西安交通大学《产品生命周期管理》课程教学大纲

一、课程基本信息

课程名称	产品生命周期管理 Management of Product Lifecycle		
课程编号			
课程学分	2	**总学时**	32
学时分配	授课学时 32		
课程类型	□公共课程□通识课程 □学科门类基础课　　　□专业大类基础课 ☑专业核心课□专业选修课□集中实践		
开课学期	□1-1 ☑1-2 □2-1 □2-2 □3-1 □3-2 □4-1 □4-2 □5-1 □5-2		
先修课程			
教材、参考书及其他资料	参考书 Bibliographies： 1.Ulrich and Eppinger, Product Design and Development, 5th edition 2.Stark, Product Lifecycle Management, Springer, 2012		

二、课程目标及学生应达到的能力（工科专业对标工程教育认证标准中专业毕业要求的 12 条具体指标点，其他专业对标行业/评估标准中专业毕业要求的具体指标点）

Ⅱ Course Objectives (by the end of the lesson students will be able to…)

The course fits into the overall program curriculum pursuing some of the defined general learning goals. In particular, the course contributes to the development of the following capabilities:

- Understand context, functions, and processes in a business and industrial environment and the impact of those factors on business performance
- Identify trends, technologies and key methodologies in a specific domain (specialization streams)
- Design solutions applying a scientific and engineering approach (Analysis, Learning, Reasoning, and Modeling capability deriving from a solid and rigorous multidisciplinary background) to face problems and opportunities in a business and industrial environment

The aim of the course is to introduce students to the basic concepts of Product Lifecycle Management (PLM) and lifecycle thinking. The acronym PLM enables a holistic lifecycle-oriented way of thinking through a set of principles, methods and tools supporting more effective and efficient management of the life cycle stages of industrial products, from their design/engineering, to production, distribution, usage until disposal/end of life. In its comprehensive meaning, PLM is a business approach based on collaboration and integration of people, processes, and technologies, which aims to support the development of more innovative, reliable and sustainable solutions (products and services) in a shorter time.

From a managerial perspective PLM encompass (i) a strategic management point of view where the product is the enterprise value creator; (ii) the application of a collaborative model for the empowerment of the core competencies distributed along the different actors involved in the lifecycle (e.g., designers, engineers, manufacturers, suppliers, etc.); (iii) the adoption of several IT solutions for establishing an access-safe product information management environment. From a technical perspective, PLM is a matter of methods, standards, and techniques for structuring the engineering processes, as well as a matter of computer-based tools for enabling virtual prototyping and collaborative workspaces. Lean product and process development is paramount support for the effective understanding and accomplishment of the above-mentioned points and will play an important role, not only as a topic of discussion taught within the course but also used to generate the students' critical attitude toward problem understanding and problem-solving. By the end of the course, students will be able to:

1. Define the main phases of a product / system lifecycle;
2. Define the main activities of product / process/ system design and engineering;
3. Identify the main tecniques and methods to be used to streamline the product / system lifecycle (lean thinking);
4. Identify the main IT solutions to be adopted by companies for supporting and managing efficiently the product / system lifecycle;
5. Evaluate how companies and organizations could put in place a proper lifecycle-oriented transformation.

课程目标与专业毕业要求的关联关系

Correlation between course objectives and graduation requirements

for the program

毕业要求：

Graduation Requirements

Students of this program should meet the following graduation requirements:

A. Master extensive theories on engineering and technology, humanities, social sciences, natural sciences, etc, demonstrate high scientific literacy, strong humanistic and artistic dispositions, and physical and mental wellbeing;

B. Have solid theoretical knowledge of industrial design, and master the knowledge related to product and its development, design, aesthetics, engineering, technology, management, planning, teamwork, professional ethics, etc.;

C. Master methods and skills of industrial design and related fields, be able to apply multidisciplinary knowledge into reality, and have strong expression, creation, practical, problem analysis and solving skills in the field of design;

D. Have good communication skills, teamwork spirit, a strong sense of social responsibility, and international vision, and be capable of applying interdisciplinary knowledge in pioneering work.

毕业要求 课程目标	A	B	C	D
1	M	H	H	H
2	M	H	H	M
3	M	H	H	M
4	M	H	H	H
5	L	H	H	N

注：毕业要求中 A、B、C、D、E、F、G、...对应毕业要求中各项具体内容；H、M、L 分别表示该课程目标对毕业要求相关项的强、中、弱程度。

Note: A, B, C and D indicate the specific aspects of the graduation requirements. H, M and L refer to a strong, medium and weak correlation of the course objectives to the graduation requirements respectively.

三、教学内容简介 Description of teaching contents

The PLM course is a mix of frontal lectures, cases, interactive class exercises, and serious games. Course topics include:

章节顺序 Chapter Title	章节名称 Chapter Title	知识点 Teaching Points	参考学时 Credit Hours
1	Introduction to Product Lifecycle Management	• Product Lifecyle • Lifecycle Thinking • Product Lifecycle Management Reference Model	4
2	New Product Development Process and Concurrent Engineering	• Product / Process / System Design and Engineeering • Innovation and Design process • Sequential, Concurrent and Lean Engineering	8
3	Main Design Methods to be used in the Product Lifecycle	• Design for X • Design to X • Requirements definition • QFD and Value Analysis • Process mapping and waste identification	8
4	Virtual Prototyping and Collaborative Platforms	• Computer Aided tools for Virtual Prototyping • Collaborative Platforms for Product Design and Development • PDM and PLM solutions	4
5	PLM projects implementation	• PLM functionalities • PLM solutions • PLM projects • PLM architectures • PLM business processes • PLM evaluation	8

四、教学安排详表 Teaching Arrangements

序号	教学内容 Teaching contents	学时分配 Credit Hours	教学方式 Teaching Methods	教学要求 （知识要求及能力要求） Learning Objectives (knowledge objective & ability objective)	对课程目标的支撑关系 Related to which Course Objective
1	Product Lifecycle Management and New Product Development	12	Real time classes, Cases	How to define Product Lifecycle How to define the New Product Development Process	1, 2
2	Design Methods and Tools	12	Real time classes, Cases	Which are the main design methods and the main IT tools to be used in the Product Lifecycle	3, 4
3	PLM projects	8	Real time classes, Application case	How PLM project can be executed in companies	4, 5

注：对课程目标的支撑关系可填写大纲中第二部分课程目标的相应序号。

The column "Related to which Course Objective" can be filled in with the number of the corresponding course objective in Part II.

七、考核方式及成绩构成 Evaluation and Composition of Grades

The final exam will be a 1.5-hour written test; oral exams will be allowed only to students that receive a 27 or higher grade on the written test. All material will be provided digitally online. Supporting books and references will also be suggested throughout the course. In-class exercises and teamwork will be used to facilitate advanced learning of PLM material and concepts. 100% of the evaluation is based on the final assignment.