

DVACAD-IEE-001/2024 (ABSTRACT):
INSTITUTE OF ENERGY AND ENVIRONMENT OF THE UNIVERSITY OF SÃO PAULO
Contest for Doctor Professor
Announcement DVACAD-IEE-001/2024

OPEN REGISTRATION FOR THE PUBLIC COMPETITION FOR TITLES AND TESTS AIMING AT THE PROVISION OF 01 (ONE) POSITION OF DOCTOR PROFESSOR AT THE INSTITUTE OF ENERGY AND ENVIRONMENT OF THE UNIVERSITY OF SÃO PAULO

The Director of the Institute of Energy and Environment of the University of São Paulo (IEE/USP) announces to all interested parties that, as decided by the Deliberative Council in an ordinary session held on 16/08/2024, the of 60 (sixty) days, starting at 8:00 am (Brasília time) on 02/09/2024 and ending at 5:00 pm (Brasília time) on 31/10/2024, registrations for the public tender for titles and evidence for filling 01 (one) position of Doctor Professor, reference MS-3, in Full Dedication to Teaching and Research Regime (RDIDP), course/position No. 1093703, with salary of BRL 15,498.97 (May/2024), with the Institute of Energy and Environment, in the area of knowledge “ENERGY AND ENVIRONMENT”, pursuant to art. 125, paragraph 1, of the [General Regulations of USP](#), and the respective program that follows:

1. Fundamental concepts about sedimentary basins: origin, classification, stratigraphy, associated volcanisms and relationships with elements and processes in petroleum systems.
2. Basic concepts of minerals and rocks and the importance of clay minerals for the exploration of conventional hydrocarbons (oil and natural gas), unconventional hydrocarbons (shale oil, shale gas) and underground CO₂ storage.
3. The carbon cycle. Variation in the concentration of CO₂ in the Earth's atmosphere over geological time. The greenhouse effect and global warming. The Paris Agreement and the United Nations Sustainable Development Goals (SDGs).
4. Types and importance of critical mineral resources and reserves as raw materials for vehicle electrification and for use in the renewable energy matrix. Perspective analysis of demand for critical minerals for 2050.
5. The role of CCUS (Carbon Capture, Use and Storage) technologies in the energy transition. Advantages and disadvantages of using CO₂ versus CO₂ geological storage in the current scenario.
6. Types and characteristics of geological CO₂ reservoirs and CO₂ trapping mechanisms in minerals and rocks.
7. Interactions between CO₂, minerals and organic matter in reservoir and sealant rocks. Study methods and laboratory analysis. Influence on CO₂ trapping processes.
8. Evaluation of the potential of sedimentary basins for CO₂ geological storage on different scales. Main geological, geochemical and petrophysical criteria/indicators for selecting the best sites.
9. Preparation of predictive maps: methods and utilizations.

10. The importance and use of geophysical well logging in the petrophysical characterization of CO₂ geological reservoirs.

11. Preparation of 3D geological models of CO₂ reservoirs. Types and geological and geophysical tools used. Calculation of estimated CO₂ storage capacity in different types of geological reservoirs.

12. Techniques for injecting CO₂ into reservoir rocks and factors controlling reservoir injectivity.

13. Factors conditioning the risk of CO₂ leakage during and after its injection into the geological reservoir. Monitoring techniques and preventive procedures.

14. Characterization of a CO₂ Geological Storage Complex and the main possible environmental impacts.

15. Evaluation of Brazil's potential for geological CO₂ storage.

16. Factors conditioning the economic viability of CO₂ geological storage projects.

The competition will be governed by constitutional principles, notably that of impersonality, as well as the provisions of the [Statute](#) and [General Rules of the University of São Paulo](#) and the [Rules of the USP Institute of Energy and Environment \(IEE/USP\)](#).

Further information, as well as the relevant rules for the competition, are available to interested parties at the Academic Division of the Institute of Energy and Environment of the University of São Paulo, at Avenida Prof. Luciano Gualberto, 1289, Building F, Room F14, phones 55-11-3091-2505 and 55-11-3091-2524, email address divisaoacademica@iee.usp.br, or on our [website \(https://www.iee.usp.br/?pagina=concursos-publicos\)](https://www.iee.usp.br/?pagina=concursos-publicos).