APPLIED DATA ANALYTICS

International MBA IMBA-EN SEP-2024 S-DBA

Area Operations and Business Analytics

Number of sessions: 15

Term: Concentrations

Category: regular

Language: English

Professor: **JUAN DE DIOS LECHUGA MARTOS**

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Juan de Dios Lechuga is a Partner in the Financial Risk Management area at KPMG, and holds an MSc in Industrial Engineering from the Pontifical University of Comillas (ICAI) and an Executive MBA from IE Business School. He has a wide breadth of experience focusing on the risk-management consulting for national and international financial institutions, both financial and energy entities. He is a highly analytical decision-maker with extensive experience in planning and developing several risk projects, targeted on regulations, and improving processes and systems.

Office Hours

Office hours will be on request. Please contact at:

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Professor: **SARA FAROOQI**

E-mail: sfarooqi@faculty.ie.edu

Sara's professional background is in investment banking, having worked in the London office of both Goldman Sachs and JP Morgan Chase, where she was consistently ranked among the top performers. While her main specialization lies within the Natural Resource sector, she has also worked with multiple Fortune 500 companies in other Capital Market domains and is currently on the advisory board of 2 investment funds based in Singapore and London. Previously, she obtained a Master's degree in Decision Sciences (Operational Research) from the London School of Economics and Political Sciences and a Bachelor's degree in Economics & Mathematics from Vassar College in the US. At IE Business School and University, Sara is a highly effective instructor in the fields of Quantitative Methods and Finance (BBA, MBA and Executive Education), who has received 30+ recognitions for outstanding teaching performance over the past years and has been voted to be the "Best Professor of the Program" on several occasions. In her research projects, Sara focuses on issues related to forecasting time series with structural discontinuities as well as the application of behavioral finance to contexts involving "low probability – high impact events".

Academic Background:

- MSc. Honors in Decision Sciences (Operational Research) from the London School of Economics

- BA in Economics and Mathematics from Vassar College, New York (Magna Cum Laude)

Office Hours

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Professor: **VICTOR GONZALEZ PACHECO**

E-mail: victorg@faculty.ie.edu

Víctor González is the former Head of External Data at Telefonica Tech and is currently the cofounder of the sports analytics startup, FITIZENS. He holds an EMBA from IE Business School, a PhD in AI and Robotics, an MSc in AI, and an MSc in Robotics from Universidad Carlos III de Madrid. He has extensive experience in Robotics, AI, and Data Science applied to several sectors. He has been teaching both undergraduate and graduate programs at IE Business School, Universidad Carlos III de Madrid, and as academic coordinator both at Telefonica Tech and Synergic Partners.

Office Hours

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SUBJECT DESCRIPTION

The Applications of Analytics for Business course is a practical, hands-on course, which can be understood as a sequel to the “Data Analytics for Managers” core course. Drawing on the tools and methods taught in the previous module, the main objective of this course is to deepen students’ understanding of data analytics applied to specific business areas such as customer management, financial risk analysis and to get an overview how to manage analytics initiatives in different sectors.

After a brief introduction to the module and recap of basic analytical methods at the beginning of the course, students will get exposure to common analytics problems encountered in industry practice. The sessions will be divided into 3 main blocks, each of which focuses on applying data analytics to the specific business function aforementioned. During each block students will discuss several real-world cases and work on a team-based analytics project. Each of the specializations covered in the course is intended to encompass problems relevant to decision makers in a wide range of industries, as well as in public and private sector settings.

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LEARNING OBJECTIVES

Students will be able to put their previously acquired analytics skills to practice by developing a range of quantitative models that are designed for aiding decision-makers in a variety of specific business disciplines. They will learn how to critically assess the potential benefits as well as limitations of using data analytic models in each domain. The emphasis is not on the technicalities underlying of the models, but on the qualitative insights that come from using models to aid managerial thinking and decision making in a particular context.

TEACHING METHODOLOGY

IE University teaching method is defined by its collaborative, active, and applied nature. Students actively participate in the whole process to build their knowledge and sharpen their skills. Professor's main role is to lead and guide students to achieve the learning objectives of the course. This is done by engaging in a diverse range of teaching techniques and different types of learning activities such as the following:

Learning Activity	Weighting
Lectures	15.0 %
Discussions	15.0 %
Exercises in class, Asynchronous sessions, Field Work	20.0 %
Group work	20.0 %
Individual studying	30.0 %
TOTAL	100.0 %

AI POLICY

In today's world, generative artificial intelligence (GenAI) is changing how we work, study and, in general, how we get things done. However, in the context of this course, the use of GenAI is not permitted, unless it is otherwise stated by the instructor. The use of GenAI tools would jeopardize the students' ability to acquire fundamental knowledge or skills of this course.

If a student is found to have used AI-generated content for any form of assessment, it will be considered academic misconduct, and the student might fail the respective assignment or the course.
AI Policy for Faculty – Three Sample Policies for Course Syllabus

PROGRAM

SESSIONS 1 - 2 (LIVE IN-PERSON)

RISK ANALYSIS I: optimal capital structure

- The Diageo Case

Preparation:

- Doc.: “Diageo” Case Study (HBS 201033-PDF-ENG)
- Doc.: Albright, C.; Winston,W.; Zappe, C. (2011). Data Analysis and Decision Making. Cengage Learning: CHAPTER 15
- Optional Preparation (how firm value rises due to tax shield but falls due to financial distress costs): "How much should a corporation borrow" “Principles of Corporate Finance”, Global 10th Edition - Brealey, Myers & Allen - McGraw Hill: CHAPTER 18

Practical Case: Diageo plc (HBS 201033-PDF-ENG)

Book Chapters: How much should a corporation borrow (CED)

Book Chapters: Data Analysis and Decision Making. Cengage Learning: CHAPTER 15 (See Bibliography)

SESSIONS 3 - 4 (LIVE IN-PERSON)

RISK ANALYSIS II

- Use of discrete and continuous probability distributions
- Scenario analysis
- Introduction to Monte Carlo Simulation
- The Wellyntoy Products case

Preparation:

- Doc.: “Wellyntoy Products” Case Study
- Doc.: "Analyzing Uncertainty: Probability Distributions and Simulations"

After lecture reading:

Doc.: Clemen, R., Reilly, T. (2004). Making Hard Decisions, Chapter 5, pp 174-207.
Doc.: Hertz, David B., (1979) Risk Analysis in Capital Investment (HBR Classic). Harvard Business Review, 57(5):169-181)

Article: Risk Analysis in Capital Investment (HBS 79504-PDF-ENG)

Book Chapters: Making Hard Decisions, Chapter 5, pp 174-207 (CED)

Technical note: Analyzing Uncertainty: Probability Distributions and Simulation (HBS UV1461-PDF-ENG)

SESSION 5 (LIVE IN-PERSON)

Presentations

SESSION 6 (LIVE IN-PERSON)

- Review simple and multiple linear regression
- Non-linear effects
- Excel add-in for building linear regression models

SESSION 7 (LIVE IN-PERSON)

- Practical exercises with multiple linear regression

SESSION 8 (LIVE IN-PERSON)

- Multicollinearity
- Analysis and interpretation of the correlation matrix
- Categorical variables
- Interaction effect

SESSION 9 (LIVE IN-PERSON)

- Overview of common financial risk analytics problems encountered in practice
- Practical exercises for revenue and margin maximization
- Introduction to the group assignment

SESSION 10 (LIVE IN-PERSON)

- Group presentations

SESSION 11 (LIVE IN-PERSON)

- Introduction to Text Analytics
- Text encoding techniques
- Information extraction and retrieval
- Text categorization
- Application of Text Analytics for legal context

Practical Case: Evisort: An A.I.-Powered Start-up Uses Text Mining to Become Google for Contracts (HBS CU251-PDF-ENG)

Technical note: An Introduction to AI for Text Mining: A Companion to the Evisort Case (HBS CU253-PDF-ENG)

SESSION 12 (LIVE IN-PERSON)

- Text Analytics Practical Workshop

SESSION 13 (LIVE IN-PERSON)

- Practical Workshop
- Overview of LLMs

SESSION 14 (LIVE IN-PERSON)

- LLMs in the real world
- Implications for modern managers

Article: Algorithms Need Managers, Too (HBS R1601H-PDF-ENG) (Optional)

SESSION 15 (LIVE IN-PERSON)

Group Presentations

Article: Competing in the Age of AI (HBS R2001C-PDF-ENG) (Optional)

Article: Artificial Intelligence for the real world (HBS R1801H-PDF-ENG) (Optional)

EVALUATION CRITERIA

The course assessment will be based on students ? individual class participation (25%), an individual assignment (30%) to be selected by students among three alternatives (one for each course block), as well as three group assignments consisting in tackling a real-world analytics problem for blocks I and II (15% each). In Block III, each group will present a single case discussion (15%).

criteria	percentage	Learning Objectives	Comments
Class Participation	25 %		Participation in class and quality/relevance of comments and questions
Group Presentation (Block I)	15 %		Quality and degree of insights of the overall solution and group presentation
Group Presentation (Block II)	15 %		Quality and degree of insights of the overall solution and group presentation
Group Presentation (block III)	15 %		Quality and degree of insights of the overall solution and group presentation
Individual Assignment	30 %		Quality of analysis and insigts provided

FAILING GRADE AND REASSESSMENT

When students receive a Fail in a course, they have the opportunity to present themselves for reassessment in order to earn the necessary credits toward graduation.

The reassessment of students should be scheduled between 5 and 10 working days after the review session takes place.

Grades for the reassessment are limited to a Low Pass and Fail.

Both, the initial Fail as well as the grade of the reassessment remain on the transcript. For the purpose of calculating the GPA however, only the grade of the reassessment is to be considered. Students receiving a failing grade in the reassessment of a course will not be able to continue in the program.

BIBLIOGRAPHY

Compulsory

- Albright, Christian; Winston, Wayne. (2019). *BUSINESS ANALYTICS: DATA ANALYSIS AND DECISION MAKING.* 7. Cengage Learning. ISBN 9780357109953 (Printed)

BEHAVIOR RULES

Please, check the University's Code of Conduct here. The Program Director may provide further indications.

ATTENDANCE POLICY

Please, check the University's Attendance Policy here. The Program Director may provide further indications.

ETHICAL POLICY

Please, check the University's Ethics Code here. The Program Director may provide further indications.