COMILLAS
UNIVERSIDAD PONTIFICIA
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Syllabus
2026 - 2027

TECHNICAL SHEET OF THE SUBJECT

Data of the subject	
Subject name	Inteligencia de Clientes y Previsión de Ventas / Customer Intelligence & Sales Forecasting
Subject code	E000015492
Credits	6,0 ECTS
Type	Optativa (Grado)
Department	Departamento de Marketing
Coordinator	Luis Muñoz Bahamonde
Office hours	Prior notification by mail
Course overview	This elective, taken after Customer Value Design and Creation and Marketing Analytics, analyses consumer behaviour using the most innovative techniques to understand and predict it: the principles of behavioural economics, advanced experimental designs and neuromarketing, customer relationship management (CRM), and the application of artificial intelligence and machine learning to the prediction of behaviour and demand. The course aims for students to understand the market research process, being able to define research problems and identify correct methodological design approaches and data collection methods. Students learn how to use quantitative and qualitative market intelligence tools to enhance decision-making by converting data into insights for business decisions. The course also shows the key factors in demand forecasting and forecast models, and students learn to infer managerial implications from these models. Its contribution to the professional profile of the Bachelor's De

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SPECIFIC DATA OF THE SUBJECT

Contextualization of the subject

Contribution to the professional profile of the degree

This elective, taken after Customer Value Design and Creation and Marketing Analytics, analyses consumer behaviour using the most innovative techniques to understand and predict it: the principles of behavioural economics, advanced experimental designs and

neuromarketing, customer relationship management (CRM), and the application of artificial intelligence and machine learning to the prediction of behaviour and demand.

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Its contribution to the professional profile of the Bachelor's Degree in Business Analytics lies in strengthening students' ability to select and apply quantitative and qualitative methods, interpret market information, and transform data into actionable knowledge for commercial and marketing decision-making. It also prepares students for roles related to marketing analytics, market research, customer insights, and demand planning.

Prerequisites

Customer Value Design and Creation and Marketing Analytics must have been taken. Foundations of Big Data, Introduction to Programming and Machine Learning are also recommended, as well as a basic command of descriptive and inferential statistics, spreadsheets and Python.

Competencies - Objectives

Competences

- **CN9.** Demonstrates knowledge and understanding of the fundamental concepts, paradigms, and tools currently used in marketing management, as well as the scope of the models, processes, and practices associated with marketing analytics.
- **HA9.** Appropriately identifies a problem in the field of marketing management and its possible causes, proposing coherent solutions and action plans based on the use of relevant sources and data.
- **CM10.** Designs effective strategies and tactics that are coherently integrated into a marketing plan as a result of applying analytical tools to the solution of business problems.

Learning outcomes

- **RA1.** Develop an in-depth understanding of customers and their decision-making processes by collecting, systematising, and analysing available information using the most appropriate tools.
- **RA2.** Structure the key processes involved in demand forecasting by applying the models best suited to the defined business problem.

THEMATIC BLOCKS AND CONTENTS

Contents - Thematic Blocks

Unit 1: THE CUSTOMER AT THE CENTRE OF DECISION-MAKING: FUNDAMENTALS AND BEHAVIOURAL ECONOMICS

1. Consumer centric and data centric companies: from data to actionable insight

2. The customer intelligence process: from the decision problem to the research problem

3. Behavioural economics: bounded rationality and systems of thinking

4. Cognitive biases and heuristics in purchase decisions: anchoring, framing, loss aversion and social proof

5. Emotional influence and decision architecture: nudging and its limits

Unit 2: GATHERING CUSTOMER EVIDENCE: RESEARCH DESIGN AND EXPERIMENTATION

1. Design approaches and information sources: internal, external, primary, secondary...

2. Qualitative and digital techniques: interviews, focus groups, netnography and social listening

3. Quantitative techniques: sampling designs, survey architecture and commercial experimentation (A/B testing)

4. Turning data into value: descriptive analysis and data storytelling for management

5. Emotion measurement and neuromarketing

Unit 3: MACHINE LEARNING APPLIED TO CUSTOMER ANALYSIS

1. Data preparation and descriptive analysis of purchase behaviour

2. Introduction to Machine Learning in marketing: supervised vs. unsupervised learning

3. Advanced customer segmentation: clustering algorithms versus traditional RFM segmentation

4. Propensity models: purchase and churn prediction

5. Estimating Customer Lifetime Value (CLV) through predictive models

Unit 4: DEMAND FORECASTING AND MACHINE LEARNING

1. The forecasting process in the company and its impact on operations, finance and commercial strategy

2. Time series components: trend, seasonality, cycle and noise

3. Analytical forecasting methods: moving averages, exponential smoothing and ARIMA models

4. Causal models: price, promotion and advertising effects

5. Validation, model selection and forecast combination

Unit 5: ARTIFICIAL INTELLIGENCE, ETHICS AND RESPONSIBLE DECISION-MAKING

1. Generative AI applied to consumer analysis: insight synthesis, synthetic data and synthetic profiles

2. Deep learning, computer vision and personalisation

3. Algorithmic bias, transparency and model explainability

4. Regulation and privacy in the age of hyper-personalisation: GDPR and the AI Act

5. Sustainability and integral ecology in demand decisions; communicating insights

TEACHING METHODOLOGY

General methodological aspects of the subject

The methodology aims for students to know and correctly apply customer intelligence and demand forecasting tools. A sequential methodology is applied to monitor student learning throughout the different stages: the lecturer presents the key concepts in class and provides materials, outlines and the basic and complementary bibliography, while students are expected to manage different information sources in order to prepare each session in advance.

The subject is organised around Project-Based Learning and case discussion, so that students face real business situations related to consumer analysis. Each analytical technique is presented, the technical operations students are expected to master are identified, and these are linked to key prediction activities in marketing (simulations and scenarios in Excel, Python programming for model development). Mastery of some operations is assessed individually through case discussion, while others are assessed through group deliverables in professional format. Written tests assess the extent to which concepts have been consolidated.

Discussion of the ethical, social and environmental implications of data-driven decisions is incorporated transversally, in line with Ignatian pedagogy and the University's integral ecology perspective.

Use of Artificial Intelligence in the subject

In this subject, the use of both non-generative Artificial Intelligence tools (such as translators, Social Listening tools or platforms to identify competitors and benchmark variables) and generative AI tools (for example Elicit, GPT, Scholar AI or LMNotebook to support literature search and systematisation, the creation of interview guides or questionnaires, the development of profiles and the generation of stimuli or synthetic data) is permitted. A responsible and critical use is encouraged.

The subject is placed at Permission Level 3, with special conditions, according to the institutional AI Assessment Scale (Perkins et al., 2024). This means that students may use AI to collaborate on specific tasks, provided that they:

- critically evaluate and modify any AI-generated content, and
- document in detail the use made of these tools.

Free or unsupervised use is not allowed. Students must demonstrate critical judgement in order to guarantee academic integrity and their own learning.

- For non-generative AI, students must state: which tools were used, in which parts of the assignment, and the keywords used (if applicable).
- For generative AI, students must specify: the tools used, the prompts or instructions given, and the specific sections of the assignment in which they were involved.

In addition, Artificial Intelligence is addressed as course content in its own right (Unit 5), developing students' ability to understand, analyse and critically assess its application to customer intelligence and demand forecasting, and not merely to use tools.

In-class Methodology: Activities

Lectures, Individual and group case solving, Workshops and software practice (Excel and Python) with tutorials, Oral presentation of the group project and Written tests

Non-Presential Methodology: Activities

Personal study and review, Personal reading of cases, Preparation of materials for class, Preparation of workshops, Individual and group assignments, Completion of deliverables in professional format

SUMMARY STUDENT WORKING HOURS

IN-CLASS HOURS		
Seminars and workshops	Monographic and research work, individual or collective	Expository lessons
20.00	20.00	16.00
OUT-OF-CLASS HOURS		
Individual and/or group study and organised reading	Monographic and research work, individual or collective	
40.00	55.00	
ECTS CREDITS: 6,0 (150,00 hours)		

EVALUATION AND CRITERIA

Students who do not attend at least 66 % of the face-to-face sessions may lose the right to sit the final exam and/or to be graded on the project.

In order to pass the subject, students must pass the practical part and the theoretical part separately, with at least a 5 in each of them.

Note on the use of Generative Artificial Intelligence

The improper use of ChatGPT or any other generative AI in tasks where it is not permitted will be considered a serious offence under the General Regulations of the University, art. 168.2.e: "*carrying out actions aimed at falsifying or defrauding the systems for assessing academic performance*". The consequences will be "*temporary expulsion of up to three months or the prohibition from sitting exams in the following examination period after the sanction is imposed, in one or several of the subjects in which the student is enrolled, [...] in addition to a fail grade (0) in the corresponding subject, [...] [and] the prohibition from sitting the exam of that subject in the following examination period*".

Note on assessment in the extraordinary examination period:

The part that has been passed will be kept for the extraordinary examination period; only the failed part will be retaken.

If the student has failed all parts, assessment and grading in the extraordinary examination period will be distributed as follows:

- 50% practical part: individual consumer analysis and demand forecasting project
- 50% theoretical part: knowledge exam

Note on repeating and exchange students

These students are exempt from attendance and their final grade will be the grade of the theoretical exam in the corresponding examination period. Nevertheless, these students are advised to contact their lecturer in order to follow the course appropriately.

Ratings

Assessment activities	Assessment criteria	Weight
Final exam and mid-term test	Acquisition of concepts Application of theory to practice	50
Group assignments	Application of theory to practice and problem solving Generation of innovative solutions Format and presentation of results	30
Individual activities and case discussion	Quality of contributions to in-class discussions Preparation and depth of case analysis	20

WORK PLAN AND SCHEDULE

Activities	Date of realization	Delivery date
Group project (partial deliverables and final presentation)	Throughout the course. See specific schedules.	
Workshops and software practice	Throughout the course. See specific schedules.	
Individual assignments and self-assessment exercises	Throughout the course. See specific schedules.	
Mid-term test	See specific schedules.	
Exam	According to the official dates set by the Dean's Office	

BIBLIOGRAPHY AND RESOURCES

Basic Bibliography

extbooks

Kahneman, D. (2011). *Thinking, fast and slow*. Farrar, Straus and Giroux.

Thaler, R. H., & Sunstein, C. R. (2021). *Nudge: The final edition*. Penguin Books.

Kohavi, R., Tang, D., & Xu, Y. (2020). *Trustworthy online controlled experiments: A practical guide to A/B testing*. Cambridge University Press.

Hyndman, R. J., Athanasopoulos, G., Garza, A., Challu, C., Mergenthaler, M., & Olivares, K. G. (2026). *Forecasting: Principles and practice, the Pythonic way*. OTexts. Open access at https://otexts.com/fpppy/

Kumar, V., & Reinartz, W. (2018). *Customer relationship management: Concept, strategy, and tools* (3rd ed.). Springer.

Kozinets, R. V. (2020). *Netnography: The essential guide to qualitative social media research* (3rd ed.). SAGE.

Articles

Huang, M.-H., & Rust, R. T. (2021). A strategic framework for artificial intelligence in marketing. *Journal of the Academy of Marketing Science*, 49(1), 30-50.

Ma, L., & Sun, B. (2020). Machine learning and AI in marketing: Connecting computing power to human insights. *International Journal of Research in Marketing*, 37(3), 481-504.

Mariani, M. M., Perez-Vega, R., & Wirtz, J. (2022). AI in marketing, consumer research and psychology: A systematic literature review and research agenda. *Psychology & Marketing*, 39(4), 755-776.

Petropoulos, F., et al. (2022). Forecasting: Theory and practice. *International Journal of Forecasting*, 38(3), 705-871. Continuously updated online version at https://forecasting-encyclopedia.com/

Brand, J., Israeli, A., & Ngwe, D. (2023). Using GPT for market research (Harvard Business School Working Paper 23-062). Later recirculated as *Using LLMs for Market Research*.

Sarstedt, M., Adler, S. J., Rau, L., & Schmitt, B. (2024). Using large language models to generate silicon samples in consumer and marketing research: Challenges, opportunities, and guidelines. *Psychology & Marketing*, 41.

Non-Western perspectives

Liu-Thompkins, Y., Okazaki, S., & Li, H. (2022). Artificial empathy in marketing interactions: Bridging the human-AI gap in affective and social customer experience. *Journal of the Academy of Marketing Science*, 50(6), 1198-1218.

Mustak, M., Salminen, J., Plé, L., & Wirtz, J. (2021). Artificial intelligence in marketing: Topic modeling, scientometric analysis, and research agenda. *Journal of Business Research*.

Reference journals for following non-Western research: *Asia Pacific Journal of Marketing and Logistics* and *Journal of Islamic Marketing* (Emerald).

Notes and other materials

Course notes

Lecturers' slides available on the Resources portal

Cases, datasets and Python notebooks on the Resources portal

TED Talk: "The Paradox of Choice", Barry Schwartz (available at ted.com)

Websites and data sources

Forecasting: Principles and Practice, the Pythonic Way

https://otexts.com/fpppy/

Forecasting Encyclopedia (living version of Petropoulos et al., 2022)

https://forecasting-encyclopedia.com/

Spanish Data Protection Agency (AEPD)

https://www.aepd.es

Instituto Nacional de Estadística (INE)

https://www.ine.es

Eurostat

https://ec.europa.eu/eurostat

AEDEMO – Spanish Association for Market, Marketing and Opinion Research

https://www.aedemo.es

Google Trends

https://trends.google.com

Complementary Bibliography

Hyndman, R. J., & Athanasopoulos, G. (2021). *Forecasting: Principles and practice* (3rd ed.). OTexts. R version of the textbook above, open access at https://otexts.com/fpp3/

Verhoef, P. C., Lemon, K. N., Parasuraman, A., Roggeveen, A., Tsiros, M., & Schlesinger, L. A. (2009). Customer experience creation: Determinants, dynamics and management strategies. *Journal of Retailing*, 85(1), 31-41.

Wedel, M., & Kannan, P. K. (2016). Marketing analytics for data-rich environments. *Journal of Marketing*, 80(6), 97-121.

Siegel, E. (2013). *Predictive analytics: The power to predict who will click, buy, lie, or die*. Wiley.

Zurawicki, L. (2010). *Neuromarketing: Exploring the brain of the consumer*. Springer.

Wedel, M., & Kamakura, W. A. *Market segmentation: Conceptual and methodological foundations*. Kluwer Academic Publishers.

Malhotra, N. K. *Marketing research: An applied orientation*. Pearson.

Grande, I., & Abascal, E. *Fundamentos y técnicas de investigación comercial*. ESIC Editorial.