COURSE OF TECHNOLOGIST-ANALYST IN SPORT

SYLLABUS

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1. JUSTIFICATION

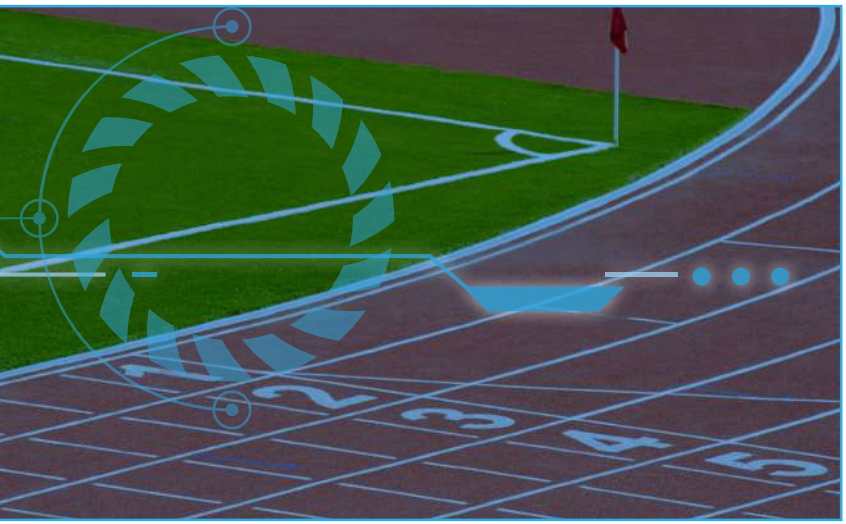
1.1. INTRODUCTION

The Sciences of Physical Activity and Sport have been consolidated as an area of study with important implications for both researchers and professionals. It is a labour market sector in continuous growth, still in development, where new professional opportunities and new jobs are constantly being born, until now unknown. Its scope of action includes many profiles dedicated to different populations and entities, distinguishing:

- >> Physical Education and school sports
- >> Grassroots sport
- >> Sport for all (leisure and health)
- >> Sports for special populations
- >> Federated sport
- >> High performance sport
- >> Professional sport

Among the agents that carry out the activity in all these sectors, a large number of organizations and organizational typologies can be found. Schools, public sport services, private companies (mainly in the fitness sector), sports clubs and academies, sports associations and professional clubs. In one way or another, in all cases it has gone from altruism and voluntary work to professionalization and a very competitive labour market. When sport becomes a demanded consumer service and considered a good capable of offering different degrees of quality, users become more demanding and it is necessary to provide solid organizational structures, affecting all cases.

To achieve quality training for these professionals, Degrees in Physical Activity, and Exercise and Sports Sciences have proliferated throughout Europe. This type of higher education has evolved from the strict concept of Physical Education, oriented towards a didactic and formative aspect to a broader concept of Sport Sciences, which brings together a set of sciences applied to different sports fields. According to the European project AEHESIS (Aligning a European Higher Education Structure in Sport Science), the global itineraries into which the Bachelor's degree in Sport Sciences can be divided are:



>> **SPORT COACHING.** This area covers key coaching activities that include, needs, analysis and planning; delivery of training sessions; coaching in competition settings and the on-going review of progress. The implication for higher education institutions is that courses that include coaching in their title, should equip students with the skills and relationships to coach in a sport, or a number of sports, to a specific level. This section also includes an element of recent growth, with increasing importance: the physical coaching. This profile is normally occupied by a specialist in Sport Sciences, while the coach in the most generic sense can be filled with more kind of profiles like physical coach, sports analyst or sports therapists.

>> **HEALTH & FITNESS.** The Health and Fitness area collectively concerns activities, behaviours, or policies pertaining to the maintenance or promotion of health, physical fitness, or wellbeing, and consists of two related subareas, which may differ in terms of intervention, strategies and goals as well as operative contexts. In this regard, including the area of Health-Related Exercise (concerns the promotion, design, and execution of exercise as a mean to maximise health) and the area of Physical Fitness (concerns the promotion, design, and execution of exercise meant to enhance individual fitness levels and wellness). It is an area that covers jobs in the community sports services sector and the fitness sector, one of the most powerful industries in the world of sport. It includes very varied profiles from the personal trainer, general trainer in fitness centres, trainer of special populations and even exercise physiologist.

>> **SPORT MANAGEMENT.** A field concerned with the coordination of limited human and material resources, relevant technologies, and situational contingencies

for the efficient production and exchange of sport services. The profile of the Sports Manager, by tradition, is usually occupied by graduates in Sport Sciences with postgraduate degrees related to Economics or Business Sciences, graduates in Economics or Business Sciences with postgraduate degrees in Sport Sciences or graduates in specific degrees in Sport Management.

>> **PHYSICAL EDUCATION.** It is the classic profile of the first studies on physical activity. It is highly focused on positions of Physical Education teacher and experts in didactics, although there are more and more profiles in basic sport training such us psychomotor rehabilitation.

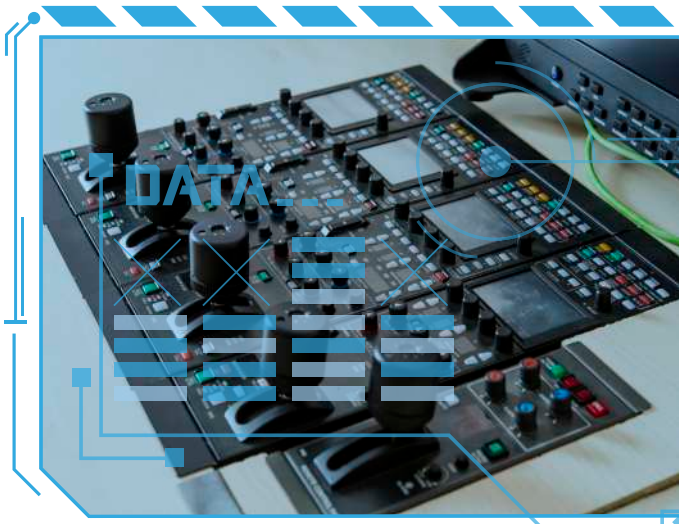
Specialization in postgraduate studies in Sports Sciences has evolved into more specific degrees, although without coherence or unity at the European level. The most widespread type of degree specialization is Sports Management, previously studied in the European NASME project (New Age for Sport Management Education in Europe). To a much lesser extent, there are some specific degrees on physical activity for health and others on Physical Education. In general, without a doubt, the most widespread model is Sport Sciences Degrees.

A bachelor degree with such a broad focus on jobs (although no less necessary, since it is necessary to have a basic and transversal education to know the sports context) leads the need to establish postgraduate courses that specialize professionals to specific job profiles, increasing the opportunities in the labour market. Among them, we find degrees of specialization in each of the subjects mentioned above.

However, although there is an increasing variety of postgraduate offers that include subjects related to technology, they tend to be very broad or with very cross-cutting themes. The Digi-Sporting Phase 1 study shows a wide gap between the use and the development of technology and the perceived importance, in all positions related to sports clubs, academies and fitness clubs.

Therefore, the objective of this part of the project is to design a study plan for the completion of a short-term online postgraduate course, which may be a draft of a master's degree, which allows a specialization of technologist-analyst in sport graduates in Sport Sciences with any specialization or area of work. It could also be suitable for people with higher training or not, that work effectively in the sports environment.

Thanks to the study carried out, based on a review of technologies and a survey conducted in 6 European countries, it has been possible to define the relative importance of each technological area, the content that should be further developed and the compentencies that should be strengthened. This study, together with the analysis of the current training market, allows us to generate a useful and effective course for sport professionals.



The objective is that sports professional acquires a technologist-analyst profile, allowing him/her to multiply his competence in the labour market, not only by being able to greatly optimize his performance in the current position but also by being able to access other newly created professional positions, currently not being covered by specific profiles.

1.2. CONSISTENCY WITH HIGHER EDUCATION IN EUROPE

Training in technology and sport in Europe, despite being something new, has already had its first developments in recent years. However, the current approach is extremely heterogeneous, since, to the great variety of types of activities related to physical activity, exercise or sport, there is added the great variety of interpretations of the word technology.

The development of this study plan (syllabus) is based on three pillars. In the first place, the contributions to the work of the group of experts of the Digi-Sporting project, made up of 9 partners from 6 European countries, with representation from different agents of the sports sector. Second, the results of a field study where a questionnaire was developed by 569 professionals in sports clubs and academies. Finally, an analysis of the training market in technology and sport.

The results show a global interest and great importance of new technologies for all training and management profiles in sports clubs. In addition, there is a great awareness and knowledge of the technical staff about the usefulness of each of the technologies in the different positions of the club, highlighting the functions of coach, other technical staff (mainly physical trainers and rehabilitator) and managers or coordinators. However, the current application at present is much lower than the perceived importance, so there is a great gap for optimization in its application and use.

In the analysis of the training market on technology and sport in Europe, 35 courses have been found that will allow to know the general situation and how they could be complemented and improved. In the first place, it should be noted that there are very few proposals at the bachelor's degree level and among those found, there is excessive heterogeneity. The degrees with the greatest impact and presence at the informative level are those of Sheffield Hallam University, Loughborough University and Universitat Politecnica de Catalunya.

>> The bachelor's degree of Sport and Exercise Technology at Sheffield Hallam University is a formation with a big load of transversal work in Sport Science and engineering. Within its content we can highlight the importance of investigation, exercise mechanics and engineering.

- On the other hand, the bachelor's degree of Sports Technology at Lughborough University has a focus in the industrial and commercial development. Consists of many transversal classes about Managing, fabrication and engineering.
- The Degree of "Ciencias y Tecnologia Aplicadas al Deporte y al Acondicionamiento Fisico" at Universitat Politecnica de Catalunya has a similar philosophy of the contents to the ones delivered at Loughborough University. It has many transversal classes of Business Management, but instead of focusing on fabrication methods, it emphasizes on sport facilities.

It can be seen how training at the bachelor degree level, which is the most complete that can be found in terms of the number of training hours, is largely intended to train managers and directors of sport companies, and even design and manufacture of technology. There is no deep specialization in the application of technology for the sports club sector, taking into account specialists in sports and exercise sciences.

At the master's degree level, the offer is much more varied. There are masters such as the Master in Sport Technologies and Digital Transformation of the European University of Madrid or the Master Sports Technology of UAS Technikum Wien: University of Applied Sciences that again focuses a lot on industrial and commercial development and not so much on the application used by a coach or a physical coach. Others, such as the Human Technology in Sports and Medicine of the Deutsche Sporthochschule Koln or the Sport and Technik Master of Science of the Universität Magdeburg have a very specialized vision for the clinical, physiological and medical fields. The Sports Engineering Masters: Fakultät für Maschinenbau from the Technische Universität Chemnitz or the Sports Equipment Technology Masters from FH Technikum Wien have an engineering and manufacturing-oriented perspective. Along the same lines, the MSc Sports Technology of the KTH Royal Institute of Technology is also oriented to engineering and manufacturing, but with an important exponent of mobile technology. In a more distant way, the initiative from The Catholic University of the Sacred Heart of Milano offers a master's degree in digital communication in the sports field, in order to train professionals to deal with the new communication scenarios.

In addition, it should be noted that practically all the previous cases the main modality is face-to-face.
Observing all the previous cases, it can be concluded that higher education in the field of technology in sport is very robust and broad for the creation and operation of companies in the field of technology. But if we focus on the direct application that a coach or a physical trainer might apply, the contents may be considered excessively broad.

Therefore, this study plan proposes a continuous training course for professionals who have preferably previously com-

pleted a cross-sectional higher education. The objective of this course is to provide professionals a technologist-analyst knowledge, which allows them to take advantage of and use new technologies specifically in clubs and academies.

This course would be more in line with other initiatives that are beginning to be demanded at the European level, which are aimed at obtaining specific training in certain technologies or in their application to specific sports. This course, of technologist-analyst in sports clubs, is an intermediate vision since it will deal with all the areas of technologies detected in the field study, deepening their practical application to sports. Its orientation is based on technology-driven, not sport-driven, so the general functionalities of each technology and its possible application to different sports will be seen, instead of talking about which technologies are specific for each sport. In this way, a much more global and inclusive training should be achieved.

The results of the study, as has been mentioned, allow us to see the need and scope for improvement in the application of new technologies in clubs. The following table shows the current use of each identified area and the perceived importance, observing the GAP and the needs of each one of them.

	Use	Importance	GAP
1. Technologies for club or entity or entity management	3.06	3.80	0.74
2. Technologies for data analysis	2.50	3.58	1.08
3. Technologies for reporting and visualization	2.27	3.48	1.21
4. Technologies for physical evaluation, injury prevention and medical technologies	2.33	3.87	1.54
5. Technologies for training quantification. Physical monitoring	2.34	3.76	1.42
6. Technologies for training quantification. Technical-tactical monitoring	2.25	3.65	1.41
7. Technologies for retransmission and media	2.91	3.72	0.80

In the same way, the field study also provides information on the digital skills that must be further developed, again demonstrating a margin for improvement.

	Use	Importance	GAP
1. Analytical skills	3.32	3.90	0.58
2. ICT skills	3.14	3.70	0.56
3. Data management skills	2.98	3.71	0.73
4. Ability to make conclusions from research data	2.93	3.75	0.82
5. Digital marketing and social media skills	3.30	3.87	0.57
6. Skills in the digital management of Big Data	2.54	3.23	0.69

2. OBJETIVES

- >> Train technologist-analyst for the effective application of new technologies in exercise, sports and physical education context.
- >> Provide the necessary knowledge to select and integrate technologies for optimization in exercise, sports and physical education context.
- >> Attract good practical examples of the application of digital transformation technology in exercise, sports and physical education context.

3. PROFILE OF THE STUDENTS

The main profile of the students of this continuous training course are graduateds in Sport Sciences, Physical Education, Kinesiology or similar areas. It is also primarily focused on other students with higher education who have already completed some type of postgraduate degree related to sports.

Additionally, this course is also suitable for other potential students with proven work experience in the field of sports, clubs and academies. Finally, and in a complementary way, it is also viable for students with secondary studies related to sports or any other subject and who have had a working relationship with the world of sport.

4. TEACHING METHODOLOGIES

The previously described objectives can be developed online thanks to new technologies, which have facilitated the access to many technological resources, necessary to be able to give quality teaching that can be equated with face-to-face or blended training.

The methodology carried out will be based on a distance education model with asynchronous operation to favour that each student can study at their own pace, at any time and from anywhere. Teaching and learning will take place through the virtual campus, which has different tools such as forums, messages, emails, etc. that allow interaction with teachers and other students, and endow the program with a two-way character, while promoting the responsibility and autonomy of the students. In addition, to all the above must be added videoconference tutorials and personalized monitoring by the teacher, which favours effective monitoring of the student.

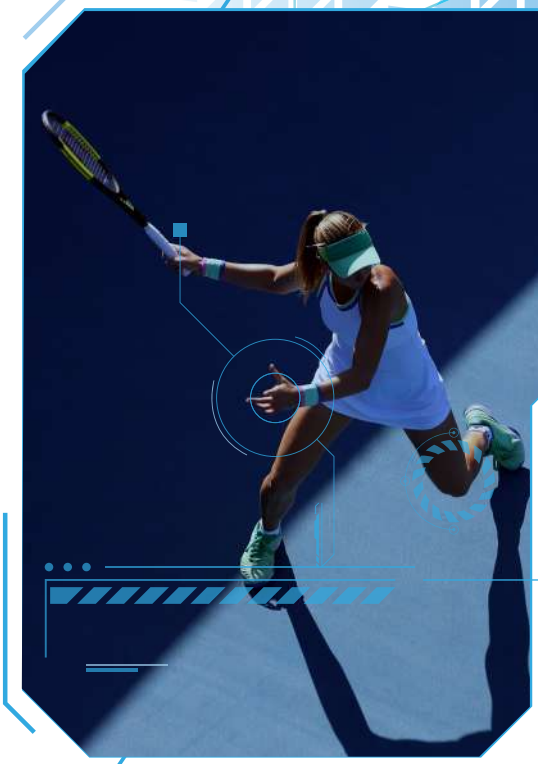
To achieve quality teaching, we will rely on the following resources:

- Audio-visual content: videos, podcast, etc.
- Digital tools: websites, newspapers, blogs, etc.
- Activities related to the subject (brief description, type of material, subject areas, disciplines involved, etc). Through them, the study and analysis of the materials provided and recommended by the teacher in the subject can be put in practice, as well as the search and consultation of bibliographic sources and complementary electronic resources.

- Different theoretical, practical and theoretical-practical teaching material.
- Access to a virtual forum: that encourages dialogue, debate and interaction between teachers and students to improve research, application and teaching systems in graduate school.
- Tutorials.
- Final work.

Contents in Virtual Campus:

- **THEORETICAL SESSIONS:** The students will have at their disposal through the teaching-learning platform the teaching materials selected or prepared by the teachers to present the basic contents, as well as support material and bibliography to prepare the subject.
- **PRACTICAL SESSIONS:** Analysis and study of the teaching materials provided by the teacher. Other activities are also contemplated such as synchronous discussion with the group of colleagues (chat through the platform) or asynchronous (through the forum) on readings, materials, videos, software and applications used.
- **WORKSHOPS AND SEMINARS:** Viewing and listening the recorded sessions of seminars organized ad-hoc, interviews with experts, or videos selected by the teacher that encourage competencies in the subject.
- **FINAL WORK:** Integration of all the contents in a specific final work with an online face-to-face defence (if this is not possible, an asynchronous presentation).



5. TEACHING PLANNING

PART 0. Introduction. The importance of digitalization and the specific role of the technologist-analyst in sport
Charge equivalent to 1 ECTS

PART 1. Technologies for club or entity or entity management
Charge equivalent to 3 ECTS

PART 2. Technologies for physical evaluation, physical tests, injury prevention, health, and medical technologies
Charge equivalent to 6 ECTS

PART 3. Electronical Performance and Tracking Systems (EPTS)
Charge equivalent to 6 ECTS

PART 4. Technologies for data storage, data analysis and visualization
Charge equivalent to 6 ECTS

PART 5. Technologies for retransmission and digital media
Charge equivalent to 3 ECTS

PART 6. Innovation and digitalization in sport clubs and academies
Charge equivalent to 2 ECTS

PART 7. Final work
Charge equivalent to 3 ECTS

Part 0	**Charge equivalent to 1 ECTS**
Denomination: Introduction. The importance of digitalization and the specific role of the technologist-analyst in sport	
Learning outcomes: • Identify the technologist-analyst position within the sports organization • Be acquainted of the functions of the technologist-analyst	
Associated digital skills: • Analytical skills • ICT skills • Data management skills	
Contents: • Profiles in the field of sports analysis • The functions of the technologist-analyst in sport	
Evaluation activities: Active participation, forums and debates 75% Test 25% • An online debate will be held in which all students must answer and interact.	

Part 1	Charge equivalent to 3 ECTS

Denomination: Technologies for club or entity or entity management

Learning outcomes:

- Select programs for the management of the sports entity based on their typology
- Undertake projects for the digitization of management processes in sports entities

Associated digital skills:

- Analytical skills
- ICT skills
- Data management skills
- Digital marketing and social media skills

Contents:

- Typology of management software for sports entities depending on the typology: sports club or sports centre
- Management of users and athletes through management software
- Corporate communication

Evaluation activities:

Active participation, forums and debates 25%
Test 25%
Workshop 50%

- An online debate will be held in which all students must answer and interact.
- An individual activity based on a practical case will be developed, with a process digitization planning in a sports club.

Part 2	Charge equivalent to 6 ECTS

Denomination: Technologies for physical evaluation, physical tests, injury prevention, health, and medical technologies

Learning outcomes:

- Properly classify evaluation technologies according to their usefulness
- Select the best evaluation system based on the expected results and the available budget
- Define the validity and reliability of the evaluation systems

Associated digital skills:

- Analytical skills
- Data management skills
- Ability to make conclusions from research data

Contents:

- Alternatives for Heart Rate Assessment
- Time evaluation systems
- Jumping evaluation systems
- Blood pressure
- Velocity of displacement
- Thermography
- Tensiomyography
- Ultrasound
- Energy expenditure and quantification

Evaluation activities:

Practical work based in the choose of one of the contents, integrated in a specific target (exercise, and or sports)
Active participation, forums and debates 25%
Test 25%
Workshop 50%

- An online debate will be held in which all students must answer and interact.
- An individual activity based on a practical case will be developed, where a protocol for evaluating physical condition, performance and injury prevention for a specific sport will be developed.

Part 3	Charge equivalent to 6 ECTS

Denomination: Electronical Performance and Tracking Systems (EPTS)

Learning outcomes:

- Know when to use one system or another depending on the context
- Properly select systems based on their validity and reliability
- Filter, classify and interpret data from positioning systems, both raw and clean

Associated digital skills:

- Analytical skills
- Data management skills
- Ability to make conclusions from research data
- Skills in the digital management of Big Data

Contents:

- Optical tracking systems
- GPS Positioning System
- Local Positioning System (SPL)
- Interpretation and analysis of data
- Practical applications to different sports

Evaluation activities:

Active participation, forums and debates 25%
Test 25%
Workshop 50%

- An online debate will be held in which all students must answer and interact.
- Design a specific data collection and analysis sheet for a sport. Create a performance report based on a predesigned database in a given context.

Part 4	Charge equivalent to 6 ECTS

Denomination: Technologies for data storage, data analysis and visualization

Learning outcomes:

- Know the different existing programs for each functionality
- Integrate data from different databases and sources
- Create basic dashboards for data analysis and visualization

Associated digital skills:

- Analytical skills
- ICT skills
- Data management skills
- Ability to make conclusions from research data
- Skills in the digital management of Big Data

Contents:

- Database management
- Filtering and selecting data
- Basic data analysis for analytical purposes
- Data analysis for informative / illustrative purposes
- Data visualization and graphs

Evaluation activities:

Active participation, forums and debates 25%
Test 25%
Workshop 50%

- An online debate will be held in which all students must answer and interact.
- Create a visualization report for the coaching staff of a specific sport, based on a set of previous databases.

Part 5	Charge equivalent to 3 ECTS

Denomination: Technologies for retransmission and digital media

Learning outcomes:

- Use social networks for internal and external communication purposes
- Integrate alternative communication systems in the absence of official broadcasts

Associated digital skills:

- ICT skills
- Digital marketing and social media skills

Contents:

- Digital Marketing Fundamentals
- Streaming and web-casting

Evaluation activities:
Active participation, forums and debates 25%
Test 25%
Workshop 50%

- An online debate will be held in which all students must answer and interact.
- Design a specific action plan for the promotion of a sports team in a season, based on digital marketing.

Part 6	Charge equivalent to 2 ECTS

Denomination: Innovation and digitalization in sport clubs and academies

Learning outcomes:

- Design innovation and development projects in the field of digitization
- Adequately execute innovation projects integrated into the general planning of the sports entity

Associated digital skills:

- Analytical skills
- ICT skills
- Ability to make conclusions from research data
- Digital marketing and social media skills

Contents:

- Concepts of innovation and development applied to sports clubs and sports entities
- Financing alternatives and incentives for sports clubs and sports entities
- The phases and sections of an innovation project
- Management and reports in innovation projects

Evaluation activities:
Active participation, forums and debates 25%
Test 25%
Workshop 50%

- An online debate will be held in which all students must answer and interact.
- Create a concept note of an innovation project for a specific call for incentives.

Part 7	Charge equivalent to 3 ECTS

Denomination: Final work

Learning outcomes:

- Create management and performance projects in sports entities based on new technologies.

Associated digital skills:

- Analytical skills
- ICT skills
- Data management skills
- Ability to make conclusions from research data
- Digital marketing and social media skills
- Skills in the digital management of Big Data

Contents:

- Phases in a strategic digitization plan
- Contents integration

Evaluation activities:

Final written work 75%

Defence of the work 25%

- Development of a strategic digitalization and technological development plan for a sports entity, integrating the rest of the Contents seen in the course. Defence of this work online.

PARTNERS

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