

25845 - Advanced Technology for Prototyping and Reverse Engineering

Información del Plan Docente

Academic Year	2017/18
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	271 - Bachelor's Degree in Industrial Design and Product Development Engineering
ECTS	5.0
Year	
Semester	Second Four-month period
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 learning process that is designed for this subject is based on the following:

The proposed methodology seeks to promote the continued work of the student and focuses on both the theoretical and practical aspects of reverse engineering and prototyping, as well as its main applications and application sectors. In sessions with the whole group the more theoretical aspects are addressed in the form of participatory master class and are completed by the study of real technical cases. Practical work with computer applications is developed in smaller

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groups and will focus on working methodologies based on cases to facilitate the completion of the draft of the subject. knowledge of equipment and technologies for work and practical sessions with a rapid prototyping company visit with other rapid prototyping technologies integrated into new product development as an everyday activity is complemented.

5.2.Learning tasks

The program is offered to help the student to achieve the expected results and includes the following activities: Learning activities are divided into participatory scheduled lectures, case studies and tutored projects

5.3.Syllabus

The theoretical and practical program comprises the following topics

1. Introduction to rapid prototyping
 2. prototyping phases, workflow and integration into the product development cycle
 - 3.Rapid prototyping Technologies and system selection. Software and file formats
 4. Introduction to reverse engineering
 5. digitizing systems, measurement and data acquisition. CAD reconstruction. Software.
 6. prototyping applications in industrial, medical, artistic and heritage conservation
- Laboratory practices and company visits
1. photopolymerizable resin 3D printer. Software file management and printing. Principle of operation, operation and maintenance
 2. photopolymerizable resin 3D printer. Generic CAD design of parts. Data collection and analysis files. Printing, cleaning and finishing prototypes.
 3. Reverse Engineering. Digitizing parts by triangulation laser sensor and articulated arm coordinate measuring. Coordinate measuring machines and laser tracker.
 4. Reverse Engineering. CAD reconstruction from point clouds.
 5. Reverse Engineering. Inspection against CAD point clouds.
 6. Integration of coursework and printing group prototypes.
 7. Visit prototyping company.

5.4.Course planning and calendar

Scheduled sessions and presentation of works

Week1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Theory	2	2	3	3	3	3	4	4	5	5	5	5	6	6
Practice and visits			1		2				3	4	5	6	7	

5.5.Bibliography and recommended resources

- Reverse engineering : an industrial perspective / edited by Vinesh Raja, Kiran J. Fernandes . London : Springer, cop. 2008
- Advanced manufacturing technology for medical applications : reverse engineering, software conversion and rapid prototyping / edited by Ian Gibson . Chichester (England) : John Wiley and Sons, cop. 2005
- Rapid prototyping : theory and practice / edited by Ali Kamrani and Emad Abouel Nasr . New York : Springer, cop.

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- Binstock, L. Rapid Prototyping System: Fast Track to Product Realization Society of Manufacturing Engineers, 1994.
- Wood, L. Rapid Automated Prototyping: An Introduction. Industrial Press, 1993.
- Jhonson, J. Principles of Computer Automated Fabrication Palatino Press, Inc., 1994.
- Burns, M. Automated Fabrication: Improving Productivity in Manufacturing Prentice Hall, 1993.