1. Basic description

Name of the course: Programming and Big Data  
Academic year: 2020–2021  
Area: International Business  
Profile: International Business in Asia, Europe and the World  
Term: 1st  
Degree / Course: Bachelor's Degree in International Business and Marketing  
Code: 40316  
Number of credits: 4  
Total number of hours committed: 100  
Teaching language: English  
Lecturer: Gloria Castellví Linde  
Timetable: Schedule Sigma  
Office hours: Friday 16.45-17.45

2. Presentation of the course

Big Data has completely changed the business landscape. Companies are using data to improve all work processes and decision making. Nowadays the knowledge and skills required to manage data and extract value are highly demanded by companies. In this new business paradigm, multidisciplinary professionals who understand analytics techniques are key pieces for the organizations.

The main goal of this subject is to provide students with the necessary tools to dive in the huge variety of large datasets of international business and marketing to reveal hidden patterns, customer preferences, market trends, and other valuable insights for the company. Big Data fundamental concepts and also an outline of technologies will be taught in order to give students the global picture of Big Data applications.

The course aims to be very practical and dynamic. This will be achieved by applying all the theoretical concepts about databases and basic programming skills into practise on real-life cases.

3. Competences to be worked in the course

<table>
<thead>
<tr>
<th>General competences</th>
<th>Specific competences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrumental competences</td>
<td>Professional competences</td>
</tr>
<tr>
<td>G.I.1. Ability to search, analyse, assess and summarise information.</td>
<td>E.P.2. Ability to analyse economic and market indicators when taking decisions within the organisation.</td>
</tr>
<tr>
<td>G.I.4. Ability to tackle and solve problems</td>
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<tr>
<td>G.I.5. Ability to take decisions in complex and changing environments.</td>
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</tr>
<tr>
<td>G.I.6. Ability to develop, present and defend arguments</td>
<td></td>
</tr>
</tbody>
</table>
Generic systemic competences
G.S.5. Ability to learn on one’s own.

Competences for applicability
G.A.2. Ability to use quantitative criteria and qualitative insights when taking decisions.
G.A.3. Ability to search and exploit new information sources.

The above competences reflect the basic competences set out in Royal Decree 1393/2007, namely:

a. Competence to **comprehend knowledge, on the basis of general secondary education**.
b. Competence to **apply knowledge** to day-to-day work in international management or marketing, in particular the ability to develop and defend arguments and to solve problems.
c. Competence to **gather and interpret** relevant data, enabling the development of critical judgements on the economic and social reality.
d. Competence to **communicate and transmit information** (ideas, problems, solutions) to a specialist and non-specialist audience.
e. Competence to **develop learning activities** in a relatively autonomous manner.

The competences worked on in the course are divided into two groups: those seen as a development or specification of a basic competence; and those that hone graduates’ professional profile with respect to general and specific competences.

**Basic competence: understanding of knowledge**
*General competences* G.I.3, G.A.2

**Basic competence: gather and interpret data**
*General competences* G.I.1, G.A.3
*Specific competences* E.P.2

**Basic competence: communicate and transmit information**
*General competences* G.I.6, G.I.8

**Basic competence: develop learning activities**
*General competences* G.I.3, G.I.4, G.S.5
*Specific competences* E.P.21

**Competences that hone graduates’ professional profile which are not included under basic competences**

In general, these competences combine the following key elements for honing students’ professional profile in the area of international business and marketing:
- Provide students with the capacity to adapt to dynamic teams and environments.
- Provide students with the capacity to create their own integral vision of the operation of a business or international marketing project.
- Provide students with the capacity to take complex decisions and carry out negotiation processes.

*General competences* G.I.4, G.I.5

**Learning outcomes**

At the end of this subject, students will be able to apply the appropriate techniques in the treatment of large international business and marketing datasets with programming languages. They will also be capable of
understanding the programming power to explore, transform and analyse data successfully.

The competences, the learning outcomes, the assessment elements and the quality of the learning process included in this Teaching Plan will not be affected if during the academic trimester the teaching model has to switch either to an hybrid model (combination of face-to-face and on-line sessions) or to a complete on-line model.

4. Contents

This course is organized in five main blocks:

Block 1: Introduction to Big Data concepts and technologies.
Big Data overview including examples related with business and marketing. The V’s of Big Data (volume, velocity, variety, veracity and value). Impact and technologies required for data collection, monitoring, storage, analysis and reporting.

Block 2: Introduction to Linux

Block 3: Introduction to Databases and SQL programming.
SQL programming: From Basic to Advanced SQL commands and functions.
Introduction to PHP and MySQL. MySQL with R.

Block 4: Introduction to Python, R and their applications
Variables, data types, inbuilt functions and libraries/packages (exploring, cleaning, transforming, analysing, visualizing and reporting data)

Block 5 Large datasets in international business and marketing.
This issue will be worked throughout the whole course. The examples and exercises suggested at class and the case study tasks will be related to international business and marketing data.

5. Assessment

Evaluation

<table>
<thead>
<tr>
<th>Form of assessment</th>
<th>Time period</th>
<th>Type of assessment</th>
<th>Assessment agent</th>
<th>Type of activity</th>
<th>Grouping</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading and other tasks (RT)</td>
<td>Weeks 1-9</td>
<td>X</td>
<td>X</td>
<td>Conceptual</td>
<td>X</td>
<td>10%/0%</td>
</tr>
<tr>
<td>Case study 1 (CS1)</td>
<td>Week 3 (tentative date)</td>
<td>X</td>
<td>X</td>
<td>Application-based</td>
<td>X</td>
<td>10%/12,5%</td>
</tr>
<tr>
<td>Case study 2 (CS2)</td>
<td>Week 5 (tentative date)</td>
<td>X</td>
<td>X</td>
<td>Application-based</td>
<td>X</td>
<td>10%/12,5%</td>
</tr>
<tr>
<td>Case study 3 (CS3)</td>
<td>Week 7 (tentative date)</td>
<td>X</td>
<td>X</td>
<td>Application-based</td>
<td>X</td>
<td>10%/12,5%</td>
</tr>
<tr>
<td>Case study 4 (CS4)</td>
<td>Week 9 (tentative date)</td>
<td>X</td>
<td>X</td>
<td>Application-based</td>
<td>X</td>
<td>10%/12,5%</td>
</tr>
<tr>
<td>Final exam (FE)</td>
<td>Exam week</td>
<td>X</td>
<td>X</td>
<td>Synthesis</td>
<td>X</td>
<td>50%</td>
</tr>
</tbody>
</table>

Synthesis evaluation:
Final exam (FE): individual exam in a lab room with a PC. The exam will consist of theoretical questions and practical programming exercises. It will be graded from 0 to 10.

Continuous evaluation:

Case study (CS) (1,2,3,4): There will be four submissions along the course based on case studies that will be worked both on the seminar classes and outside the classroom. They will be scheduled according to the development of the course and will be solved in groups or individually. Each one will be graded from 0 to 10.

Reading and others tasks (RT): Some reading and audiovisual material will be distributed after sessions to reinforce and broaden knowledge. These homework tasks will be evaluated through the Aul@ESCI platform

The continuous assessments mark will be the maximum of the options

- 20% CS1 + 20% CS2 + 20% CS3 + 20% CS4 + 20%RT
- 25% CS1 + 25% CS2 + 25% CS3 + 25% CS4

Regular evaluation

In order to pass the course it will be necessary to have a grade above 4/10 in the final exam, above 4/10 in the continuous evaluation mark and an overall course grade (50% FE + 50% continuous evaluation mark) of 5/10.

Regarding to students who do not exceed 4/10 in the continuous evaluation mark the final grade will be the minimum between 4/10 and 50% FE + 50% continuous evaluation mark.

Students who fail the regular evaluation but score at least 4/10 for their continuous evaluation will be able to retake the synthesis assessment in the extraordinary exam.

Students who do not attend the final exam will receive a “No Show” grade.

Resits

Continuous evaluation exercises can’t be retaken.

The extraordinary exam will take place according to the schedule fixed by the Degree Coordination. Students who do not attend the extraordinary exam will keep his regular evaluation score.

Students must obtain a minimum grade of 4/10 in their retaken final exam and an overall course grade (50% extraordinary exam + 50% continuous evaluation mark) of 5/10 to pass the course.

Working competences and assessment of learning outcomes:

<table>
<thead>
<tr>
<th></th>
<th>GI1</th>
<th>GI3</th>
<th>GI4</th>
<th>GI5</th>
<th>GI6</th>
<th>GI8</th>
<th>GS5</th>
<th>GA2</th>
<th>GA3</th>
<th>EP2</th>
<th>EP21</th>
<th>Learning outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading tasks</td>
<td></td>
<td>X</td>
<td>X</td>
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<tr>
<td>Case study 1 (CS1)</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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</tr>
<tr>
<td>Case study 2 (CS2)</td>
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<td>X</td>
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<td>X</td>
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<tr>
<td>Case study 3 (CS3)</td>
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<td>X</td>
<td>X</td>
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<td>X</td>
<td></td>
</tr>
<tr>
<td>Case study 4 (CS4)</td>
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<td>X</td>
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<td>X</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Final exam (FE)</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
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</tbody>
</table>

Any students found copying and/or plagiarising work, in whole or in part, will fail the subject. They will receive a final grade of zero and will not be allowed to take the make-up exam. In accordance with the UPF Disciplinary Rules and Regulations for Students, other additional sanctions may apply depending on the seriousness of the offence.

6. Bibliography and teaching resources

Basic bibliography


**Supplementary bibliography**


**Teaching resources (posted on AULA-ESCI)**

R resources

https://cran.r-project.org/
Manuals https://cran.r-project.org/manuals.html
Packages https://cran.r-project.org/web/packages/available_packages_by_date.html
Cheat sheets https://rstudio.com/resources/cheatsheets/

Python resources

https://www.python.org/
https://docs.python.org/3/
https://www.python.org/about/apps/

SQL resources

http://www.mysql.com/, MySQL®
http://www.postgresql.org, PostgreSQL®

Linux resources

https://www.linux.org/

7. Methodology

Lectures sessions are based on relevant theoretical explanations and basic exercises to develop programming skills. Teaching notes, lecture slides and other resources will be provided by the professor. Some reading and audiovisual material will be distributed after the sessions to reinforce and broaden knowledge.

In seminar sessions students will work solving company cases with datasets of international business and marketing using the programming concepts taught in the theory sessions. Students may work individually or in groups.

Continuous individual programming practising will be necessary in order to get familiar with programming language and structures, and to improve agility to be able to use programming as a useful tool to obtain results.

8. Scheduled activities
<table>
<thead>
<tr>
<th>Week</th>
<th>Activity in the classroom</th>
<th>Activity outside the classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grouping/type of activity</td>
<td>Grouping/type of activity</td>
</tr>
<tr>
<td>Week 1</td>
<td>Introductory session: Goals of the course. Syllabus presentation. Lecture 1 (2h)</td>
<td>Lecture tasks and lecture 1 review</td>
</tr>
<tr>
<td>Week 2</td>
<td>Lecture 2 (2h) Seminar 1 (1h)</td>
<td>Lecture tasks and lecture 2 review</td>
</tr>
<tr>
<td>Week 3</td>
<td>Lecture 3 (2h) Seminar 2 (1h)</td>
<td>Lecture tasks practice coding Working in case study 1</td>
</tr>
<tr>
<td>Week 4</td>
<td>Lecture 4 (2h) Seminar 3 (1h)</td>
<td>Lecture tasks practice coding</td>
</tr>
<tr>
<td>Week 5</td>
<td>Lecture 5 (2h) Seminar 4 (1h)</td>
<td>Practice coding Working in case study 2</td>
</tr>
<tr>
<td>Week 6</td>
<td>Lecture 6 (2h) Seminar 5 (1h)</td>
<td>Lecture tasks, study and practice coding</td>
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<tr>
<td>Week 7</td>
<td>Lecture 7 (2h) Seminar 6 (1h)</td>
<td>Lecture tasks and practice coding Working in case study 3</td>
</tr>
<tr>
<td>Week 8</td>
<td>Lecture 8 (2h) Seminar 7 (1h)</td>
<td>Lecture tasks and practice coding</td>
</tr>
<tr>
<td>Week 9</td>
<td>Lecture 9 (2h) Seminar 8 (1h)</td>
<td>Practice coding Working in case study 4</td>
</tr>
<tr>
<td>Week 10</td>
<td>Lecture 10 (2h) Seminar 9 (1h)</td>
<td>Study for the final exam and practice coding</td>
</tr>
</tbody>
</table>

Final exam week

This planning is illustrative and can be modified by the lecturer along the trimester depending on the needs of the students