Syllabus: Advanced Data Analysis – Introduction to machine learning

BARÇA INNOVATION HUB
Universitas

Justification

An introductory data science in team sports course serves as a crucial foundation for students looking to understand the growing role of analytics in sports. This certificate bridges the gap between traditional sports knowledge and the data-driven approach that is revolutionizing the industry. It introduces students to the basic concepts of data science and statistics, specifically tailored to sports applications, allowing them to grasp how numbers can translate into actionable insights on the field.

This certificate covers fundamental statistical concepts such as descriptive statistics, probability, and basic inferential statistics, all contextualized within sports scenarios. Students learn about how sports data is collected, data cleaning, and analysis of sports-related data using entry-level tools and software like Excel and Tableau. Students will also be introduced to the programming language Python to do more advanced analyses.

This introductory certificate lays the groundwork for more advanced studies in sports analytics while also providing valuable skills for students pursuing various careers in team sports and the sports industry. It caters to a wide audience, from current and aspiring coaches and support staff working inside the teams to future data analysts who aspire to work inside sports teams. By the end of the program, students will have a solid understanding of how data is collected, analysed and utilised in team sports, preparing them for a future where data literacy is increasingly important in all aspects of sports. This certificate will help facilitate the transfer of technical and

physical information from the matches and training to assist the coaches and decision-makers in making informed decisions.

SYLLABUS

- **Objectives**
- **Skills**
- **Graduate profile**
- **Aim to**
- **Criteria for participation and approval**

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- **Module 1. Introduction to machine learning**
- **Module 2. Machine learning. Part 2**
- **Module 3. Case study**
- **Module 4. Communication and presentation**

Objectives

By establishing objectives, we give ourselves a clear idea of what we want to achieve once the teaching and learning process of this course has finished. But our aims are even more specific: we also want to establish what you will need to accomplish in order for this new knowledge to contribute to your educational goals.

To achieve these objectives, you must complete the entire process laid out in the different stages of the course.

Thus, if you work in the way suggested, you will be well-positioned to meet the following objectives:

General objective

introduce data science and how it is applied to sport.

Specific objectives

1. introduce and explain data science, the mathematics and statistics that form the foundation for data science
2. data collection, cleaning and analysis.

3 different techniques and methods used in data analysis.

4 introduce the different technologies and software commonly used in data analysis.

CONTINUE

Skills

The skills we hope you will develop throughout this course are:

General skills

1. **Group and collaborative work:** the ability to work with colleagues in order to accomplish shared goals and to achieve the synergy typical of a high performance group.

2. **The capacity of analysis/reflection:** the capacity to methodically examine the different aspects of a certain reality or situation and to carry out an assessment of that situation.

3. **Creativity and innovative, knowledge-based solutions:** the capacity to find alternative solutions to existing problems based on formal knowledge.

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Graduate profile

At the completion of this certificate, the graduate will have a good understanding of the fundamentals of data science. They will be able to identify types of data and how to use different streams of data. They will be able to perform exploratory data analysis and use the different software tools like Excel, Tableau and Python. Finally, graduates will be able to do some detailed and advanced data analysis in python and will be introduced to the basics of how to communicate findings from data analysis.

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Aim to

This certificate assumes no prior knowledge or experience in working with data. It caters to a wide audience, from current and aspiring coaches and support staff working inside the sport to future data analysts and sports journalists.

Students of this course ideally have a basic college degree or have exposure to high school mathematics. Exposure to sports data and some basic level experience working with sports data is a plus.

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Criteria for participation and approval

Participation criteria

During the month of course, the student is expected to:

- [ ] Browse the multimedia contents of each of the modules that make up the course.
- [ ] Solve the evaluations assigned in each module.
- [ ] Carry out the proposed activities, whether group or individual.
- [ ] Take the final exam.

Approval criteria

For the approval of the course, the student is required to complete the (4) proposed activities in the course and pass the final exam. The student must obtain a final score of 70% or more. This grade will be the average between the activities and the final exam.

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Module 1. Introduction to machine learning

CONTINUE

Module 2. Machine learning. Part 2

CONTINUE

Module 3. Case study

CONTINUE

Module 4. Communication and presentation

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