Course Syllabus
Product Design and Development

March - July 2025-1

IX Level

Professor:

Lu Chang-Say, Estuardo

I. General information of the course

Name of the course:	Product Design and Development		
Prerequisite:	Marketing for Engineering	**Code:**	03171
Preceding:	Does not have	**Semester:**	2025-1
Credits:	4	**Level:**	IX
Weekly hours:	5 hours	**Modality of the course:**	Presencial
Course Type: Career(s):	**Mandatory Course:** Industrial and Commercial Engineering	**Course coordinator:**	Mónica Chávez mchavez@esan.edu.pe

II. Summary

The course aim is to provide students with the concepts and tools for the design of new products. The different approaches and methodologies for the design of new products, the stages of the design project, the design and the quality and the fundamental practices of design are reviewed. Economic, financial, and operational evaluations. Criteria for the selection of new products. Product life cycle. Also, the mechanisms and approaches for the introduction of new products.

III. Course Objective

The aim of the course is to facilitate students' development of a key ability in the search of value creation of a business. Which consists in the capacity to generate, integrate and combine ideas for the successful launching of new products on the market, as well as planning and developing each of the stages of the process that should be followed. The course seeks to also develop the skills of evaluation of the attractiveness of a category market of a new product, the effective presentation of its offers, as well as the leadership and the teamwork involved in the management of a launch project.

IV. Learning Results

As the outcome of completing this course, the student should get the ability to:

- Develop and conduct appropriate experimentation, analyze, and interpret data, and use engineering judgment to draw conclusions.
- Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- Communicate effectively with a range of audiences. Developing skills of speaking and writing, as well as the argumentation and the effective presentation of proposals, research plans and launching plans.
- Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- Acquire and apply new knowledge as needed, using appropriate learning strategies.

- Analyzes, evaluates, and recommends the opportunities of market that could be turn into potential ideas for successful products launching that allow companies to lever up their growth strategies.
- Designs and develop in detail a plan and the process that an idea for a product have to follow to turn it into a winning concept, analyzing carefully each of its stages.
- Evaluates the attractiveness of the market for a new product, applying methods of forecasting to estimate the market demand.
- Formulates and presents clearly how to develop a differential concept from a product idea and a better comprehension of the needs of the target audience.
- Designs, analyzes, and interprets research and products or concepts tests.
- Designs and establishes the plans for launching and methods of introduction of new products to the market aligned with the rest of the marketing mix variables.

V. Methodology

The subject development considers:

- The professor acts as a learning facilitator, combining class expositions, lecturers, case studies and assignment discussions.
- Active participation of students inside and outside the classroom is expected.
- To enrich class and group discussion, mandatory readings and video materials or resources must be completed by students prior to the session, according to the course program.
- Field and desk research and complementary text readings can also be combined.
- All learnings must be applied in a final integrated project that would be develop and presented in teams.
- The method of teaching reinforces in the participant the development of the skills needed to perform successfully in the business world such as analytical skills, critical synthesis, solving problems and decision making.

VI. Assessment

The evaluation system is permanent and comprehensive and is intended to promote student learning. The course grade is obtained by averaging the permanent assessment average (70%), and a final exam (30%).

The final average (FA) is obtained as follows:

FA = (0,70 x PAA) + (0,30 x FE)

Where:

FA = Final Average
PAA = Permanent Assessment Average **FE** = Final Exam

The permanent evaluation is the weighing average of the corresponding assessments: Participation and attendance in classes / Quizzes / Graded Assessments / Mid-term Evaluation / Case Studies and Presentations / Final Integrative Work. The average of these grades gives the corresponding final mark.

The final course Project would consist of a new Product Launching Proposal (with some strategical and tactical parts of a marketing plan) that would be prepared and validated in teams. These include different progress checks that must be present during the course development in the date indicated in the course program.

This final work must be presented in the virtual classroom written in a file in Word (Arial 11). It is imperative that the sources of information and bibliography are cite under the format APA. The virtual classroom must also contain the power point file of the oral exposure and all annexes which complement the work (like excels tables with analysis, videos, market studies, etc.).

The weights of the permanent evaluation are described in the following table:

PERMANENT ASSESSMENT AVERAGE - PAA 70%		
Evaluation Type	**Description**	**Weighting %**
Diagnostic Test	Test to find out entrance level	0%
Reading Control	3 Quizzes	10%
Practical Applications	4 Case studies	10%
Graded Assessments	2 Tests	20%
Mid-term Evaluation	Covers topics given in the first seven weeks of classes	20%
Final Course Project*	1st Report in progress (20%) + Final Report (30%) + Oral Team Presentation (15%) & Individual Presentation (35%)	30%
Participation	Attendance and Participation in class discussions	10%

(*) In the assessment of the written document of the research, aspects of content, monitoring, and utilization of the standards of the American Psychological Association (APA) is further contemplate. Thereby it promotes communication skills in academic written down documents.

VII. Program Content

WEEK	***CONTENTS***	***ACTIVITIES / EVALUATION***
LEARNING UNIT I: PRODUCT DEVELOPMENT FUNDAMENTALS AND PROCESS **LEARNING RESULTS:** • Analyzes, evaluates, and recommends the opportunities of market that could be turn into potential ideas for successful products.		

1° From March 17th to 22nd	**1.1 PRODUCT MARKETING IMPORTANCE** 1.1.1 Relevance of Costumer Centric Businesses 1.1.2 Value Generation 1.1.3 Product Idea and Product Concept 1.1.4 Strategic and Tactical Planning in Marketing **1.2. NEW PRODUCTS AND INNOVATIONS** 1.2.1 What is a New Product? 1.2.2 Technological Innovation and Entrepreneurship 1.2.3 The 'S' Curve with New Products 1.2.4 Types of New Products **Mandatory reading:** BAKER M. & HART S. (2007). Chaps. 1 & 2. Competition and product strategy & The product in theory and practice, pp. 33-39, pp. 40-71.	Presentation of the Course Methodology Guidelines for work groups Guidelines for the Final Project
2° From March 24th to 29th	**1.3 WHY DEVELOPING NEW PRODUCTS?** 1.3.1 Importance of New Products 1.3.2 Main Reasons of the Failure of New Products 1.3.3 Key Success Factors of New Products **1.4 NEW PRODUCT PROCESS OF DEVELOPMENT** 1.4.1 Product Lifecycle 1.4.2 Time to Market 1.4.3 Product Development Process 1.4.4 Stage-Gate Process 1.4.5 Product Lifecycle Management - PLM **Mandatory reading:** BAKER M. & HART S. (2007). Chap. 4. The product lifecycle in theory and practice. pp. 103-135. & Chap. 6. The importance, nature and management of new product development process. pp.157-196. **Complementary reading:** ULRICH K. & EPPINGER, S. (2013). Cap. 1, Introducción, pp.1-10	**Case Study #1** Examples of types of new products launching that were successful and other that fail.
3° From March 31st to April 5th	**1.5 NEW PRODUCTS MANAGEMENT** 1.5.1 Policies and Strategies for New Products: Mission, Vision, Guidelines and Drivers 1.5.2 Product Portfolio Analysis: BCG Matrix 1.5.3 Generic Business Strategies and Competitive Marketing Strategies 1.5.4 Commercial Growth Strategies: Product and Market **Mandatory reading:** Managing Competition: The Product Strategy is Central BAKER M. & HART S. (2007). Chaps. 1 & 5. Competition and product strategy & Product portfolios. pp. 19-33, pp. 136-153 **Complementary reading:** Ulrich, K. & Eppinger, S. (2013). Chap. 2, Development processes and organizations, pp.11-32.	**Presentation Product Idea for the Final Project** **Quiz 1** Readings: BAKER, M. & HART S. (2007) Op. cit. Chap 1, 2 & 4. pp. 33-39, 40-71 y pp. 103-135

<table>
<tr><td colspan="3">LEARNING UNIT II: PRODUCT IDEATION, OPPORTUNITY SEEKING AND ATTRACTIVENESS VALIDATION
LEARNING RESULTS:
• Designs, analyzes, and interprets research and tests of products or concepts.
• Evaluates the attractiveness of the market for a new product, applying methods of forecasting to estimate the potential market demand.</td></tr>
<tr><td rowspan="2">4°
From
April 07th
to 12th</td><td>2.1 BLUE OCEAN STRATEGY
2.1.1 The Innovative value proposition
2.1.2 How to create higher value and more attractive markets?
2.1.3 Application of the ERIC Matrix

2.2 CREATIVITY AND INNOVATION
2.2.1 Creative Process and Innovation
2.2.2 Sources for generating new ideas
2.2.3 Intuitive and rational techniques to enhance creativity
2.2.4 Business obstacles to creativity</td><td rowspan="2">Classes in Computer Laboratory</td></tr>
<tr><td>Mandatory reading:
Kim Ch., & Mauborgne, R. (2006) Chaps. 1, 2 & 3, Blue Ocean Strategy, Formulation of Blue Ocean Strategy, Reconstruction of Market Boundaries. (pp. 1-80).

Ulrich K. & Eppinger, S. (2013). Chaps. 3, Opportunity Identification. (pp. 35-51).</td></tr>
<tr><td rowspan="2">5°
From
April 14th
to 19th</td><td>2.3 IDENTIFICATION OF NEEDS
2.3.1 Needs Analysis Process
2.3.2 Study of usage habits and attitudes
2.3.3 Importance of the finding of an Insight
2.3.4 Empathy Map
2.3.5 Value Proposition and Consumer: Differentiation and Entry Points
2.3.6 Matrix of Attributes Importance versus Customers Evaluations
2.3.7 Changing expectations and innovation</td><td>Test 1
(Weeks 1 to 5)
In Laboratory
Readings:
Baker, M. & Hart, S. (2007) Op. cit. Chaps. 5 & 6.

pp. 136-153 y 157-196.

Classes in Computer Laboratory</td></tr>
<tr><td>Mandatory reading:
Ulrich, K. & Eppinger, S. (2013). Chap. 5. Identifying customer needs, pp. 73-91.

BAKER M. & HART S. (2007). Chaps. 8. & 9, Idea management for new product development & Screening new products, pp. 215-254, 256-273.</td></tr>
<tr><td>6°
From
April 21st
to 26th</td><td>2.4 SELECTION OF THE BEST IDEAS
2.4.1 Screening of business ideas
2.4.2 Methods to select the best ideas

2.5 MARKET ATTRACTIVENESS ANALYSIS
2.5.1 Strategic Validation of the Opportunity and Attractiveness of the Market
2.5.2 Market Attractiveness Matrix versus Competitive Position or IE Matrix.</td><td>Case Study #2
Growth Strategies of Peruvian Corporations

Classes in Computer Laboratory</td></tr>
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	2.5.3 Evaluation and selection of the best ideas for new products in a portfolio **Mandatory reading:** BAKER M. & HART S. (2007). Chaps. 11, Business Analysis. pp. 308-328.	
7° From April 28th to May 3rd	**2.6 VALIDATION OF MARKET ATTRACTIVENESS** 2.6.1 Market Size Study 2.6.2 Demand Forecasting Methods: Quantitative Methods 2.6.3 Market Estimation for new products: Qualitative Methods **Complementary reading:** Kahn, K. (2006). Chap. 1. *New Product Forecasting: An Applied Perspective*. (pp. 10-18.). Sharpe Inc.	**Quiz 2** Readings: Baker, M. & Hart, S. (2007) Op. cit. Chaps. 8 & 9 pp. 215-254 & 256-273 Ulrich K. & Eppinger, S. (2013) Op. cit Chaps. 3 & 5 pp. 35-51 & 73-91. **Classes in Computer Laboratory**
8° From May 5th to 10th	**MID-TERM EXAMS**	
LEARNING UNIT III: CONCEPT CREATION AND CUSTOMER VALIDATIONS **LEARNING RESULTS:** • Develops and designs in detail the plan or process that a product idea must follow to become a winning concept, carefully analyzing each of its stages. • Formulates and clearly presents how to develop a differentiated concept from a product idea, based on a better understanding of the target audience's needs.		
9° From May 12th to 17th	**3.1 GENERATION OF WINNING CONCEPTS** 3.1.1 Factors in the Purchase Decision Process 3.1.2 Development of a Differentiated Concept: value search process, benefits, and not attributes 3.1.3 Creation and writing of Positioning Concepts **Mandatory reading:** Ulrich, K. & Eppinger, S. (2007). Chap. 7. Concept Generation. In *Product Desing & Development.* (pp. 119-141).	
10° From May 19th to 24th	3.1.4 Types of Key Benefits for a concept 3.1.5 Application of Perception Principles that facilitate positioning 3.1.6 Review of concepts for the Integrative Project **Complementary reading:** BAKER M. & HART S. (2007). Chaps. 10, Concept Development and Testing. pp. 274-307.	**Quiz 3** Readings: Ulrich K. & Eppinger, S. (2013) Op. cit. Chaps. 7 & 9, pp.119-141 y 165-180 POPE, J (1984) Op. cit. Part IV. pp. 131-197 and 210-229. **Classes in Computer Laboratory**
11° From May 26th to 31st	**3.2 CONCEPT AND PRODUCT TESTING** 3.2.1 How to prepare a market research brief 3.2.2 Design Product Test and Concept Test	**Case Study #3** Analysis and development of winning concepts

	3.2.3 Interpretation of Test Results	**Classes in Computer Laboratory**
	Mandatory reading: Ulrich, K. & Eppinger, S. (2013) chap. 9, Concept Test, pp. 165-180. Baker, M. & Hart, S. (2007). Chap. 12. Product Testing. pp. 327-354. POPE, Jeffrey (1984). Part IV: *Solving specific marketing problems*. pp. 131-197 and 210-229.	
LEARNING UNIT IV: MARKING, PACKAGING AND LAUNCHING STRATEGIES **LEARNING RESULTS:** • Designs and establishes the plans for launching and methods of introduction of new products to the market aligned with the rest of the marketing mix variables.		
12° From June 2nd to 7th	**4.1 PRODUCT QUALITY STRATEGY, TECHNICAL SPECIFICATIONS AND SUSTAINABILITY** 4.1.1 Product quality strategy 4.1.2 Standardization, approval and certification 4.1.3 Sustainable product quality: Circular economy 4.1.4 Establishment of Target Specifications 4.1.5 Quality Function Deployment (QFD) Matrices: Integrating customer needs into product design	**Final Project - First Part** (Diagnosis and Concept) **Test 2** **(Weeks 11 to 13):** Readings: BAKER M. & HART S. (2007). Op. Cit. Chap. 12, pp. 327-354 GONZALES, M. (2001) Chap. 3 & 4, Op. Cit. pp. 25-33 y 51 a 77. **Classes in Computer Laboratory**
	Mandatory reading: GONZALES, M. (2001) Chap. 3 & 4, The QFD Methodology and Introduction to the House of Quality, pp. 25-33 and 51 a 77. **Complementary Reading:** Ulrich, K. & Eppinger, S. (2013) Chap. 6. *Product specifications,* pp. 93-116.	
13° From June 9th to 14th	**4.2 BRANDS AND INTELLECTUAL PROPERTY** 4.2.1 Brand Development and Branding Strategy 4.2.2 Creation and registration of a brand name 4.2.3 Other forms of differentiation protection: Patents, Industrial design registration, and Designations of origin 4.2.4 Branding Strategies: Brand Extensions **4.3 PACKAGING** 4.3.1 Elements and functions of packaging 4.3.2 Labeling and packaging design 4.3.3 Package impact in the ecology	**Case Study #4** Addition of New Product to Portfolio: New Concept, Brand, Packaging, Quality Specifications, Sales Potential Estimation and Launch Method
	Mandatory reading: AAKER, David. (1996) Chap. 3, Brand Identity System, pp. 69-109. **Complementary Reading:** CERVERA, Luis Ángel. (2003) Envase y Embalaje. La Venta silenciosa. Chap. 1, 2 & 6 pp. 27-38, 39-126. & pp. 217-231.	

14° From June 16th to 21st	**4.3 INTRODUCTION AND LAUNCHING** 4.3.1 Consumer Buying Behavior for Innovations: Diffusion and Adoption 4.3.2 Blocks and risks to new products 4.3.3 Launching Methods and Strategies for a Product Introduction 4.3.4 Sales Promotions to accelerate market Introduction **Mandatory reading:** Baker, M. & Hart, S. (2007). Chaps. 13, Commercialization: test marketing and launching the new product. In *Product Strategy & Management.* (pp. 357-395.)	
15° From June 23rd to 28th	**ORAL PRESENTATIONS OF FINAL TEAM PROJECTS** (Special dates / times for this activity will be scheduled)	**Final Project Submission and Oral Presentation**
16° From June 30th to July 5th	**FINAL EXAMS**	**From 2.6 to 4.3**

VIII. References

Basic Course Textbooks:

Baker, M. & Hart S. (2007). *Product Strategy and Management.* (2nd. Ed.) Edinburgh: Pearson Education.

Ulrich, K. & Eppinger, S. (2012). *Product Design and Development.* (5th. Ed.) Los Angeles: McGraw Hill Education.

Complementary Bibliography:

Aaker, D. & Joachimsthaler, E. (2000). *Brand Leadership.* New York: The Free Press.

Cohen, L. (1995). *Quality Function Deployment. How to make QFD work for you.* Massachusetts: Addison-Wesley Publishing Co.

Cohen, W. (2006). *The Marketing Plan.* (5th Ed). USA: John Wiley & Sons, Inc.

Chan, K., W. & Mauborgne, R. (2005). *Blue Ocean Strategy.* Boston: Harvard Business School Press.

Chunawalla, S.A. (2009). *Product Management.* Mumbai: Himalaya Publication. http://site.ebrary.com/lib/esan/docDetail.action?docID=10415149&p00=chunawalla

Dyllick, T. & Rost, Z. (2017). *Towards true product sustainability.* Journal of Cleaner Production. 162, 346-360.

Fernandez Del Hoyo, A. (2009). *Innovación y gestión de nuevos productos: a visión estratégica y práctica.* Madrid: Pirámide.

Floren, H. & Others. (2017). *Critical success factors in early new product development: a review and a conceptual model.* International Entrepreneurship and Management Journal. 14 (2), 411-427.

Kahn, K. (2006). *New Product Forecasting: An Applied Perspective.* Sharpe Inc. Download free version by chapters at: http://site.ebrary.com/lib/esan/docDetail.action?docID=10178089&p00=kahn

Lehmann, D. & Winer, R. (2002). *Product Management.* (3rd. Ed.). Boston: McGraw-Hill Education.

Müller-Stewens & Möller, (2017). *Performance In New Product Development A comprehensive framework, current trends and research directions.* Journal Management Control. 28 (2), 157- 201.

Pinna, C. & Others (2018). *Effect of product lifecycle management on new product development performances: Evidence from the food industry.* Computers in Industry, 100, 184-195

Pope, J. (1993). *Practical Marketing Research.* (3rd Ed.) AMACOM.

Schnarch, A. (2014). *Desarrollo de Nuevos Productos: Creatividad, Innovación y Marketing.* (6ta. ed.) Bogotá: McGraw Hill Interamericana.

IX. Laboratory Support

Computer Lab with Microsoft Excel is required in weeks 4, 5, 7, 9, 11,12 & 13.

X. Professor

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