

COURSE INFORMATION SHEET

Course Information	
Course Title	Product Design and Manufacturing Process
Degree	Master in International Industrial Project Management
Semester	1st.
ECTS Credits	2,1
Department	Organización Industrial
Field	Industrial Engineering

Lecturers Information	
Lecturer	
Name	Carlos Echanove Escudero
Department	Organización Industrial
Field	Product Design and Development
ECTS	0,9 (9 hours)
e-mail	carlosechanoveesc@gmail.com
Tutorial Hours	Available upon request via email
Lecturer	
Name	Daniel Fernández Caballero
Department	Ingeniería Mecánica
Field	CAM/CAD/CAE
ECTS	0,4 (4 hours)
e-mail	daniel.fernandez.caballero@gmail.com
Tutorial Hours	Available upon request via email
Lecturer	
Name	Carlos Sáenz de Santamaría
Department	IBS
Field	PLM: Product Life Management
ECTS	0,3 (3 hours)
e-mail	csaenz@gestamp.com
Tutorial Hours	Available upon request via email

Lecturer	
Name	Oscar Larra
Department	IBS
Field	Manufacturing Processes
ECTS	0,9 (9 hours)
e-mail	olarra@gestamp.com
Tutorial Hours	Available upon request via email
Lecturer	
Name	Tom Larsen
Department	IBS
Field	I + D at Gestamp (Product Design all over Gestamp)
ECTS	0,3 (3 hours)
e-mail	Tom.Larsen@uk.gestamp.com
Tutorial Hours	Available upon request via email

DETAILED INFORMATION ABOUT THE COURSE

Context of the course

Contribution to the professional profile of the degree

This module has as main objective to expose the student to the present strategies and practices on Product Design and Manufacturing Processes, emphasizing current real-life applications and identification of product and processes in the industry.

Objectives

This module particularly, it aims to:

Product Design and Development:

1. Introduce Product & Life Cycle Management strategies and describe the stages on the design and development of a product stressing the differences between sequential engineering vs. concurrent engineering.
2. Present methodologies and different alternatives for Product Design including: Engineering and value analysis, Quality Function Deployment (QFD), Design for Manufacture and Assembly (DFMA) and Robust, Modular and Ecodesign.
3. Describe CAD/CAM/CAE design tools & PLM processes.
4. Provide with the required documents for manufacturing processes such as Engineered Plans, Bills of Materials (BOM), Analysis Diagram, Cause an Effect Analysis, and Roadmaps Configuration Management Tools, plans and databases.
5. Product Design in the Automotive industry
6. Gestamp's approach to Product Design to meet a variety of performance requirements with examples and applications within Gestamp Chassis

Manufacturing Processes (Gestamp)

1. Principles, classification and description of the different manufacturing processes in Gestamp: cold and hot deformation, welding, removing materials, etc.
2. Raw materials
3. Press machine equipment and its classification
4. Components of a forming process (forming and cutting)
5. Process automation, layout, flexible manufacturing in Gestamp
6. Gestamp Products & Processes example: Sequence of Project milestones, inputs and outputs related to Product Design and Manufacturing Processes. Product and Process Validation.
7. Documents needed for manufacturing: engineering drawings, Bill of Materials (BOM), drawing assembly, notification engineering change, configuration management in Gestamp

PLM Product life-Cycle Management

1. Introduction to software Definition and describe its functions(CRM, ERP, MRP, PLM, etc)
2. Highlight the value of Project Lifecycle Management software to different industries
3. Application of PLM software to a real-life example

Prerequisites

To have taken previous Modules 1 to 3 of the Master

THEMATIC UNITS AND CONTENT

Content – Module

Theme 1: Product Design and Development

The Context of Product Design and Development (Adriana Acevedo)

- Product strategies and product life cycle
- Stages in design and product development
- Sequential versus concurrent engineering
- Methodologies and product design options: Engineering / value analysis, Quality Function deployment (QFD), Design for Manufacture and Assembly (DFMA), Robust, Modular Design, Eco-design
- Documents needed for manufacturing: engineering drawings, Bill of Materials (BOM), drawing assembly, road work orders, notification engineering change, configuration management

The Product Design Tools (Daniel Fernández Caballero)

- Introduction
- CAD / CAM / CAE.
- Applications

PLM Product life-Cycle Management (Javier Pérez de Zabalza)

- Introduction to SW Definition (CRM, ERP, MRP, PLM, etc)
- Why PLM? Benefits and Cons
- PLM in Gestamp: Teamcenter
- Future of PLM

Product Design Gestamp (Tom Larsen)

- Automotive Product Design overview
- Gestamp development approach
- Manufacturing Feasibility & Development Tools and Techniques

Theme 2: Manufacturing Process, Engineering and Automation

Manufacturing processes Gestamp (Óscar Larra)

- Introduction
- Product specifications and manufacturing
- Raw materials: steel
- Forming process elements and classification
- Process choice and its influence in product complexity, quality and cost
- Assembly process: welding
- Die manufacturing: layout and feasibility, manufacturing sequence and validation events
- Cost breakdown following manufacturing processes
- Automotive industry: Manufacturing process

Skills
Generic skills of degree programme
<p>CG 4. Ability to apply knowledge acquired in different contexts related to product design and process manufacturing and its various areas of study in an interdisciplinary or transverse way</p> <p>CG 5. Critical thinking and arguing consistent with comprehension of the external context and product design and manufacturing process</p> <p>CG 7. Interpersonal abilities in listening, negotiating and persuasion, and working in multicultural teams to be able to operate effectively in different roles and, when appropriate, assume leadership responsibilities.</p> <p>CG 10. Display initiative, creativity, and enterprising spirit when applying practices and strategies.</p>
Skills specific to the sub-field of knowledge
<p>CE 3. Ability to use and apply the appropriate methodologies and instruments (CAM/CAD/CAE, PLM, GPCS) in general and more particularly to Gestamp</p>

TEACHING APPROACH AND STRATEGIES

General learning and teaching approach of the course	
<p>The teacher will provide the relevant documentation and the students are REQUIRED TO READ IT BEFORE EACH SESSION. During the class, students will work to solve problems and debate issues related to the theory covered.</p>	
Class-based activities	Skills
<p>AF1. Lectures & expositive and interactive classes</p> <p>AF2. Case presentation (Team practice).</p> <p>AF3. Individual oral presentations</p> <p>Exam</p>	<p>CG 4, CG 5, CG 10, CE 3</p> <p>CG 7, CG 10, CE 3</p> <p>CG 4, CG 5, CG 10, CE 3</p> <p>CG 4, CG 5, CE 3</p>
Out of class activities	Skills
<p>AF5. Individual study</p> <p>AF6. Exercise preparation</p> <p>AF7. Teamwork analysis (Case).</p>	<p>CE3</p> <p>CG 5, CG 10, CE3</p> <p>CG 7, CG 10</p>

ASSESSMENTS AND ASSESSMENT CRITERIA

Assessment activities*	CRITERIA	Weight
Class participation	Critical and self-criticism ability. Capacity of applying Innovation to real business cases. Capacity for the development and the transmission of ideas and solutions Initiative and intrapreneurship	20%
Practices and exercises	Capacity of analysis and synthesis for decision making Leadership and teamwork capacity Critical and self-criticism ability Capacity for the development and the transmission of ideas and solutions.	30%
Final Project/Exam Presentation	Knowledge and comprehension of the key elements for the formulation of Innovation strategies. Capacity of analysis and synthesis for decision making. Capacity for the development and the transmission of ideas and solutions	50%
If you fail the course	CRITERIA	Weight
Final test	To measure understanding of fundamental ideas and knowledge	50%
Individual assignment	Capacity for the development and the transmission of ideas and solutions	50%

*If the student fails any assessment concept, s/he will have another chance to repeat the work. The deadline will be the week marked by the professor as re-sit within in the academic calendar.

RESOURCES

Basic Bibliography
Fundamentals of Modern Manufacturing Mikell P. Groover J Wiley & Sons
Transparencies and additional course materials
They will be provided during the course and available on Moodle.
Complementary Bibliography