Course title: Analytics for Social Good
Language of instruction: English
Professor: Helena Ramalhinho
Professor's contact and office hours: helena.ramalhinho@upf.edu (office hours to be announced)
Course contact hours: 45
Recommended credit: 6 ECTS credits
Course prerequisites: Students must have basic knowledge of Algebra, Statistics and Mathematics. Knowledge in coding and programming language will help.

Language requirements: Recommended level in the European Framework B2 (or equivalent: Cambridge Certificate if the teaching language is English, DELE or 3 semesters in the case of Spanish)

Course focus and approach: In this course, it will be present and discussed key topics and issues in Analytics with focus on the applications in social, health, sustainable and humanitarian organizations.

Course description: Analytics focuses on transforming data into insights by applying advanced analytical method, based on mathematics, statistics and artificial intelligent models and algorithms, to improve the performance of an organization. In the first part of the course, the analytic tools and methodologies will be introduced. On the second part, cases studies from Humanitarian, Social, Health Care and Environmental organizations (as NGO humanitarian organization, social care organization, public services, hospital or primary health institutions) will be presented and discussed. Examples of applications of Analytics in this organizations are home health care logistics and scheduling; planning disaster response and preparedness to improved decision; location of the primary health care centers, or schools; planning the humanitarian aid distribution; planning a sustainable transportation; etc.

Learning objectives:
The objectives of the course are the following:
1) Learn the foundational concepts and methods of Analytics (Descriptive, Predictive, Prescriptive).
2) Learn how to develop and apply analytic tools, approaches and techniques used in decision making in Humanitarian, Social, Health Care and Environmental organizations;
3) Provide strategic and operational management examples and case studies of these organizations.
4) To expose students to issues in humanitarian and non-profit logistics through a series of guest speakers and case studies.

Course workload:
The students are expected to do individual and group activities as reading, exercises, role-player games, group projects and deliver reports on some activities. The students are also expected to participate actively in all activities of the course. If it is possible, field trips or talk by professional experts will be organized.

**Teaching methodology:**
The methodology of this course will be based on lecture classes, practical classes (exercises and case studies), as well as set of highly interactive and participative activities.

**Assessment criteria:**
The grading of the course will be done in the following way:
- 40% group project;
- 10% online test;
- 20% class participation
- and 30% final exam.

**Absence policy**

After the add/drop, all registrations are considered final and BaPIS Absence Policy begins to apply. For the academic year 2011-2012, such policy is as follows:

*Attending class is mandatory and will be monitored daily by professors. Missing classes will impact on the student’s final grade as follows:*

<table>
<thead>
<tr>
<th>Absences</th>
<th>Penalization</th>
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<tbody>
<tr>
<td>Up to two (2) absences</td>
<td>No penalization</td>
</tr>
<tr>
<td>Three (3) absences</td>
<td>1 point subtracted from final grade (on a 10 point scale)</td>
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<tr>
<td>Four (4) absences</td>
<td>2 points subtracted from final grade (on a 10 point scale)</td>
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<tr>
<td>Five (5) absences or more</td>
<td>The student receives an INCOMPLETE (“NO PRESENTADO”) for the course</td>
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The PEHE/BaPIS attendance policy **does not distinguish between justified or unjustified absences**. The student is deemed responsible to manage his/her absences.

*Emergency situations (hospitalization, family emergency...) will be analyzed on a case by case basis by the Academic Director of the BaPIS.*

**Classroom norms:**
- No food or drink is permitted in class
- Students will have a ten-minute break after one one-hour session
- Respect is an important aspect in this class
Weekly schedule
This is a tentative schedule, check for updates (last revision: June 2020). The reading list can be updated just before the starting of the course.

Week 1-2
Introduction to Analytics (Descriptive, Predictive, Prescriptive Analytics).
Present the main concepts and techniques of Analytics and Operations Research: Operations Research methodology, Linear and Integer Programming and Optimization Algorithms. These concepts are important to understand the applications of Analytics to Social Good.

Week 3-4
Descriptive Analytics. Converting data into meaningful information to understand the path and current performance using several techniques as plotting data in charts, extracting data from databases and summarizing data using visual tool as PowerBI.

Week 5
Predictive Modelling and Analysis. Brief introduction to predictive analytic models and to statistical forecasting models. Apply forecasting models to time series in Humanitarian, Social, Health Care and Environmental organizations.

Week 6
Location decisions in Humanitarian, Social, Health Care and Environmental organizations.
Introduction to Location Models and Algorithm. Examples of applications in several organizations.

Week 7
Transportation planning in Humanitarian, Social and Health Care organizations.
Analytics to transportation and vehicle routing planning.

Week 8
Discussion on the drafts of the group project. Revision of some concepts and exercises.
Online Test.

Week 9
Sustainable and humanitarian logistics. Role player game (beer game).

Week 10
Group projects presentations. Real examples of applications and applications of Analytics to help the Covid-19 pandemic.

Last revision: April 2021.

Required readings:
Course reading pack prepared by professor.


Recommended bibliography:


