

Programa	Experto
Physical Data Analysis with R for Sport Scientists	David Pajón (https://www.linkedin.com/in/davidpajonmoreno/?originalSubdomain=es)

Syllabus – Course Outline

Proposed Title: Data Analysis of Physical Performance with R for Sport Scientists

Justification of the Proposal:

The analysis of physical performance data has experienced significant growth and importance in recent years within professional sports clubs and organizations. The use of programming languages such as R has been crucial for handling large volumes of data from various sources (GPS, force platforms, questionnaires, accelerometers, etc.).

The insights gained from these analyses have a major impact on daily decision-making across different departments (Physical Preparation, Medical Staff, Scouting, etc.), adding value to the work of Sport Scientists and achieving a greater impact on team/club performance.

This profile of Sport Scientist is highly sought after in top-level clubs, and job descriptions specify these competencies as essential for professional hiring. However, there are currently no courses focused on learning programming languages like R applied to physical performance data, nor are there subjects related to these topics in undergraduate programs. Therefore, acquiring this specific skill can be a distinguishing factor in this highly competitive sector.

Course Objectives



- **General Objective:** Develop programming skills in R for physical performance data analysis.
- **Specific Objectives:**
 1. Understand the software, its functionalities, and opportunities.
 2. Follow the steps for the correct data analysis process.
 3. Encourage the development of proposals related to physical performance using data analysis.
 4. Communicate results effectively and impactfully.

Competencies:

- **Generic Competencies:** The generic competencies defined for this degree are as follows:

- Teamwork and Collaboration:

Ability to integrate with peers to achieve shared goals and the synergy of a high-performance group.

- Analytical/Reflective Capability:

Ability to methodically examine various aspects of a reality or situation and provide a valuation of them.

- Creativity/Innovative Solutions Based on Knowledge:

Ability to offer new solutions to existing problems based on formal knowledge.

- **Specific Competency:** This program aims to develop the necessary programming skills in students to achieve the highest effectiveness in data handling. Additionally, it promotes the growth of critical thinking in selecting statistical models and visualizations for solving performance-related issues using data analytics.

Graduate profile:

The certificate will provide graduates with the knowledge, skills, and abilities required to excel in the field of physical performance. Graduates will gain the skills to contribute to a



professional team structure by adding value through data analysis, offering valid solutions and information for decision-making.

Graduates will be able to use data as a facilitating tool in short, medium, and long-term projects required in the role of a Sport Scientist. The certificate will provide a structured approach to problem-solving, including question analysis, data structuring for subsequent use, selection of appropriate methodology, and communication of results.

Aim to:

Professionals interested in sports science and physical performance with no prior experience in programming or database management who wish to acquire advanced tools for physical data analysis and visualization.

Individuals keen on researching and seeking answers to improve physical performance, reduce injury risk, or innovate in professional sports.

Profiles seeking to make a multidisciplinary impact in professional clubs or those who wish to bridge the academic and professional realms.

Proposed Topics for Program Development:

- Topic 1. Data Exploration, Transformation, and Cleaning.
- Topic 2. Metric Calculation, Database Cross-Referencing.
- Topic 3. Advanced Data Visualization.
- Topic 4. Use of Statistical Models Applied to Physical Performance.

ANEXO 1

Case Studies

Module 1: Application of intermittence to raw data with GPS.

Module 2: Force platforms, profiling, and change detection applied to calculations with raw data.

Module 3: Dashboard for recording Wellness and RPE.

Module 4: Using Chat-GPT as a complement for data analysis and processing in RStudio.





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