



FACULDADE DE  
CIÊNCIAS E TECNOLOGIA  
UNIVERSIDADE DE  
COIMBRA



## Centre for Mechanical Engineering, Materials and Processes

### CEMMPRE

#### PROPOSTA DE PLANO DE DOUTORAMENTO/DOCTORAL PLAN PROPOSAL

(a ser redigido em Inglês / to be filled in English)

**ORIENTADOR(A)/SUPERVISOR:** Maria Augusta Neto

**GRUPO/GROUP:** A

**ORIENTADOR(A)/SUPERVISOR:** Ana Catarina Pinho

**GRUPO/GROUP:** B

**ORIENTADOR EXTERNO/EXTERNAL SUPERVISOR:** Beatriz Branquinho Gomes

**GRUPO/GROUP:** A

**LOCAL DE REALIZAÇÃO DO TRABALHO/PLACE OF WORK:** Departamento de Engenharia Mecânica,  
Faculdade de Ciências e Tecnologia, Universidade de Coimbra

**TÍTULO DO PLANO DE DOUTORAMENTO/TITLE OF THE DOCTORAL PLAN:**

**Data Analysis and Prediction in High Performance Teams**

**RESUMO/SUMMARY (max. 300 words total)**

**Objetivo/Objectives:**

It's a fact that science is becoming more present daily and essential to the quality of life of all human beings. With the constant technological advances in all fields, it is important to find ways that able more effective tasks; the sports field is no different. The top clubs already have a science (analysis) department and use different tools to be more prepared for the obstacles and barriers they'll find during the competitive period.

The main objective of this study is to collect data (anthropometric measures, physical/physiological/biomechanical test results) from some sports team members at different time moments of the season and seasons, analyze them to predict individual and collective behaviour as well

as performance for further competitions. The data analysis is critical to comprehend the relation and correlation between the different parameters such as movement patterns, strategy and tactics in team sports. But they are also crucial in helping to create new machine learning algorithms that can integrate the branch of Artificial Intelligence (AI) related to sports. Machine Learning algorithms use aggregated data to evaluate athletes' skills and overall potential and rank them in several categories.

**Resultados Esperados/Expected Results:**

It is expected that a large amount of data and a suitable algorithm helps to predict with considerable accuracy what is to come. To accomplish all this development, it is fundamental to select a software language (ex: Python, R, MATLAB) and choose the AI right model, train it, and, then, apply it.

With this study, it is pretended to guide high-performance management teams to plan and manage specific periods of the competitive season, giving them the information needed to improve the performance of each member of the team as well as the team in general.

Within a medium/long period, this tool will be more present in high performance teams and sports in general.

<b>Programa Doutoral/Doctoral Program</b>	<b>Ordenação por ordem de preferência/Sorting in order of preference</b>
<b>Engenharia Mecânica/Mechanical Engineering</b>	<b>1</b>
<b>Engenharia Química/Chemical Engineering</b>	<b>3</b>
<b>Engenharia Biomédica/Biomedical Engineering</b>	<b>2</b>
<b>Biociências/Biosciences</b>	<b>4</b>