

Advanced Joining Processes Unit

# Assessing scientific publication indices of Mechanical Engineering faculties in Portugal

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#### **1. Introduction**

This study evaluates the performance of associate and full professors in the departments of FEUP, focusing on their publication output and impact within the scientific community. It also extends its analysis to the leading mechanical engineering departments in Portugal, including the University of Coimbra (UC) and the University of Lisbon (IST-UL).

## 2. Methodology

Citation profiles (CP) of 360 professors were retrieved from the Scopus database as of May 2024, and used to calculate bibliometric indices and the Canberra distance. Two comparison methods were used: 2D graphics for a fast comparison and multidimensional scaling (MDS) with hierarchical clustering (HC) for analysing all indices chosen.

## 4. Mechanical engineering departments

For an ease assessment of departments promotions, the three affiliated categories were compared by h-index and the number of papers published in Q1 and Q2 journals.





Figure 1. Workplan

Category	Department	Assistant	Associate	Full
FEUP	Civil Engineering (DEC)	(-)	26	8
	Chemical Engineering (DEQ)	(-)	17	10
	Electrical and Computer Engineering (DEEC)	(-)	27	6
	Informatics Engineering (DEI)	(-)	20	5
	Industrial Engineering and Management (DEGI)	(-)	12	4
	Metallurgic and Materials Engineering (DEM)	(-)	13	6
	Mechanical Engineering (DEMec)	28	20	13
Coimbra UC	Mechanical Engineering (UC)	26	14	6
Lisbon UL	Mechanical Engineering (IST)	47	32	20

Table 1. Summary of the study data



Figure 2. Chosen indices to assess scientific performance [1]

## **3. FEUP departments**

Figure 4. Professors' performance based on h-index and the total number of publications in Q1 and Q2 journals, with shaded areas highlighting the top 50% in each category

### 5. Multidimensional scaling evaluation

All associate and full professors CPs were assessed recuring to MDS and HC, which shows staff element groups. The HC identifies key patterns in the data, clusters similar items together and presents them in a hierarchical tree for an easy interpretation [2].



Figure 5. MDS (left) and Dendrogram (right) generated through HC, using the average values of the seven indices for associate and full professors

## 6. Conclusion

In general, the CP grade correlates with the professor category of

Associate and full professors were evaluated according to the seven predefined indices.



Figure 3. Indices comparison between associate and full professors from FEUP departments





- all departments, improving with the promotion.
- DEQ is the FEUP department with highest performance, followed by DEMec.
- Among the leading Portuguese mechanical engineering departments, FEUP shows a larger CP gap across the three categories, generally indicating, as a comparison, a more equitable promotion system.
- The MDS technique allows for the group of the best studied departments, DEQ and DEMec have similar CPs, as well as UC and IST. DEEC comes after, having greater CPs than the other FEUP departments.

#### References

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