BUSINESS CASES WITH DATA SCIENCE

SYLLABUS
2020-2021

INSTRUCTOR INFORMATION	FERNANDO LUCAS BAÇÃO 2º floor, room 10 Tel: 21 3870413 (ext. 222) bacao@novaims.unl.pt http://www.novaims.unl.pt/fbacao JOÃO FONSECA JPFONSECA@NOVAIMS.UNL.PT David Silva dsilva@novaims.unl.pt
SCHEDULE	Sessions – Mondays from 14h00 – 17h00
OFFICE HOURS:	Mondays from 12h00 – 14h00 (schedule appointment by email), 2nd Floor, Room 10
CONTACT	Email: bacao@novaims.unl.pt; dsilva@novaims.unl.pt; jpfonseca@novaims.unl.pt; Moodle: announcements; Business Case X Forum, we are going to create a forum on Moodle for each business case;
DESCRIPTION AND OBJECTIVES	Using a case-based learning approach the Business Cases with Data Science course addresses the ways in which enterprises such as businesses, non-profits, and governments can use data to gain insights, improve the decision-making process and leverage the informational resources available in operations, marketing, finance, and strategic planning among other functions. The students will use the knowledge and skills they've developed during the courses of the first semester to come up with relevant and intelligent solutions to business problems, through the use of analytical models. During the course the students will have the opportunity do use different analytical tools, appropriate to the different business problems proposed. The fundamental objective of the course is to help the students bridge the gap between understanding the analytic tools and being able to apply them appropriately

	in a specific business context. Through hands-on projects the students will be exposed to a number of real-world business problems, where they should be able to provide relevant analytical solutions. Additionally, student will also be developing communication and teamwork skills, which are critical for the course.
LEARNING OUTCOMES	• Understand what a business case is and why to use it; • Identify the typical components of a business case • Model business cases in accordance to the CRISP-DM process model; • Identify and implement the most adequate analytical models to different business cases; • Interpret model results from both a data science and a business perspective; • Make data-driven decisions to optimize business processes; • Improve communication skills, both oral and written; • Improve teamwork skills;
COURSE SUCCESS	In this course success depends on a number of factors: • Deep understanding of the topics learnt on the courses of machine learning and data mining; • Knowledge of the analytic tools; • Attend classes; • Work during the semester on the assigned projects and deliver them on time; • Read the suggested references.
ORGANIZATION (GROUPS)	Most of this course is based on teamwork, thus it is of crucial importance that the students define their groups before the first business case is presented. It is also important to choose wisely the group members as once the group is submitted there will be no opportunities to change to the group composition. The guidelines for the groups are: • Students must organize themselves into groups of 3 or 4 students (give a name to your group); • Students should assume the role of consultants providing a service to the company; • The instructors assume the role of the company project stakeholder and business expert; • Students must submit the groups until the 19th of February otherwise they will be randomly allocated.

PROJECTS DELIVERABLES	• Source Code:
	  o Python (Jupyter Notebook or .py);
	  o Code/modules should be commented to facilitate comprehension of what is intended to do;
	• Report:
	  o Should consider the following topics, but should not replicate what is on source code:
	  ▪ Problems and their solutions according to **CRISP-DM** phases;
	  ▪ Interpret results and their implications to business, including data-driven decisions to optimize the business processes;
	  ▪ Theoretical considerations about deployment and maintenance plans;
	  ▪ Considerations for future model improvement;
	  ▪ Should be written in the provided template and **not exceed 10 pages**, including references and any appendixes;
	• Presentation:
	  o PowerPoint, Prezi, or any other presentation tool;
	  o The presentation should be designed as a presentation to be delivered to the **company board of directors** to obtain the "go ahead" for deployment;
	  o Should not exceed **10 minutes** (there is a penalty for the presentations that exceed 10 minutes);
	• All deliverables should be submitted through Moodle until 23h59 of the respective business case presentation date

STRUCTURE OF THE CLASSES	The content of the course is composed of 5 business cases. The typical rotation of cases, in the 2 first business cases, will be: **Week 1**: the instructors or a company presents the business case to the students, explaining the business context and objectives of the company;

	Week 2: the students pitch their work (10 minutes), explaining what they did, the models used, and the results achieved in the project. In business cases 3, 4 and 5 there is an additional week of work: **Week 1**: the instructors or a company presents the business case to the students, explaining the business context and objectives of the company; **Week 2**: this session will be used to work and, eventually, consult with the instructors about questions related with the project. This week is meant to alleviate the student's stress and give additional time to complete the project; **Week 3**: the students pitch their work, explaining what they did, the models used, and the results achieved in the project. The business cases are: BC 1. Online Wine Store BC 2. Hotel BC 3. Delivery App BC 4. eCommerce Website BC 5. Supermaket
CONTENTS	1. CP1. Introduction to Business Cases with Data Science course; 2. CP2. Introduction to CRoss-Industry Standard Process for Data Mining (CRISP-DM) methodology; 3. CP3. Example of a business case and how to solve it; 4. CP4. Online Wine Store – who are my customers? 5. CP5. Hotel – cancellations are hurting my business? 6. CP6. Delivery App – can I optimize the app? 7. CP7. eCommerce Website – what customers should buy next? 8. CP8. Supermarket – how much oranges am I going to sell?
BIBLIOGRAPHY	References:

<table>
<tr><td></td><td colspan="2">Chapman, P., Clinton, J., Kerber, R., Khabaza, T., Reinartz, T., Shearer, C., & Wirth, R. (2000). CRISP-DM 1.0: Step-by-step data mining guide. Retrieved from https://the-modeling-agency.com/crisp-dm.pdf
Provost, F., and Fawcett, T. (2013). Data Science for Business . Sebastopol, CA: O¿Reilly
Guidici, P., and Figini, S. (2009). Applied Data Mining for Business and Industry . UK: Wiley
Shmueli, G., Bruce, P. C., Gedeck, P., Patel, N. R. (2019). Data Mining for Business Analytics: Concepts, Techniques, and Applications in Python. Hoboken, NJ: Wiley</td></tr>
<tr><td>EVALUATION</td><td colspan="2">80% Group projects (BC 1-2: 10%; BC 3-5: 20%)
20% Final exam (individual open-book)</td></tr>
<tr><td rowspan="15">CALENDAR

EVENTUAL SCHEDULE OF AND ADDITIONAL SESSION FOR SUPPORT</td><td>08/02</td><td>Course overview;
Business cases;
CRISP-DM;</td></tr>
<tr><td>15/02</td><td>Business case example: Customer segments</td></tr>
<tr><td>22/02</td><td>Case 1: Online Wine Store</td></tr>
<tr><td>01/03</td><td>Case 1: Groups presentations</td></tr>
<tr><td>08/03</td><td>Case 2: Hotel</td></tr>
<tr><td>15/03</td><td>Case 2: Groups presentations</td></tr>
<tr><td>22/03</td><td>Case 3: Delivery App</td></tr>
<tr><td>29/03</td><td>Easter Break</td></tr>
<tr><td>05/04</td><td>Trimester 3 Exam Period</td></tr>
<tr><td>12/04</td><td>Case 3: Groups presentations</td></tr>
<tr><td>19/04</td><td>Case 4: eCommerce Website</td></tr>
<tr><td>26/04</td><td>Case 4: Work and support session</td></tr>
<tr><td>03/05</td><td>Case 4: Groups presentations</td></tr>
<tr><td>10/05</td><td>Case 5: Supermarket</td></tr>
<tr><td>17/05</td><td>Case 5: Work and support session</td></tr>
<tr><td>24/05</td><td>Case 5: Groups presentations</td></tr>
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