

25845 - Advanced Technology for Prototyping and Reverse Engineering

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	271 - Bachelor's Degree in Industrial Design and Product Development Engineering
ECTS	5.0
Course	
Period	Second Four-month period
Subject Type	Optional
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

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 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 .

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5.2. Learning activities

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. Program

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. Planning and scheduling

Scheduled sessions and presentation of works

Week	1	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. 2006
- 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.

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- Burns, M. Automated Fabrication: Improving Productivity in Manufacturing Prentice Hall, 1993.