lectures to present real problems (M12R, M11R), so that the students can train CEM8, CT1, CT2 y CT4.

Learning outcomes 5,6,7,8 and 9 are evaluated

#### **A3. Tutorial sessions.**

M17R. Students questions can be submitted to other students and the subject responsible through an Virtual Chat in order to train CEM8 y CT1 skills.

Learning outcomes 5,6,7,8 and 9 are evaluated

Students with special educational needs should contact the Student Attention Service (Servicio de Atención y Ayudas al Estudiante) in order to receive the appropriate academic support

## 5. ASSESSMENT METHODOLOGY

Grade=0.1\*Attendance to lab sessions + 0.5\*Exam +0.2\*Problems + 0.2\*Lab sessions

Lab sessions are mandatory.

All evaluation tools check the learning results: 5, 6, 7, 8 and 9, and the skills: CB2R, CB3R, CB5R, CEM8, CT1, CT2 and CT4.

## 6. BOOKLIST

### MAIN BOOKLIST:

- Design for manufacturing [Recurso electrónico] : a structured approach. Edition: -. Author: Poli, C., 1935-. Publisher: Boston : Butterworth-Heinemann, c2001. ([Library](#))
- CAD CAM CIM [Recurso electrónico]. Edition: 3rd ed.. Author: Radhakrishnan, P.. Publisher: New Delhi : New Age International (P) Ltd., Publishers, c2008. ([Library](#))
- Modeling of Metal Forming and Machining Processes [Recurso electrónico] : by Finite Element and Soft Computing Methods . Edition: -. Author: Dixit, Prakash M.. Publisher: London : Springer-Verlag London Limited, 2008. ([Library](#))
- Additive Manufacturing Technologies [Recurso electrónico] : Rapid Prototyping to Direct Digital Manufacturing . Edition: -. Author: Gibson, Ian. Publisher: Boston, MA : Springer-Verlag US, 2010 ([Library](#))
- Design of experiments for engineers and scientists [Recurso electrónico]. Edition: -. Author: Antony, Jiju. Publisher: Oxford ; Burlington, MA : Butterworth-Heinemann, 2003. ([Library](#))

### ADDITIONAL BOOKLIST:

- Product design for manufacture and assembly. Edition: 3rd ed. Author: Boothroyd, Geoffrey. Publisher: New York] : CRC Press, 2011 ([Library](#))

## 7. VIRTUAL / CLASSROOM TEACHING SCENARIO

### 1. Methodology and learning activities

Learning activities	Face to Face / online	Methodology
45 Theoretical sessions about the subject	Face to face 100% (*)	45 theoretical sessions by video conference. Skills: CB2R, CT2, CB3R, CT1, CEM8, CT4, CB5R. -Case face to face 100%: conventional methodology. -Case face to face < 100%. Face to face students: conventional methodology, online students: online methodology.
10 Practical sessions	Face to face 100% (**)	10 (grouped in 6 issues) online practical sessions. Skills: CT2, CT1, CEM8 y CT4. -Case face to face 100%: conventional methodology. -Case face to face 50%. Face to face students: conventional methodology, online students: online methodology.
4 Problems and exercises	Online	Four multimedia files with problems and exercises to resolve by the students. Solutions should be submitted to the educational platform. Skills: CT2, CT1, CEM8 y CT4.
Tutorial sessions	Face to face - Online	Tutorial sessions at the trainern timetable. Face to face and online (synchronous and asynchronous) tutorial sessions.

(\*) The Center may establish a different attendance percentage depending on the number of students and capacity of the classroom / laboratory.

(\*\*) The Center may establish rotating attendance depending on the number of students and capacity of the classroom / laboratory (class in the schedule and classroom / laboratory assigned to one part of the group and videoconference broadcast to the rest, with periodic rotation of students, as determined by the Center).

For online activities, the teaching staff involved in teaching is reserved the right not to give consent for the capture, publication, retransmission or reproduction of his speech, image, voice and explanations of chair, in the exercise of its teaching functions, within the scope of the University of Jaén.

## 2. Evaluation system

### Regular

Evaluation tool	Face to Face / online	Description	Percentage
S1 Attendance and participation	Face to face 100%	-Case face to face 100%: conventional evaluation. -Case face to face <100%. Face to face students: conventional evaluation, online students: Professor notes, and attendance to the online learning activities	10%
S2 Exam	Face to face 100%	Exam: Questions-problems	50 %
S3 Exercises and works	Online Asynchronous	Student submissions	20 %
S4 Practical sessions reports	Online Asynchronous	Student submissions	20 %

### Extra call

Evaluation tool	Face to Face / online	Description	Percentage
S1 Attendance and participation	Face to face 100%	-Case face to face 100%: conventional evaluation. -Case face to face < 100%. Face to face students: conventional evaluation, online students: Professor notes, and attendance to the online learning activities	10%
S2 Exam	Face to face 100%	Exam: Questions-problems	50 %
S3 Exercises and works	Online Asynchronous	Student submissions	20 %
S4 Practical sessions reports	Online Asynchronous	Student submissions	20 %

For those students without a grade in the S1, S3 and S4 activities the final grade will be the exam grade.

## 3. Resources

Type	Goal	Description
Social networks	Information management	<b>Educational platform PLATEA.</b> <b>Google meets.</b> <b>e-mail.</b>
Software	Lab simulations	Virtualized software. Licensed Engineering Software: Fusion, Catia, Abaqus, and Mathematica. Open source software such as Ultimaker Cura and netlogo. Internet connection
Books	Engineering contents in electronic format	Several books used in the subject are available in electronic format at the UJA library

## 8. VIRTUAL TEACHING SCENARIO

### 1. Methodology and learning activities

Learning activities	Face to Face / online	Methodology
45 Theoretical sessions about the subject	Online (*)	45 theoretical sessions by video conference. Skills: CB2R, CT2, CB3R, CT1, CEM8, CT4, CB5R
5 Practical sessions	Online (*)	5 online practical sessions. Skills: CT2, CT1, CEM8 y CT4.  Sessions 2 - 4: Guidance via google meets, and practical tasks via engineering software virtualized.  Session 1 about 3D printing and 3D scanning. The available machines can be controlled via web.  Session 5 about an electronic measurement system. We will provide real measurements accomplish the calibration of the system.
4 Problems and exercises	Online (*)	Four multimedia files with problems and exercises to resolve by the students. Solutions should be submitted to the educational platform. Skills: CT2, CT1, CEM8 y CT4.
Tutorial sessions	Online (*)	On line tutorial sessions at the trainers timetable according to educational platform reservation Sheet.

(\*) In the online scenario, the professors involved in teaching are reserved the right not to consent for the capture, publication, retransmission or reproduction of his speech, image, voice, and explanations, in the exercise of its teaching functions, within the scope of the University of Jaén.

## 2. Evaluation system

### Regular

Evaluation tool	Face to Face / online	Description	Percentage
S1 Attendance and participation	Online Synchronous	Professor notes, and attendance to the online learning activities	10%
S2 Exam	Online Synchronous	Exam: Questions-problems in educational platform + Identification via meet	50 %
S3 Exercises and works	Online Asynchronous	Student submissions	20 %
S4 Practical sessions reports	Online Asynchronous	Student submissions	20 %

### Convocatoria extraordinaria

Evaluation tool	Face to Face / online	Description	Percentage
S1 Attendance and participation	Online Synchronous	Professor notes, and attendance to the online learning activities	10%
S2 Exam	Online Synchronous	Exam: Questions-problems in educational platform + Identification via meet	50 %
S3 Exercises and works	Online Asynchronous	Student submissions	20 %
S4 Practical sessions reports	Online Asynchronous	Student submissions	20 %

For those students without a grade in the S1, S3 and S4 activities the final grade will be the exam grade.

## 3. Resources

Type	Goal	Description
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Social networks	Information management	<b>Educational platform PLATEA.</b> <b>Google meets.</b> <b>e-mail.</b>
Software	Lab simulations	Virtualized software.  Licensed Engineering Software: Fusion, Catia, Abaqus, and Mathematica.  Open source software such as Ultimaker Cura and netlogo.  Internet connection
Books	Engineering contents in electronic format	Several books used in the subject are available in electronic format at the UJA library

## DATA PROTECTION CLAUSE (on line exams)

**Institution in charge of data processing:** Universidad de Jaén, Campus Las Lagunillas, s/n, 23071 Jaén

**Data Protection Delegate:** dpo@ujaen.es

**Purpose:** In accordance with the Universities Law and other national and regional regulations in force, carrying out exams and assessment tests corresponding to the courses students are registered in. In order to avoid frauds while sitting the exam, the exam will be answered using a videoconference system, being able the academic staff of the University of Jaén to compare and contrast the image of the person who is answering the exam with the student's photographic files. Likewise, in order to provide the exam with evidential content for revisions or claims, in accordance with current regulation frameworks, the exam will be recorded and stored.

**Legitimacy:** compliance with legal obligations (Universities Law) and other national and regional regulations currently in force.

**Addressees:** service providers who are the owners of the platforms where the exams are carried out and with whom the University of Jaén has signed the corresponding data access contracts.

**Storage periods:** those established in current in force regulations. In the specific case of exam videoconference recordings, not before the examination records and transcripts are closed or the exam can still be reviewed or challenged.

**Rights:** you can exercise your right of access, amendment, cancellation, opposition, suppression, limitation and portability by sending a letter to the postal or electronic address indicated above. In the event that you consider that your rights have been violated, you may submit a complaint to the Andalusian Council for Transparency and Data Protection [www.ctpdandalucia.es](http://www.ctpdandalucia.es)

## CLASS RECORDING CLAUSE PERSONAL DATA PROTECTION

**Person in charge:** Universidad de Jaén, Paraje Las Lagunillas, s/n; Tel.953 212121; [www.ujaen.es](http://www.ujaen.es)

**Data protection delegate (DPO):** TELEFÓNICA, S.A.U. ; Email: dpo@ujaen.es

**Procedure aim:** To manage proper recordings of teaching sessions with the aim of facilitating learning process under a multimodal and/or online teaching

**Period for record storage:** Images will be kept during legal term according to regulations in force

**Legitimacy:** Data will be managed according to legal regulations (Organic Law 6/2001, December 21, on Universities) and given consent provided by selecting corresponding box in legal admission documents

**Data recipients (transfers or assignments):** Any person allowed to get access to every teaching modality

**Rights:** You may exercise your rights of access, rectification, cancellation, portability, limitation of processing, deletion or, where appropriate, opposition. To exercise these rights, you must submit a written request to the Information, Registration and Electronic Administration Service of the University of Jaen at the address above, or by e-mail to the address above. You must specify which of these rights you are requesting to be satisfied and, at the same time, you must attach a photocopy of your ID card or equivalent identification document. In case you act through a representative, legal or voluntary, you must also provide a document that proves this representation and identification. Likewise, if you consider that your right to personal data protection has been violated, you may file a complaint with the Andalusian Data Protection and Transparency Council [www.ctpdandalucia.es](http://www.ctpdandalucia.es)

