

## Lecturer

**Name:** Marta Zamorano Garzón

**Name for daily/classes use:** Marta

**Academic Background:** Mechanical Engineering

**Field of Specialization:** PhD Student (Mechanical Engineering and industrial organization), Mechanical Engineering Department (2017-)

**Employer:** Universidad Carlos III de Madrid

**Previous Positions:** Research fellow in Mechanical Engineering Department (2016-2017)

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## Lecturer

**Name:** Sergio Fuentes del Toro

**Name for daily/classes use:** Sergio

**Academic Background:** Industrial Engineering

**Field of Specialization:** Teaching and Research Staff

**Employer:** Universidad Carlos III de Madrid

**Previous Positions:** Key Account Manager

**Contacts:** [sfuentes@ing.uc3m.es](mailto:sfuentes@ing.uc3m.es)

**List of recent/ Relevant Publications:** Experimental Analysis of the Clutch Pedal in the Driver Position

**CV:** [www.linkedin.com/in/sergiofodt](http://www.linkedin.com/in/sergiofodt)

## Lecturer

**Name:** Jonatan Pajares Redondo

**Name for daily/classes use:** Jonatan

**Academic Background:** Bachelor's Degree in Industrial Electronics and Automation Engineering and Master in Mechanical Engineering and Transportation

**Field of Specialization:** PhD student in Mechanical Engineering

**Employer:** Universidad Carlos III de Madrid

**Previous Positions:** Researcher in Electronics Engineering Department

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## Lecturer

**Name:** Eduardo Corral Abad

**Name for daily/classes use:** Eduardo

**Academic Background:** Ph.D. In Mechanical Engineering

**Field of Specialization:** research group MAQLAB: <http://www.maqlab.org/es/>

**Employer:** Universidad Carlos III de Madrid

**Previous Positions:**

**Contacts:** [ecorral@ing.uc3m.es](mailto:ecorral@ing.uc3m.es)

**List of recent/ Relevant Publications:**

- The kinematics of the rotary into helical gear transmission (2016)  
Mechanism and Machine Theory
- Analysis of the influence of crack location for diagnosis in rotating shafts based on 3 x energy (2016)  
Mechanism and Machine Theory
- Kinematics and dynamics of the quasi-passive biped "PASIBOT" (2011)  
Journal of Mechanical Engineering, University of Ljubljana.
- Forward and Inverse Dynamics of the Biped PASIBOT (2014)  
International Journal of Advanced Robotic Systems.
- A quasi-static approach to optimize the motion of a UGV depending on the track profile (2014)  
Solid State Phenomen Vol 220.221. Switzerland.

**CV:** [https://www.researchgate.net/profile/Eduardo\\_Corral](https://www.researchgate.net/profile/Eduardo_Corral)

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## Lecturer

**Name:** Héctor José Muñoz Díaz

**Name for daily/classes use:** Héctor

**Academic Background:**

- Degree in Mechanical Engineering. Universidad Carlos III de Madrid.

- Master on vehicles and machines. Universidad Carlos III de Madrid.

**Field of Specialization:** 3D printing applications. Automotive and machines.

**Employer:** PDI in Universidad Carlos III de Madrid.

**Contact:** [hemunozd@inst.uc3m.es](mailto:hemunozd@inst.uc3m.es)

**CV:** [www.linkedin.com/in/héctor-josé-muñoz-díaz-aa0694b8](http://www.linkedin.com/in/héctor-josé-muñoz-díaz-aa0694b8)

## Lecturer

**Name:** Carolina Álvarez Caldas

**Name for daily/classes use:** Carolina

**Academic Background:** Ph.D. In Mechanical Engineering

**Field of Specialization:** research group MECATRAN: [MECATRAN WEB](#)

**Employer:** Universidad Carlos III de Madrid

**Contact:** [calvarez@ing.uc3m.es](mailto:calvarez@ing.uc3m.es)

**CV:** <https://researchportal.uc3m.es/display/inv20107>

**List of recent/ Relevant Publications:**

- Influence of anodized depth on fatigue life for bicycle cranks. (2018)

*Engineering Failure Analysis*

- Determining the stress distribution in a bicycle crank under in-service loads. (2016)

*Experimental Techniques*

- Material characterization for FEM simulation of sheet metal stamping processes. (2014)

*Advances in Mechanical Engineering*

- Procedure to verify the suspension system on periodical motor vehicle inspection. (2013)

*International journal of vehicle design*

- Analysis of Dynamic Systems Using Bond Graph and SIMULINK. (2013)

1st International Symposium on the Education in Mechanism and Machine Science (ISEMMS 2013)

## Lecturer

**Name:** Jon Goitia Hernández

**Name for daily/classes use:** Jon

**Academic Background:** Bachelor of Science in Electronic Engineering and Automation in Universidad Carlos III de Madrid

**Field of Specialization:** Power electronics and power supply design specialization

**Employer:** 3D Printing Technical Director – BQ (Madrid)

**Previous Positions:**

- Hardware Design Engineer – BQ (Madrid) Dec. 2013 – Dec. 2015

- Founder – LEAPto3D (Madrid) May 2012 – Dec. 2013

**Contacts:**

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# Course Description

**Title:** CAD Wars: The last 3D Printer

**Fields of activity:** Indicate the fields of activity

**Examination type:** Project / Practical Work

**Number of ECTS credits issued:** None

**Learning Goals and Objective:** This course aims to provide students with the opportunity to synthesise knowledge from various areas of the three-dimensional printing field.

On the one hand, the course will permit to shed some light about the creation of 3D structures programs such as Solid Edge. On the other hand, once the pieces are already designed, students will also use 3D printing programs which are needed for a correct impression of the set of pieces

At the end of the course, students are expected to have the sufficient knowledge to model and design its own pieces and to use the required programs to fulfill this task.

# Syllabus

Name of activity	Introduction to 3D printing
Number of working hours	1.5 hours
Type of activity	Lecture
Lecturer	Sergio Fuentes Del Toro
Short summary of content	In this first part of the course, all basic information regarding to the creation of pieces, its assembling and the different configuration for 3D printing will be taught.
Bibliography	N/A
Expected effect	At the end of this activity students are expected to have a little amount of knowledge regarding to all the different parts of 3D printing. This session pretends to equalize the level of all students in this topic and to provide them a clear vision of whole process.

Name of activity	Drawing view creation
Number of working hours	6 hours
Type of activity	Lecture
Lecturer	Eduardo Corral Abad and Sergio Fuentes Del Toro
Short summary of content	In this part of the course, students will learn how to design pieces for its further impression. The fundamental points that are going to be focussed will be dimension of the pieces, methods and normalizing techniques. The main program that is going to be taught on will be Solid Edge.
Bibliography	N/A
Expected effect	At the end of this activity students are expected to have an ample knowledge to be able to create its own pieces in 3D modeling programs, especially in Solid Edge.

Name of activity	Assembling
Number of working hours	3 hours
Type of activity	Lecture
Lecturer	Jonatan Pajares Redondo
Short summary of content	In this part of the course students will be taught how to design sets. Assembly modeling is a technology and a method used by computer-aided design and product visualization computer software systems to handle multiple files that represent components within a product, where new parts will be added to the model. These techniques will be demonstrated in Solid Edge.
Bibliography	N/A
Expected effect	After this session, students are expected to know how to put all their individual data files of individual components assembled together through several sub-assembly levels and having an assembly that describes the whole product.

Name of activity	3D printing
Number of working hours	3 hours
Type of activity	Laboratory
Lecturer	Héctor Muñoz Díaz
Short summary of content	In this laboratory students will put into practice the latest techniques with the most used programs regarding to 3D printing settings before its subsequent printing. Some aspects that will have to be taken into account for 3D printing will be: shell thickness, layer height, density of the pieces, initial layer thickness, etc. This is fundamental because it can mean the difference between a successful print, and a failed print.
Bibliography	N/A

Expected effect	After this laboratory students are expected to know how to apply different 3D configuration techniques for its further impression.
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Name of activity	BQ Company Visit
Number of working hours	3 hours
Type of activity	Company visit
Lecturer	Jon Goitia Hernández
Short summary of content	In this activity students will visit BQ installations, from their machinery to the different areas that they have, making special emphasis in the use of three-dimensional printing to produce their goods.
Bibliography	N/A
Expected effect	Students are expected to understand the functioning of the enterprise, for instance, what the company does or how they achieve and produce their goals and goods.

Name of activity	Case Study
Number of working hours	1.5 hours
Type of activity	Case Study
Lecturer	Jon Goitia Hernández
Short summary of content	In this session students will debate the latest applications that 3D printing can have, discussing the different fields that it can be used, overviewing the benefits and the drawback that they could have.
Bibliography	N/A
Expected effect	To shed some light in the different applications that 3D printing can have, opening an ample range of possibilities for the students.

Name of activity	Project Work
Number of working hours	4.5 hours
Type of activity	Project Work
Lecturer	Jonatan Pajares Redondo, Héctor Muñoz Díaz, Eduardo Corral Abad and Sergio Fuentes Del Toro
Short summary of content	In this session, students will put into practice all the different programs and techniques that they have learned during the week. They will be divided into small groups and will have to create by themselves a set of pieces for its further evaluation. It will consist mainly in two phases. First, they will have to mode and virtually construct the set and then physically, by printing them and assembling it. Professors will be there instructing them and helping if needed.
Bibliography	N/A
Expected effect	The main purpose of this activity is to let students develop its own creativity and to let them demonstrate the knowledge they have acquired during the course, so they are expected to create their own 3D set.

Name of activity	Examination
Number of working hours	3 hours
Type of activity	Examination
Lecturer	Jonatan Pajares Redondo, Héctor Muñoz Díaz, Eduardo Corral Abad and Sergio Fuentes Del Toro
Short summary of content	The different teams that were made for the project work will have to present their project in group, to the teachers, company representatives. They will have to present their project and explain the various techniques that they have used to build the set, the tools used, the adversities and complications that they had to overcome.
Bibliography	N/A
Expected effect	Students will be able to take into account for further projects the



	different complications that they could have when building and modeling a set of pieces, not only the problems that they had, but also the ones that other teams could have.
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Name of activity	Competition
Number of working hours	1.5 hours
Type of activity	Field Work
Lecturer	Jonatan Pajares Redondo, Héctor Muñoz Díaz, Eduardo Corral Abad and Sergio Fuentes Del Toro
Short summary of content	In this final session of the course, the teams that were made in the Project Work will have to assembly and put together in real live the pieces that they had constructed and printed. Each of the teams will compete between each other to have the prototype that best suits the asked requirements.
Bibliography	N/A
Expected effect	With this session, teachers will like to show students that three-dimensional printing is not only an academic tool, but it is also useful in real life and enjoyable structures can be printed and designed.