

INTRODUCTION TO BUSINESS AND SOCIAL ANALYTICS

**Bachelor in Data and Business Analytics BDBA SEP-2023
IBSA-DBA.2.M.A**

Area Others

Number of sessions: 20

Academic year: 23-24

Degree course: SECOND

Number of credits: 3.0

Semester: 2^o

Category: COMPULSORY

Language: English

Professor: **MANOEL FERNANDO GADI ALONSO**

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MANOEL FERNANDO GADI ALONSO

Academic Background:

- Executive MBA, Business Administration and Management, IE Business School, Spain
- Master in Computer Science and Statistics, University of Sao Paulo, Brazil
- Computer Science Degree, University of Sao Paulo, Brazil

Academic Experience:

- Risk & Fraud Analytics - Master in Business Analytics & Big Data at IE Business School
- Statistical Programming Python - Master in Business Analytics & Big Data at IE Business School
- Building a Fintech - Master in Business Analytics & Big Data at Universidad de Alcalá de Henares
- Math and Stats for Big Data - Master in Business Analytics & Big Data at U-TAD

Corporate Experience:

- Founder and CEO of Suncaged Analytics Consulting Europe (Madrid: 2019-curr)
- Director of Analysis & Reporting, Altamira Real Estate (Madrid: 2018-2019)
- Director of Credit Rating, Big Data and Business Analytics, Bravo Capital (Madrid: 2015-2018)
- Head of R&D for Risk Analytics Area, Santander Bank Headquarters Spain (Madrid: 2012-2015)
- R&D Risk Analytics Area Manager, Santander Bank United Kingdom (Milton Keynes: 2008-2012)
- Credit Risk Modelling Manager, Santander Bank Brazil (Sao Paulo: 2007-2008)
- Credit Risk Supervisor, ibi bank (C&A group) (Sao Paulo: 2006-2007)

- Credit Card Risk analyst, Citibank Brazil (Sao Paulo: 2003-2005)

Office Hours

Office hours will be on request. Please contact at:

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SUBJECT DESCRIPTION

Disruptive business models and disruptive technology are generating a frenzy in the race to have the best of breed technology and systems. The same is becoming reality in the field of statistical & computational models for Analytics.

Companies like Capital One with its thousand simultaneous tests, Amazon with its recommendation systems and Google with its raking algorithm among others formed an army which took Analytics to a complete new level by making prescriptive modeling and testing the bedrock of its competitive advantage. According to Thomas H. Davenport and D.J. Patil, being a Data Scientist is "The Sexiest Job of the 21st Century", as it is one of the highest-ranking professional with the training and curiosity to make discoveries in the world of data.

In this course, we will discuss how companies in many different industries blend Analytics as part of their competitive advantage to become much stronger players while including lots of interesting real world examples. We start by bringing all students to the same page, giving some flavour of the ingredients, recipes and outputs of a model process, and finish by showing models in use.

LEARNING OBJECTIVES

These 20 sessions aim to give students some experience of the use of Analytics in different industries:

- By providing reading and watchable material covering many areas of traditional Analytics;
- By checking out real-world success cases of how Advanced Analytics has and is generating competitive advantage;
- By getting hands dirty and experimenting through a practical model development;
- And by generating forward thinking discussion to exploit how Big Data is reshaping industries.

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	Estimated time a student should dedicate to prepare for and participate in
Lectures	40.0 %	30.0 hours

Discussions	6.67 %	5.0 hours
Exercises in class, Asynchronous sessions, Field Work	20.0 %	15.0 hours
Group work	24.0 %	18.0 hours
Individual studying	9.33 %	7.0 hours
TOTAL	100.0 %	75.0 hours

PROGRAM

SESSION 1 (LIVE IN-PERSON)

Opening Session

Technique: Applications of Analytics in Business and Public Sector

Objective of the session: Course Opening

SESSION 2 (LIVE IN-PERSON)

Applications of Analytics - Applications of Analytics in Business and Public Sector

Objective of the session: Get to know and discuss applications of Machine Learning in Businesses and Public Sector
Recommended reading - case study: "Do you fear an analytics driven competitor? You should! "

Practical Case : Do you fear an analytics driven competitor? You should! (IST010071-U-ENG-WOD)

SESSION 3 (LIVE IN-PERSON)

Model Development Process - The Flow - The work flow of of Machine Learning models

Objective of the session: revisit the flow from ML course adding additional layers and discuss the Model Life Cycle

SESSION 4 (LIVE IN-PERSON)

Model Development Process - The Stats

Technique: Stats

Objective of the session: introduce additional statistic metrics used by business to develop / assess models adding them to student's toolkit, discuss statistic metrics used by business to develop / assess models.

Recommended reading: "The Credit Scoring Toolkit"

Book Chapters: Raymond Anderson: The Credit Scoring Toolkit, OUP Oxford (chapter 8) (ced)

SESSION 5 (LIVE IN-PERSON)

Time Series - Prophet - PART 1

Technique: Time Series - Prophet Forecasting

Objective of the session: Introduce Prophet Forecasting and virus spread

Recommended reading - case study: "Protecting the Population from the 2009 Pandemic H1N1 Virus"

Practical Case: Protecting the Population from the 2009 Pandemic H1N1 Virus (HBS PH1011-PDF-ENG)

SESSION 6 (LIVE IN-PERSON)

Time Series - Prophet - PART 2

Technique: Time Series - Prophet Forecasting

Objective of the session: Introduce Prophet Forecasting and virus spread

Recommended reading - case study: "Protecting the Population from the 2009 Pandemic H1N1 Virus"

SESSION 7 (LIVE IN-PERSON)

Regression - Naive Bayes - PART 1

Objective of the session: Understand Naive Bayes and the Real State - Housing Price

Recommended reading - case study: "Portland's Urban Growth Boundary and Housing Prices"

Practical Case: Portland's Urban Growth Boundary and Housing Prices (A) (HBS HKS141-PDF-ENG)

SESSION 8 (LIVE IN-PERSON)

Regression - Naive Bayes - PART 2

Objective of the session: Understand Naive Bayes and the Real State - Housing Price

Recommended reading - case study: "Portland's Urban Growth Boundary and Housing Prices"

SESSION 9 (LIVE IN-PERSON)

Regression - Support Vector Machine (SVM) - PART 1

Type: Synchronous / Live in-person

Objective of the session: Introduce SVM technique and Company Ratings business application.

Recommended reading - case study: "Big Data on Company Ratings"

Practical Case : Big Data on Company Ratings (IST010072-U-ENG-WOD)

SESSION 10 (LIVE IN-PERSON)

Regression - Support Vector Machine (SVM) - PART 2

Type: Synchronous / Live in-person

Objective of the session: Introduce SVM technique and Company Ratings business application.

Recommended reading - case study: "Big Data on Company Ratings"

SESSION 11 (LIVE IN-PERSON)

PARTIAL EXAM

SESSION 12 (LIVE IN-PERSON)

Classification - Multiple Discriminant Analysis (MDA) - PART 1

Objective of the session: Introduce MDA technique and the Credit Scoring business application.

Recommended reading - case study: The Case Study "Retail Credit Scoring for Auto Finance LTD"

Practical Case: Retail Credit Scoring for Auto Finance Limited (HBS IMB467-PDF-ENG)

SESSION 13 (LIVE IN-PERSON)

Classification - Multiple Discriminant Analysis (MDA) - PART 2

Objective of the session: Introduce MDA technique and the Credit Scoring business application.
Recommended reading - case study: The Case Study "Retail Credit Scoring for Auto Finance LTD"

SESSION 14 (LIVE IN-PERSON)

Classification - Ensemble methods - PART 1

Objective of the session: Introduce Ensemble models and the New York City log of complaints data.
Recommended reading - case study: NY311

Practical Case: NYC311 (HBS 818056-PDF-ENG)

SESSION 15 (LIVE IN-PERSON)

Classification - Ensemble methods - PART 2

Objective of the session: Introduce Ensemble models and the New York City log of complaints data.
Recommended reading - case study: NY311

SESSION 16 (LIVE IN-PERSON)

Technique: Expert Modelling - AHP Algorithm

Objective of the session: Learn what we can do when we have consolidated stats but not the detailed dataset by applying the AHP algorithm to build a model to Climate Change consolidated data

Recommended reading - case study: "Climate Change - Factsheet" and "The Analytic Hierarchy Process"

Article: Australia's Industry Inefficient and standing still (Climate Analytics, 2018, December)

Book Chapters: Chiara Mocenni: The Analytic Hierarchy Process (ced)

SESSION 17 (LIVE IN-PERSON)

Model Development Process - The Flow - Model Deployment & Model Monitoring - PART 1

Technique: Model Development Flow - The Model Deployment & Model Monitoring

Objective of the session: Deploy a model into production & learn how to monitor if a model is losing performance

SESSION 18 (LIVE IN-PERSON)

Model Development Process - The Flow - Model Deployment & Model Monitoring - PART 2

Technique: Model Development Flow - The Model Deployment & Model Monitoring

Objective of the session: Deploy a model into production & learn how to monitor if a model is losing performance

SESSION 19 (LIVE IN-PERSON)

FINAL EXAM

SESSION 20 (LIVE IN-PERSON)

GROUP PROJECT PRESENTATION

EVALUATION CRITERIA

criteria	percentage	Learning Objectives	Comments
A. Class Participation	10 %		
B. Quizzes	15 %		
C. Group project	20 %		
D. Partial Exam	25 %		
E. Final Exam	30 %		

RE-SIT / RE-TAKE POLICY

A. Class participation and discussion

Class participation will be evaluated based on the following criteria:

- One participation point for attending class.
- Extra participation point for sharing experience or for star comment during class - quality (not quantity) of your participation in class discussion: The most important dimension of participation concerns what it is that you are saying.
- In case the professor requests participation in forums: 0,1 or 2 participation points are given depending on the quality of the participation.

B. Quizzes

Most weeks throughout the course short online-quiz based on covered material will take place (unless otherwise specified by the professor at the beginning of the session). These quizzes will help you assess your overall understanding of the subject being studied and identify any caveat in your learning. NO MAKE UP FOR QUIZZES WILL BE PERMITTED.

C. Group project_Student Series

The group project is an integral part of this course. Each group (the ones defined by IE or randomly composed of N students defined by the professor) will be asked to work on a project involving coding/data analysis and finally, prepare and deliver a presentation. These presentations will be delivered as part of a new initiative entitled: Students Series. This initiative is launched by BDBA to promote students communication and presentations skills in conveying complex concepts.

D. Partial Exam & E. Final Exam

There will be one partial exam and one final exam. They are practical, meaning you will be asked to perform task in Python and submit your solution to a web site. Therefore, for these exams, you must bring your own laptops with Anaconda Python installed and they must have internet access with IE Wifi setup. You can refer to any class material and also access the internet during the exam. HOWEVER, NO COMMUNICATION BETWEEN STUDENTS ARE ALLOWED DURING THE EXAMS (IN PERSON OR ONLINE). MOBILE PHONES ARE NOT ALLOWED.

As per University Policy:

Each student has 4 chances to pass any given course distributed in two consecutive academic years (regular period and July period).

It is mandatory to attend 100% of the classes. Students who do not comply with at least 70% attendance will lose their 1st and 2nd chance, and go directly to the 3rd one (they will need to enroll again in this course the next academic year).

Grading for retakes will be subject to the following rules:

1. Those students who failed the subject in the first regular period will have to do a retake in July (except those not complying with attendance rules who are banned from this possibility).
2. Dates and location of the July retakes will be posted in advance and will not be changed. Please take this into consideration when planning your summer.
3. The maximum grade that a student may obtain in the 2nd exam session is 8 out of 10. Those students in the 3rd call will be required to attend 50% of the classes. If due to schedule overlap, a different option will be discussed with the professor in order to pass the subject.

BIBLIOGRAPHY

Recommended

- Yves Hilpisch. *Title: Python for Finance: Mastering Data-Driven Finance, 2nd edition*. O'Reilly Media. ISBN 1492024333 (Printed)
- Raymond Anderson. *The Credit Scoring Toolkit: Theory and Practice for Retail Credit Risk Management and Decision Autom.* Oxford Press. ISBN 0199226407 (Digital)

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.