1. BASIC INFORMATION

Course	Foundations of Scouting and Applied Big Data in Sports
Degree program	Bachelor´s Degree in Physical Activity and Sport Sciences
School	School of Sport Sciences and Physical Activity
Year	Fourth year
ECTS	6
Credit type	Optional
Language(s)	English
Delivery mode	Campus-based
Semester	S7/S8
Academic year	2027-2028
Coordinating professor	Iyán Iván Baragaño

2. PRESENTATION

In this subject, the student will become familiar with the analysis of large volumes of data, the implementation of predictive models, data visualization, and the application of objective conclusions to the practical field of Physical Activity and Sports Sciences. Through mastering various software for data recording and analysis, the student will be able to work with their own data sources as well as with data from external providers. Upon completion of this subject, the student will have basic knowledge of the data processing cycle: acquisition, processing, analysis, and application.

3. LEARNING OUTCOMES

Knowledge

KNO4: Identifies strategies and initiatives to promote healthy habits through physical activity and sport and/or auxiliary actions that help to maintain and improve physical condition.

- Identifies the strengths of new technology and its use in high-performance sport.
- Determines the most appropriate tools for maximising performance in different sports and models of training.
- Explains key concepts of the different data analysis and visualisation software used in high-performance sport.
- Identifies new ways and models of training/physical conditioning for high-performance sport through the use of new technology and digitalisation.

Skills

AB2: Plans physical exercise activities, progressions and strategies to promote health and sports performance based on individual and environmental factors.

- Practises using different software and technology for the reporting and visualisation of data on physical conditioning and fitness training in high-performance sport.
- Implements the best available tools for the different areas of body conditioning, fitness training and sports performance.

Competences

- Comp21. Identify, organise, manage, plan, coordinate, implement and evaluate staff performance, with an emphasis on the management, coordination, planning, supervision, and technical/scientific evaluation of the activity, performance and provision of services by professionals active in the sport and physical activity sector, in all types of services and in any type of organisation, context and environment, with a focus on particular groups within the population, and in any area of professional practice within the sport and physical activity sector, while guaranteeing the safety, effectiveness and professional standards of the activity carried out in compliance with applicable regulations.
- Comp 22. Identify, organise, manage, plan, coordinate and implement various types of physical activity and sports—and conduct technical/scientific evaluations of them—tailored to the development, characteristics and needs of individuals and the type of activity, space, and entity, in all types of physical activity and sports services, including sporting events, and in any type of organisation, population group, context and environment, with an emphasis on particular groups such as senior citizens (the elderly), schoolchildren, people with disabilities and people with diseases, health problems or similar conditions (diagnosed and/or prescribed by a physician), in any area of professional activity within the sport and physical activity sector (formal and informal physical education and sports instruction; physical and sports training; health-focused exercise; physical activity and sports management), while guaranteeing the safety, effectiveness and professional standards of the activity carried out in compliance with applicable regulations.
- Comp23. Develop and draw on the expertise needed to offer advice, issue certification and conduct technical and scientific evaluations in relation to physical activities, sports and resources in all physical activity and sports services, contexts, environments and areas of professional activity within the sport and physical activity sector, as well as to prepare and produce technical reports in all physical activity and sport services.
- Comp37. Strategic communication. Transmit messages (ideas, concepts, feelings, arguments), both orally and written, strategically aligning the interests of the different stakeholders involved in the communication in the academic and professional environment.
- Comp 38. Digital competence. Use information and communication technologies to search for and analyze data, research, communicate and learn.
- Comp 41. Critical analysis. Integrate analysis with critical thinking in a process of evaluating different ideas or professional possibilities and their potential for error, based on evidence and objective data that lead to effective and valid decision-making.

4. CONTENT

- Topic 1. Introduction to new big data technologies for high-performance sport: data ethics.
- Topic 2. Data processing tools for high-performance sport.
- Topic 3. Data analysis, visualisation and reporting in high-performance sport.
- Topic 4. Performance optimisation and injury prevention in high-performance sport through data analysis.
- Topic 5. Tools for game analysis: the incorporation of big data.
- Topic 6. Tools for high-performance sport scouting through data analysis.

5. TEACHING-LEARNING METHODOLOGIES

Below are the types of teaching-learning methodologies that will be applied:

- Lecture
- Learning based on workshops/lab techniques
- Project-learning
- Simulation

6. LEARNING ACTIVITIES

Listed below are the types of learning activities and the number of hours the student will spend on each one:

Campus-based mode:

Training activity	Hours
Lectures	4
Practical application classes	26
Debates	8
Oral presentations	10
Workshops and laboratory activities	10
Tutoring	12
Face-to-face evaluation tests	2
Self-study	56
Design work for strategies and intervetion plans	13
Report writing	9
TOTAL	**150**

7. ASSESSMENT

Listed below are the assessment systems used and the weight each one carries towards the final course grade:

Campus-based mode:

Assessment system	Weight
Face-to-face evaluation tests	40-50%
Design work for strategies and intervention plans	15-20%
Performance assessment	15-30%
Oral presentations	5-10%
Reports and writings	5-10%

When you access the course on the Campus Virtual, you'll find a description of the assessment activities you have to complete, as well as the delivery deadline and assessment procedure for each one..

7.1. First exam period

To pass the course in the first exam period, you must obtain a final course grade of at least 5 out of 10 (weighted average).

In any case, you will need to obtain a grade of 5.0 in the final exam in order for it to count towards the final grade along with all the grades corresponding to the other activities.

7.2. Second exam period

To pass the course in the second exam period, you must obtain a final grade of at least 5 out of 10 (weighted average).

In any case, you will need to obtain a grade of at 5.0 in the final exam in order for it to count towards the final grade along with all the grades corresponding to the other activities.

The student must deliver the activities not successfully completed in the first exam period after having received the corresponding corrections from the professor, or those that were not delivered in the first place.

8. SCHEDULE

This table shows the delivery deadline for each assessable activity in the course:

Assessment activities	Deadline
Face-to-face evaluation tests	Weeks 8 & 15
Reports and writings	Week 12
Oral presentations	Week 10
Performance assessment	Cross-sectional
Design work for strategies and intervetion plans	Week 16

This schedule may be subject to changes for logistical reasons relating to the activities. The student will be notified of any change as and when appropriate.

9. BIBLIOGRAPHY

The main reference work for this subject is:

- Vales, A. (2015). *Fútbol: Del análisis de juego a la edición de informes técnicos.* MCSports
- Molnar, C. (2021*). Interpretable Machine Learning. A Guide for Making Black Box Models Explainable*. https://christophm.github.io/interpretable-ml-book/
- Molnar, C. (2022). *Modeling Mindsets: The Many Cultures Of Learning From Data.* https://leanpub.com/modeling-mindsets

The recommended Bibliography is:

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- International Olympic Committee. (2024). *OLYMPIC AI AGENDA.*
- Jennings, J., Perrett, J. C., Wundersitz, D. W., Sullivan, C. J., Cousins, S. D., & Kingsley, M. I. (2024). Predicting successful draft outcome in Australian Rules football: Model sensitivity is superior in neural networks when compared to logistic regression. *PLoS ONE, 19*(2 February). https://doi.org/10.1371/journal.pone.0298743
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- Majumdar, A., Bakirov, R., Hodges, D., McCullagh, S., & Rees, T. (2024). A multi-season machine learning approach to examine the training load and injury relationship in professional soccer. *Journal of Sports Analytics, 10*(1), 47–65. https://doi.org/10.3233/JSA-240718
- Novillo, Á., Gong, B., Martínez, J. H., Resta, R., del Campo, R. L., & Buldú, J. M. (2024). A multilayer network framework for soccer analysis. *Chaos, Solitons & Fractals, 178*, 114355. https://doi.org/10.1016/j.chaos.2023.114355
- Rico-González, M., Pino-Ortega, J., Méndez, A., Clemente, F. M., & Baca, A. (2023). Machine learning application in soccer: a systematic review. In *Biology of Sport* (Vol. 40, Issue 1, pp. 249–263). Institute of Sport. https://doi.org/10.5114/biolsport.2023.112970
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- Wang, Z., Veličković, P., Hennes, D., Tomašev, N., Prince, L., Kaisers, M., Bachrach, Y., Elie, R., Wenliang, L. K., Piccinini, F., Spearman, W., Graham, I., Connor, J., Yang, Y., Recasens, A., Khan, M., Beauguerlange, N., Sprechmann, P., Moreno, P., … Tuyls, K. (2024). TacticAI: an AI assistant for football tactics. *Nature Communications, 15*(1), 1906. https://doi.org/10.1038/s41467-024-45965-x

10. EDUCATIONAL GUIDANCE AND DIVERSITY UNIT

From the Educational Guidance and Diversity Unit we offer support to our students throughout their university life to help them reach their academic achievements. Other main actions are the students inclusions with specific educational needs, universal accessibility on the different campuses of the university and equal opportunities.

From this unit we offer to our students:

1. Accompaniment and follow-up by means of counselling and personalized plans for students who need to improve their academic performance.
2. In terms of attention to diversity, non-significant curricular adjustments are made in terms of methodology and assessment for those students with specific educational needs, pursuing an equal opportunities for all students.
3. We offer students different extracurricular resources to develop different competences that will encourage their personal and professional development.

4. Vocational guidance through the provision of tools and counselling to students with vocational doubts or who believe they have made a mistake in their choice of degree.

Students in need of educational support can write to us at:

orientacioneducativa@universidadeuropea.es

11. ONLINE SURVEYS

Your opinion matters!

The Universidad Europea encourages you to participate in several surveys which help identify the strengths and areas we need to improve regarding professors, degree programs and the teaching-learning process.

The surveys will be made available in the “surveys” section in virtual campus or via e-mail.

Your assessment is necessary for us to improve.

Thank you very much for your participation.