Course title: Analytics for Social Good
Language of instruction: English
Professor: Helena Ramalhinho, Laura Portell
Professor's contact and office hours: helena.ramalhinho@upf.edu; laura.portell@upf.edu
(office hours to be announced)
Course contact hours: 45h
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

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. The first part of the course will focus on basic concepts of operations research, linear programming, data statistics and visualization techniques, and an introduction of the machine learning techniques. Examples of good use of data and the misuse will be presented. 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 these 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.
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.

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Course workload:

The students are expected to do individual and group activities as reading, exercises, 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:
- 30% group project;
- 20% online test;
- 20% class participation and presentations;
- 30% final exam.

BaPIS absence policy

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

Absences	Penalization
Up to two (2) absences	No penalization
Three (3) absences	1 point subtracted from final grade (on a 10-point scale)
Four (4) absences	2 points subtracted from final grade (on a 10-point scale)
Five (5) absences or more	The student receives an INCOMPLETE ("NO PRESENTADO") for the course

The BaPIS attendance policy **does not distinguish between justified or unjustified absences**. The student is deemed responsible to manage his/her absences.

Only absences for medical reasons will be considered justified absences. The student is deemed responsible to provide the necessary documentation. Other emergency situations will be analyzed on a case by case basis by the Academic Director of the BaPIS.

The Instructor, the Academic Director and the Study Abroad Office should be informed by email without any delay.

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. The reading list can be updated just before the starting of the course.

- 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.

- Introduction to Descriptive Analytics and Statistical Data Analysis.

- Data visualization tools and techniques. Creation of a dashboard.

- Introduction to Machine Learning and Predictive analytical models.

- Basic principles of Deep Learning and Computer Vision.

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

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

- Sustainable and humanitarian logistics. Role player game (beer game).

- Real examples of applications. Possible presentation by different organizations.

- Group projects presentations

Recommended bibliography:

Davenport T. H., Harris J. G. & Harris J. (2010). *Analytics at Work: Smarter Decisions, Better Results*. Harvard Business Review Press.

Evans, J.R. (2020). *Business Analytics*. Pearson 3rd Edition.

Ghiani G., Laporte G. & Musmanno R. (2013). *Introduction to Logistics Systems Management*. Wiley (e-book).

Tatha, P., & Christopher M. (2018). *Humanitarian Logistics. Meeting the Challenge of Preparing for and Responding To Disasters*. Kogan Page.

Tomasini R., Wassenhove L., & Van Wassenhove L. (2009). *Humanitarian Logistics*. INSEAD Business Press.