Course Syllabus
Product Design and Development

March - July 2024-1

IX Level

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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:**	2024-1
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:**	Javier Del Carpio jdelcarpio@esan.edu.pe

II. Summary

The course aim is to provide student 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 review. 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 develop 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 in the market, (including the design of a package prototype), as well as, to plan and develop each of the stages of the process that should be follow. 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 his offers, as well as the leadership and the teamwork involve in the management of a launching 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 the 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 methodology of the course encourages students' active participation and use of diverse methods and techniques. The professor acts as learning facilitator, combining class expositions, lecture analysis and discussions, case studies and discussions, discussion of journals articles and teamwork.
The method of teaching reinforces the participant learning and develops the skills needed to performance successfully in the business world such as analytical skills, critical synthesis, solving problems and decision making.
A mandatory textbook is used, and its reading must be complete by students prior to the session, according to the course program. Complementary text can also combine the study of topics. Besides, the course encourages students to work each topic using the case method.
The course contemplates the accomplishment and sustentation of a final proposed plan to develop the launching or relaunching of a product of the choice of the students. The final project will be developed in teams.

VI. Assessment

The evaluation system is permanent and comprehensive and is intended to promote student learning. The course grade is obtained by the permanent assessment average (55%), the midterm exam (20%) and the final exam (25%).

The continuous evaluation is the weighing average of the corresponding assessments: Reading Quizzes / Graded Assessments / Case Studies Presentations / Final Work - Product Launching Proposal. The average of these scores gives the corresponding note.

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

PERMANENT ASSESSMENT AVERAGE - PAA 55%		
Evaluation Type	**Description**	**Weighting %**
Diagnostic Test	Test to find out entrance level	0%
Reading Control	3 Quizzes	15%
Graded Assessments	2 Tests	30%
Practical Applications	4 Case studies and other Activities in class	15%

Final Assignment Teamwork*	A New Product Launching Plan 1st Draft (20%) + Final Paper (30%) + Oral Team Presentation (20%) & Individual Presentation (30%)	35%
Participation	Attendance and Participation in class discussions	5%

(*) 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.

The final average (FA) is obtained as follows:

FA = (0,20 x ME) + (0,55 x PAA) + (0,25 x FE)

Where:

FA = Final Average
PAA = Permanent Assessment Average
ME = Mid-Term Exam
FE = Final Exam

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 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. • Acquire and apply new knowledge as needed, using appropriate learning strategies.		
1° From March 21th to 27th	**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). Chap. 1. Competition and product strategy. In *Product Strategy & Management* (pp. 33-39) & Chap. 2. The product in theory and practice. In *Product Strategy & Management* (pp. 40-71). (2nd. Ed.). Edinburgh: Pearson Education. Ulrich, K. & Eppinger, S. (2012). Chap.1. Introduction. In *Product Design & Development*. (pp.1-10). (5th. Ed.). Los Ángeles: McGraw Hill Education.	Presentation of the Course Methodology Guidelines for the Final Assignment and Research Work Review of the Guide for Written Report in ESAN with APA norms. Review of the Guidelines for Effective Oral Presentations

2° **From April 01th to 06nd**	**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 Reduction of Products Lifecycles 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. In *Product Strategy & Management. (*pp. 103-135). & Chap. 6. The importance, nature and management of new product development process. In *Product Strategy & Management. (*pp. 157-196). (2nd. Ed.). 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), pp. 411-427.	**Case Study #1** Examples of types of new products launching that were successful and other that fail.
3° **From April 08th to 13th**	**1.5 NEW PRODUCTS MANAGEMENT** 1.5.1 Organization and Structure 1.5.2 Global Vision of the Development Process 1.5.3 Product policy and guidelines: Mission 1.5.4 Product portfolio analysis 1.5.5 Generic Business Strategies 1.5.6 Growing Strategies: New Product & New Market **Mandatory reading:** 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. Baker, M. & Hart, S. (2007). Chap. 1. Competition and product strategy. In *Product Strategy & Management*. (pp. 19-33) & Chap. 5. Product portfolios. In *Product Strategy & Management*. (pp. 136-153) **Complementary reading:** Ulrich, K. & Eppinger, S. (2012). Chaps. 2. Development processes and organizations. In *Product Design & Development*. (pp.11-32).	**Quiz 1** **(Weeks 1 & 2)** Readings: Baker, M & Hart, S. (2007) Op. cit. Chap 1, 2, & 4. Floren, H. & Others (2017). *Critical success factors in early new product development: a review and a conceptual model.* Op cit.

LEARNING UNIT II: PRODUCT IDEATION, OPPORTUNITY SEEKING AND ATTRACTIVENESS VALIDATION

LEARNING RESULTS:

- Develop and conduct appropriate experimentation, analyze, and interpret data, and use engineering judgment to draw conclusions.
- Evaluates the attractiveness of the market for a new product, applying methods of forecasting to estimate the potential market demand.
- Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

4° From April 15th to 20nd	**2.1 BLUE OCEAN STRATEGY** 2.1.1 How to innovate without being worried of competitors. 2.1.2 The six ways to explore new market creation 2.1.3 How to be more creative with the ERIC matrix. **2.2 CREATIVITY AND INNOVATION** 2.2.1 Origin of Ideas, sources of opportunities 2.2.2 The Creative Process: Rational + Intuitive 2.2.3 Problem Solving and Creatives Techniques 2.2.4 Brakes and Blocks to Creativity **Mandatory reading:** Kim Ch., & Mauborgne, R. Chaps. 1, 2 & 3, Creating blue oceans, Analytical tools and Frameworks & Reconstruction of the market boundaries. In *Blue Ocean Strategy*. (pp. 1-80). Boston: Harvard Business School Press. **Complementary reading:** Ulrich K. & Eppinger, S. (2012). Chaps. 3. Opportunity Identification. In *Product Design & Development*. (pp. 35-51).	**Case Study #2** Growing Strategies applied by Peruvian Corporations **Classes in Computer Laboratory**
5° From April 22th to 27th	**2.3 IDENTIFICATION OF NEEDS** 2.3.1 Understanding needs and wants. 2.3.2 Usage Habits and Attitude Study 2.3.3 Importance of the finding of an Insight 2.3.4 Creating Customers Value Proposition: Points of Parity and Points of Difference 2.3.5 Matrix of Attributes Importance versus Customers Evaluations 2.3.6 Changing expectations and innovation **Mandatory reading:** Ulrich, K. & Eppinger, S. (2012). Chap. 5. Identifying customer needs. In *Product Design & Development*. (pp. 73-90 Baker, M. & Hart, S. (2007). Chaps. 8. Idea management for new product development. In *Product Strategy & Management*. (pp. 215-254).	**Test 1** **(Weeks 1 to 5)** **In Laboratory** From 1.1 to 2.1 Readings: Baker, M. & Hart, S. (2007) Op. cit. Chaps. 5 & 6. Pinna, C. & Others (2018) *Effect of product lifecycle management on new product development performances: Evidence from the food industry*. Op.cit. **Classes in Computer Laboratory**
6° From April 29th May 4th	**2.4 SELECTION OF IDEAS** 2.4.1 Screening of 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. 2.5.3 Assessment of a Portfolio of new product projects. **Mandatory reading:** Baker, M. & Hart, S. (2007). Chaps. 9. Screening new products. In *Product Strategy & Management.* (pp.308-327) **Complementary reading:** Baker, M. & Hart, S. (2007). Chaps. 11. Business Analysis. In *Product Strategy & Management.* (pp.256-273).	

7° From May 6th to 11th	**2.6 VALIDATION OF MARKET ATTRACTIVENESS** 2.6.1 Market Size Studies, Estimations and Sales Forecast 2.6.2 Methods for New Products Demand Forecasting 2.6.3 Qualitative Break Down methodology for new products **Complementary reading:** Kahn, K. (2006). Chap. 1. In *New Product Forecasting: An Applied Perspective*. (pp. 10-18.). Sharpe Inc.	**Quiz 2** **(Weeks 5 to 7)** Readings: Baker, M. & Hart, S. (2007) Op. cit. Chaps. 8 & 9 Ulrich K. & Eppinger, S. (2012) Op. cit. Chaps. 5 **Classes in Computer Laboratory**
8° From May 13th to 18st	**MID-TERM EXAMS FOR MANDATORY COURSES**	
LEARNING UNIT III: CONCEPT CREATION AND CUSTOMER VALIDATIONS **LEARNING RESULTS:** • Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives. • 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.		
9° From May 20nd to 25th	**3.1 WINNING CONCEPTS CREATION** 3.1.1 Concept Development: the process of pursuit value 3.1.2 Importance of discovering Insights 3.1.3 Empathy Map 3.1.4 Development of Positioning Concepts 3.1.5 Key Benefit types for Concept Creation **Mandatory reading:** Ulrich, K. & Eppinger, S. (2007). Chap. 7. Concept Generation. In *Product Desing & Development.* (pp. 119-141). **Complementary reading:** Baker, M. & Hart, S. (2007). Chaps. 10. Concept Development and Testing. In *Product Strategy & Management.* (pp. 274-307).	**Classes in Computer Laboratory**
10° From May 27th to June 1th	**3.2 CONCEPT AND PRODUCT TESTING** 3.2.1 How to prepare a market research brief and how to design a Concept Test or a Product Testing 3.2.2 Concept Test 3.2.3 Product Testing 3.2.4 Concept and Use Test **Mandatory reading:** Ulrich, K. & Eppinger, S. (2012). Chap. 9. Concept Test. In *Product Design & Development.* (pp. 165-180). Baker, M. & Hart, S. (2007). Chap. 12. Product Testing. In *Product Strategy & Management.* (pp. 328-354). (2nd. Ed.). Pope, J. (1993). Part IV: *Solving specific marketing problems*. (pp. 107-156 & 192-197).	**Quiz 3** **(Weeks 7 to 10)** Readings: Ulrich K. & Eppinger, S. (2012) Op. cit. Chaps. 7&9. Pope, J. (1993) Op. cit. Part IV. pp. 107 - 156 & 192-197

LEARNING UNIT IV: BRANDING, QUALITY WITH TECHNICAL SPECIFICATIONS, PACKAGING AND LAUNCHING STRATEGIES

LEARNING RESULTS:

- Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- 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.
- 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.
- Communicate effectively with a range of audiences. Developing the skills of speaking and writing, as well as the argumentation and the effective presentation of proposals, research plans and launching plans.

11° From June 3th to 8th	**4.1 BRAND IDENTITY AND INTELLECTUAL PROPERTY** 4.1.1 Intellectual Property Right and Brand Naming 4.1.2 Brand Management, Brand Identity vs. Brand Image 4.1.3 Brand Strategies for a portfolio of products and line extensions. **Mandatory reading:** Aaker, D. & Joachimsthaler, E. Chap 2. Brand identity the cornerstone of the brand strategy. In *Brand Leadership.* (pp. 31-64). New York: The Free Press.	**Case Study #3** Analysis of Examples of Concepts per Benefit Types **Classes in Computer laboratory**
12° From June 10th to 15th	**4.2 TECHNICAL STANDARDS, PRODUCT QUALITY SPECIFICATIONS AND SUSTAINABILITY** 4.2.1 Product quality and Sustainable Designing 4.2.2 Technical specifications Norms 4.2.3 Matrix of the Houses of Quality: Integrating customer requirements in the design **Mandatory reading:** Cohen, L. (1995). Chap. 4, 5, 6 & 17. Quality Function Deployment. How to make QFD work for you. (pp. 68-122) & (pp. 296-306). Massachusetts: Addison-Wesley Publishing Co. **Complementary Reading:** Ulrich, K. & Eppinger, S. (2012). Chap. 6. *Product specifications.* In *Product Design & Development.* (pp. 91-116). Dyllick, T. & Rost, Z. (2017) Towards true product sustainability. Journal of Cleaner Production. 162, pp. 346-360.	**Final Project - First Part** **Test 2** **(Weeks 11 to 13):** **In laboratory** From 2.6 to 4.1 Readings: Baker, M. & Hart, S. (2007) Op. cit. Chaps. 12 pp. 317-354 Aaker, D.& Joachimsthaler, E. Chap. 2. (pp. 31-64).
13° From June 17th to 22th	**4.3 INTRODUCTION AND LAUNCHING** 4.3.1 Consumer Buying Behavior for Innovations: 4.3.2 Diffusion of Innovation and Adoption Curve 4.3.3 Blocks and risks to new product adoption 4.3.4 Launching Methods and Strategies for a 4.3.5 Product Introduction 4.3.6 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.)	**Case Study #4** Addition of New Product to Portfolio: New Concept, Brand, Packaging, Quality Specifications, Sales Potential Estimation and Launch Method

14° From June 24th to 29th	**4.4 PACKAGING** 4.4.1 Components and functionalities of a Package. 4.4.2 Types of Packages. 4.4.3 Package impact in the ecology 4.4.4 Packaging Technologies and Trends **Complementary reading:** Chunawalla, S.A. (2009). Chap. 21. Packaging. In *Product Management.* (pp. 259-265). Mumbai: Himalaya Publication	
15° From July 1th to 6th	***FINAL PRESENTATIONS OF TEAM ASSIGNMENTS***	**Written and Oral Presentations of Final Project**
16° From July 8th to 13th	**FINAL EXAMS FOR MANDATORY COURSES**	**From 2.6 to 4.4**

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.

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

Kapferer, J.N. (2012). *The New Strategic Brand Management.* (5th. Edition), London: Kogan Page

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 in required in weeks 4, 5, 7, 9, 11,12 & 13.

X. Professors

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