



UNIVERSIDAD
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Course Syllabus Product Design and Development

August-December 2021-2

IX Level

**Lu Chang-Say, Estuardo
Yan Lau, Mario Alberto**

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:	2021-2
Credits:	4	Level:	IX
Weekly hours:	5 hours	Modality of the course:	Remote - Synchronous
Course Type: Career(s):	Mandatory Course: Industrial and Commercial Engineering	Course coordinator:	Javier Del Carpio idelcarpio@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 develop also 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 develop in teams.

VI. Assessment

The evaluation system is permanent and comprehensive, and is intend to promote student learning. The course grade is obtain by averaging the continuous evaluation (50%), the midterm exam (25%) 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 describe in the following table:

CONTINUOUS EVALUATION AVERAGE - CEA 50%		
Evaluation Type	Description	Weighting %
Reading Control	2 Quizzes	10%
Graded Assessments	3 Tests	35%
Practical Applications	4 Case studies and Other Activities in class	15%
Final Assignment Teamwork*	A New Product Launching Plan	35%

	1st Draft (20%) + Final Paper (30%) + Team and Individual Oral Presentation (50%)	
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 (PF) is obtained as follows:

$$FA = (0,25 \times ME) + (0,50 \times CEA) + (0,25 \times FE)$$

Where:

- FA** = Final Average
ME = Mid-Term Exam
CEA = Continuous Evaluation Average
FE = Final Exam

VII. Program Content

WEEK	CONTENTS	ACTIVITIES / EVALUATION
LEARNING UNIT I: PRODUCT DEVELOPMENT FUNDAMENTALS AND PROCESS		
LEARNING RESULTS:		
<ul style="list-style-type: none"> 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 August 23th to 28th	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	Presentation of the Course Methodology Guidelines for the Final Assignment and Research Work
	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	Review of the Guide for Written Report in ESAN with APA norms. Review of the Guidelines for Effective Oral Presentations
	Mandatory reading: Baker, M. & Hart S. (2007). Chap. 1. Competition and product strategy. In <i>Product Strategy & Management</i> (pp. 33-39) & Chap. 2. The product in theory and practice. In <i>Product Strategy &</i>	

	<p><i>Management</i> (pp. 40-71). (2nd. Ed.). Edinburgh: Pearson Education.</p> <p>Ulrich, K. & Eppinger, S. (2012). Chap.1. Introduction. In <i>Product Design & Development</i>. (pp.1-10). (5th. Ed.). Los Angeles: McGraw Hill Education.</p>	
<p>2°</p> <p>From August 30th to September 4th</p>	<p>1.3 WHY DEVELOPING NEW PRODUCTS?</p> <p>1.3.1 Importance of New Products</p> <p>1.3.2 Main Reasons of the Failure of New Products</p> <p>1.3.3 Key Success Factors of New Products</p> <p>1.4 NEW PRODUCT PROCESS OF DEVELOPMENT</p> <p>1.4.1 Reduction of Products Lifecycles</p> <p>1.4.2 Time to Market</p> <p>1.4.3 Product Development Process</p> <p>1.4.4 Stage-Gate Process</p> <p>1.4.5 Product Lifecycle Management - PLM</p> <p>Mandatory reading:</p> <p>Baker, M. & Hart, S. (2007). Chap. 4. The product lifecycle in theory and practice. In <i>Product Strategy & Management</i>. (pp. 103-135). & Chap. 6. The importance, nature and management of new product development process. In <i>Product Strategy & Management</i>. (pp. 157-196). (2nd. Ed.).</p> <p>Floren, H.& Others (2017). <i>Critical success factors in early new product development: a review and a conceptual model</i>. International Entrepreneurship and Management Journal. 14 (2), pp. 411-427.</p>	<p>Case Study #1</p> <p>Examples of types of new products launching that were successful and other that Fail.</p>
<p>3°</p> <p>From September 6th to 11th</p>	<p>1.5 NEW PRODUCTS MANAGEMENT</p> <p>1.5.1 Organization and Structure</p> <p>1.5.2 Global Vision of the Development Process</p> <p>1.5.3 Product policy and guidelines: Mission</p> <p>1.5.4 Product portfolio analysis</p> <p>1.5.5 Generic Business Strategies</p> <p>1.5.6 Growing Strategies: New Product & New Market</p> <p>Mandatory reading:</p> <p>Pinna, C. & Others (2018) <i>Effect of product lifecycle management on new product development performances: Evidence from the food industry</i>. Computers in Industry, 100, 184-195.</p> <p>Ulrich, K. & Eppinger, S. (2012). Chaps. 2. Development processes and organizations. In <i>Product Design & Development</i>. (pp.11-32).</p> <p>Baker, M. & Hart, S. (2007). Chap. 1. Competition and product strategy. In <i>Product Strategy & Management</i>. (pp. 19-33) & Chap. 5. Product portfolios. In <i>Product Strategy & Management</i>. (pp. 136-153)</p>	<p>Quiz 1 (Week 1 & 2)</p> <p>Readings: Baker, M & Hart, S. (2007) Op. cit. Chap 1, 2, 4 & 6.</p> <p>Floren, H. & Others (2017). <i>Critical success factors in early new product development: a review and a conceptual model</i>. Op cit.</p>
<p>LEARNING UNIT II: PRODUCT IDEATION, OPPORTUNITY SEEKING AND ATTRACTIVENESS VALIDATION</p> <p>LEARNING RESULTS:</p> <ul style="list-style-type: none"> • 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. 		

<ul style="list-style-type: none"> Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. 		
<p>4°</p> <p>From September 13th to 18th</p>	<p>2.1 BLUE OCEAN STRATEGY</p> <p>2.1.1 How to innovate without being worry 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.</p> <p>2.2 CREATIVITY AND INNOVATION</p> <p>2.2.1 The Creative Process 2.2.2 Problem Solving 2.2.3 Brakes and Blocks to Creativity</p> <p>2.3 HOW TO SEARCH AND FIND IDEAS FOR NEW PRODUCTS?</p> <p>2.3.1 Origin of Ideas, sources of opportunities 2.3.2 Creatives techniques 2.3.3 Rational and intuitive techniques</p> <p>Mandatory reading: Kim Ch., & Mauborgne, R. Chaps. 1, 2 & 3, Creating blue oceans, Analytical tools and Frameworks & Reconstruction of the market boundaries. In <i>Blue Ocean Strategy</i>. (pp. 1-80). Boston: Harvard Business School Press. Ulrich K. & Eppinger, S. (2012). Chaps. 3. Opportunity Identification. In <i>Product Design & Development</i>. (pp. 35-51).</p>	<p>Case Study #2</p> <p>Growing Strategies applied by Peruvian Corporations</p> <p>Classes in Computer Laboratory</p>
<p>5°</p> <p>From September 20th to 25th</p>	<p>2.4 IDENTIFICATION OF NEEDS</p> <p>2.4.1 Needs and Desires 2.4.2 Usage Habits and Attitude Study 2.4.3 Matrix of Attributes Importance versus Customers Evaluations 2.4.4 Creating Customers Value Proposition</p> <p>2.5 SELECTION OF IDEAS</p> <p>2.5.1 Screening of Ideas 2.5.2 Methods to Select the Best Ideas</p> <p>Mandatory reading: Ulrich, K. & Eppinger, S. (2012). Chap. 5. Identifying customer needs. In <i>Product Design & Development</i>. (pp. 73-90) Baker, M. & Hart, S. (2007). Chaps. 8. Idea management for new product development. In <i>Product Strategy & Management</i>. (pp. 215-254).</p>	<p>Test # 1 (Weeks 1 to 5) In Laboratory From 1.1 to 2.4 with reading assigned: Baker, M. & Hart, S. (2007) Op. cit. Chaps. 5. Pinna, C. & Others (2018) <i>Effect of product lifecycle management on new product development performances: Evidence from the food industry.</i> Op.cit.</p> <p>Classes in Computer Laboratory</p>
<p>6°</p> <p>From eptember 27th to October 2nd</p>	<p>2.6 MARKET ATTRACTIVENESS ANALYSIS</p> <p>2.6.1 Strategic Validation of the Opportunity and Attractiveness of the Market 2.6.2 Market Attractiveness Matrix versus Competitive Position or IE Matrix. Applications to a portfolio of projects.</p> <p>Mandatory reading: Baker, M. & Hart, S. (2007). Chaps. 9. Screening new products. In <i>Product Strategy & Management</i>. & Chaps. 11. Business</p>	

	Analysis. In <i>Product Strategy & Management</i> . (pp.308-327) (pp.256-273).	
<p>7°</p> <p>From October 4th to 9th</p>	<p>2.7 VALIDATION OF MARKET ATTRACTIVENESS</p> <p>2.7.1 Market Size Studies, Estimations and Sales Forecast</p> <p>2.7.2 Methods for New Products Demand Forecasting</p> <p>2.7.3 Qualitative Break Down methodology for new products</p> <p>Mandatory reading: Kahn, K. (2006). Chap. 1. In <i>New Product Forecasting: An Applied Perspective</i>. (pp. 10-18.). Sharpe Inc.</p>	<p>Quiz 2 (Weeks 5 to 7)</p> <p>Readings: Baker, M. & Hart, S. (2007) Op. cit. Chaps. 8, 9 & 11</p> <p>Classes in Computer Laboratory</p>
<p>8°</p> <p>From October 11th to 16th</p>	<p>MID-TERM EXAMS FOR MANDATORY COURSES</p>	<p>From 1.1 to 2.6</p>
<p>LEARNING UNIT III: CONCEPT CREATION AND CUSTOMER VALIDATIONS</p> <p>LEARNING RESULTS:</p> <ul style="list-style-type: none"> 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. 		
<p>9°</p> <p>From October 18th to 23th</p>	<p>3.1 WINNING CONCEPTS CREATION</p> <p>3.1.1 Development of a Concept: the process of pursuit value</p> <p>3.1.2 Importance of discovering Insights</p> <p>3.1.3 Empathy Map</p> <p>3.1.4 Development of Positioning Concepts</p> <p>3.1.5 Key Benefits types for Concept Creation</p> <p>Mandatory reading: Ulrich, K. & Eppinger, S. (2007). Chap. 7. Concept Generation. In <i>Product Design & Development</i>. (pp. 119-141). Baker, M. & Hart, S. (2007). Chaps. 10. Concept Development and Testing. In <i>Product Strategy & Management</i>. (pp. 274-307).</p>	<p>Classes in Computer Laboratory</p>
<p>10°</p> <p>From October 25th to 30th</p>	<p>3.2 CONCEPT AND PRODUCT TESTING</p> <p>3.2.1 How to prepare a market research brief and how to design a Concept Test or a Product Testing</p> <p>3.2.2 Concept Test</p> <p>3.2.3 Product Testing</p> <p>3.2.4 Concept and Use Test</p> <p>Mandatory reading: Ulrich, K. & Eppinger, S. (2012). Chap. 9. Concept Test. In <i>Product Design & Development</i>. (pp. 165-180). Baker, M. & Hart, S. (2007). Chap. 12. Product Testing. In <i>Product Strategy & Management</i>. (pp. 328-354). (2nd. Ed.). Pope, J. (1993). Part IV: <i>Solving specific marketing problems</i>. (pp. 107-156 & 192-197).</p>	<p>Test #2 (Weeks 7 to 10)</p> <p>In laboratory</p> <p>From 2.5 to 3.2 with reading assigned: Ulrich K. & Eppinger, S. (2012) Op. cit. Chaps. 5, 7 & 9.</p>

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.

<p>11°</p> <p>From November 2nd to 6th</p>	<p>4.1 BRAND IDENTITY AND INTELLECTUAL PROPERTY</p> <p>4.1.1 Intellectual Property Right and Brand Naming</p> <p>4.1.2 Brand Management, Brand Identity vs. Brand Image</p> <p>4.1.3 Brand Strategies for a portfolio of products and line extensions.</p> <p>Mandatory reading: Aaker, D. & Joachimsthaler, E. Chap. 2. Brand identity the cornerstone of the brand strategy. In <i>Brand Leadership</i>. (pp. 31-64). New York: The Free Press.</p>	<p>Case Study #3 Analysis of Examples of Concepts per Benefit Types</p> <p>Classes in Computer laboratory</p>
<p>12°</p> <p>From November 8th to 13th</p>	<p>4.2 TECHNICAL STANDARDS, PRODUCT QUALITY SPECIFICATIONS AND SUSTAINABILITY</p> <p>4.2.1 Product quality and Sustainable Designing</p> <p>4.2.2 Technical specifications Norms</p> <p>4.2.3 Matrix of the Houses of Quality: Integrating customer requirements in the design</p> <p>Mandatory reading: Ulrich, K. & Eppinger, S. (2012). Chap. 6. <i>Product specifications</i>. In <i>Product Design & Development</i>. (pp. 91-116). 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. Dyllick, T. & Rost, Z. (2017) Towards true product sustainability. <i>Journal of Cleaner Production</i>. 162, pp. 346-360.</p>	<p>First Part of Final Project</p> <p>Classes in Computer laboratory</p>
<p>13°</p> <p>From November 15th to 20th</p>	<p>4.3 PACKAGING</p> <p>4.3.1 Components and functionalities of a Package</p> <p>4.3.2 Types of Packages.</p> <p>4.3.3 Package impact in the ecology</p> <p>4.3.4 Packaging Technologies and Trends</p> <p>4.3.5 Development of a package prototype</p> <p>Mandatory reading: Chunawalla, S.A. (2009). Chap. 21. Packaging. In <i>Product Management</i>. (pp. 259-265). Mumbai: Himalaya Publication.</p>	<p>Test #3 (Weeks 11 to 13): In laboratory From 3.1 to 4.2 Readings assigned: Pope, J. (1993) Op. cit. Part IV. pp. 107 - 156 & 192-197.</p>

<p style="text-align: center;">14°</p> <p style="text-align: center;">From November 22th to 27th</p>	<p>4.4 INTRODUCTION AND LAUNCHING</p> <p>4.4.1 Consumer Buying Behavior for Innovations: Diffusion of Innovation and Adoption Curve</p> <p>4.4.2 Blocks and risks to new product adoption</p> <p>4.4.3 Launching Methods and Strategies for a New Product Introduction</p> <p>4.4.4 Sales Promotions to accelerate introduction</p> <hr/> <p>Mandatory reading: Baker, M. & Hart, S. (2007). Chaps. 13, Commercialization: test marketing and launching the new product. In <i>Product Strategy & Management</i>. (pp. 357-395.)</p>	<p style="text-align: center;">Case Study #4</p> <p style="text-align: center;">The launching strategy of a new product with its market size estimation</p>
<p style="text-align: center;">15°</p> <p style="text-align: center;">From November 29th to December 4th</p>	<p>FINAL PRESENTATIONS OF TEAM ASSIGNMENTS</p>	<p>Written and Oral Presentations of Final Project</p>
<p style="text-align: center;">16°</p> <p style="text-align: center;">From December 6th to 11th</p>	<p>FINAL EXAMS FOR MANDATORU COURSES</p>	<p style="text-align: center;">From 2.7 to 4.4</p> <p style="text-align: center;">Reading assigned: Baker, M. & Hart, S. (2007) Op. cit. Chap. 13</p>

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.
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- 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

Lu Chang-Say, Estuardo - MBA, MMSc, Ind. Eng.
elu@esan.edu.pe

Yan Lau, Mario - MBA
myan@esan.edu.pe