INSTITUTE OF GEOSCIENCES, UNIVERSITY OF SÃO PAULO (IGc-USP)
Official Public IGc-USP Notice Nº 02/2024
Date: March 15, 2024

Applications are now open for the Selection Process for a Doctor Assistant Professor Position at the Department of Sedimentary and Environmental Geology of the Institute of Geosciences of the University of São Paulo.

The Directorate of the Institute of Geosciences of the University of São Paulo (IGc-USP) hereby informs all interested persons that, per the decision reached at the Regular Meeting of the Congregation held on March 3, 2024, applications are open for 90 (ninety) days, beginning at 8:00 am (Brasília time, BRT) on March 21, 2024 and ending at 5:00 pm (Brasília time, BRT) on June 18, 2024, for the selection process of titles and examinations to fill one (1) position of Ph.D. Professor, in Full-Time Dedication to Teaching and Research (RDIDP in the Portuguese acronym), with a salary of R$ 14,761.02 (fourteen thousand thousand, seven hundred and sixty-one reais and two cents) within the subject area of **Geotechnics**, under the terms of article 25, § 1 of the General Statute of USP and the following programmatic themes:

GSA0419 – ENGINEERING GEOLOGY: 1. Engineering Geology: concepts and methods. 2. Engineering properties of rocks and unconsolidated materials. 3. Soil characterization and classification. 4. Characterization and classification of rock masses: main methods and their application. 5. Stability of natural slopes and excavations in soils and rocks: processes of gravitational movement in soils, kinematic analysis of rock masses, treatment of masses. 6. Geological-geotechnical investigations: sampling, surveying, geophysics, field tests. 7. Geology applied to civil engineering works: dams, tunnels, linear works, foundations. 8. Concepts and methods of mapping and geotechnical cartography.

GSA0312 – HYDROGEOLOGY AND WATER RESOURCES: 1. Basic concepts in hydrogeology: hydraulic properties of soils, sediments and rocks; types and classification of aquifers. 2. Movement of underground water and Darcy's Law: energies involved in the water movement; underground flow concept; type of permeabilities and porosities; water in the unsaturated zone. 3. Hydrogeological cartography: regional and local flow systems; surface water body-aquifer interaction; reloading and unloading zones; anthropogenic and natural interferences in the water flow in aquifers. 4. Design, construction, maintenance of deep tubular wells and quantity and quality monitoring wells: phases of underground collection implementation, well drilling methods, sanitary care and well contamination. 5. Aquifer tests and hydraulic characterization of abstraction works: techniques for estimating the hydraulic characteristics of wells and aquifers, principles of hydraulic drawdown, interference between abstractions; establishment of optimal flow in wells. 6. Quantity management and exploitation of aquifers: estimates of aquifer recharge; base flow; hydrological balance of basins; saline intrusion; monitoring aquifer exploration, intensive exploration and sustainable flow; funding

grant. 7. Geochemistry of groundwater: physical-chemical characteristics of water, water-rock relationship, potability standard, sample collection and analysis methods. 8. Transport and behavior of contaminants in the subsurface: sources of contamination, phenomena that control the behavior and transport of chemical substances in miscible and non-miscible phases in soils and groundwater. 9. Quality management of groundwater resources: vulnerability of aquifers to contamination, registration of pollutant sources, human and environmental risks, soil and aquifer remediation, monitoring of water and soil quality, groundwater protection strategies and resource management underground water.

GSA5961 – Unsaturated Soil Mechanics: Introduction – Objective, water balance, applications, basic concepts. Climatic Effects on Geotechnical Works. Suction Measurement – Fundamental concepts. Moisture content measurement. Suction Measurement Techniques. Axis Translation Technique. Liquid retention capacity - Retention curve. Empirical representation of the retention curve. Permeability function. Shear strength of unsaturated soils – Concepts, tests and models. Behavior of collapsible and expansive soils and practical applications.

GSA5910 – Advanced Hydrogeology: 01. Groundwater in the hydrogeological cycle: importance, occurrence mode and interaction with the aquifer-soil-plant-atmosphere system. Concepts of water balance in the soil and in river basins. 02. Water in equilibrium: thermodynamic bases of the total water potential in the aquifer system. 03. Water in motion: physical properties of aquifers and the flow of fluids in a saturated environment; Darcy's law and limitations; equipotential lines in heterogeneous and anisotropic media. 04. General equation of flow in saturated porous media, simplifications and construction of numerical models. Concepts of computational numerical modeling. 05. Unsaturated zone: concepts of wettability and contact angle; capillarity and capillary pressure; pore-scale behavior of multiphase flow (water and air and/or other immiscible fluid); hair bangs; soil characteristic curves (capillary pressure versus depth, saturation versus depth); permeability and relative permeability; relative permeability curves; macroscopic behavior of fluids in the unsaturated zone. 06. Regional hydrogeology: underground water flow networks and tubes; hydrogeological cartography and conceptual models of aquifer circulation, surface and groundwater interaction. 07. Pumping tests and transient systems in hydrogeology; concepts of storage in free and confined aquifers, maximum and staged flow tests in free and confined aquifers; concept of sustainability and fossil aquifers.

The selection process will be governed by constitutional principles, notably that of impersonality, as well as the provisions of the Statute and the General Rules of the University of São Paulo and the Rules of the Institute of Geosciences of the University of São Paulo, and the determinations below:

1. Candidates are required to apply online exclusively through the link https://uspdigital.usp.br/gr/admissao within the period indicated above. The candidate must fill in the requested personal data and attach the following documents:

I – detailed Memorial and proof of the published papers, the relevant activities carried out related to the selection process and other information that allows the evaluation of merits, in digital format;
II – proof that the candidate holds a Doctor's degree, granted or acknowledged by USP, or nationally acknowledged;
III – proof of discharge from military service for male candidates;
IV – voter registration card, electoral discharge certificate or detailed certificate issued by the Electoral Justice less than 30 days before the beginning of the enrollment period.
V – Official identity document.

2. The Congregation of the IGc-USP will evaluate applications in their formal characteristics and publish the final decision in an official notice.

Single Paragraph – The selection process will take place after the application is accepted, within a period of 30 (thirty) to 120 (one hundred and twenty) days, from the date of publication in the Official State Gazette of the approval of applications, in accordance with Article 134, single paragraph, of the General Statute of USP.

3. The selection process will be carried out according to objective criteria, in two stages, through the attribution of scores in exams, divided as follows:
- 1st stage (eliminatory) – written exam (weight 2)
- 2nd stage:
– I) Evaluation of the Memorial with public proof of argumentation (weight 4)
- II) Didactic exam (weight 4)

§ 1 - The call for applicants to take the exams will be published in the Official State Gazette.
§ 2 - Candidates who present themselves after the established time will not be able to take the exams.
§ 3 - In the evaluation of the tests by the judging committee, the external purpose for creating the vacancy (granting the teaching position) for which this competition is intended, available in the annex to this notice, will be considered.

I – First stage: WRITTEN EXAM – Eliminatory Character
The written exam will deal with matters of general and doctrinal order and will be carried out in accordance with the provisions of art. 139, and its single paragraph, of the General Regulations of USP.
Candidates who obtain a minimum score of seven from the majority of the members of the judging committee will be considered qualified for the 2nd stage;
Only candidates approved in the first stage will participate in the second stage.

.

II - Second stage: PUBLIC ARGUMENTATION EXAM AND EVALUATION OF THE MEMORIAL AND DIDACTIC EXAM

JUDGMENT OF THE MEMORIAL

The judgment of the Memorial, expressed by a global grade, including judgment and evaluation, shall reflect the merits of the candidate.

During the analysis of the Memorial, the commission shall appreciate:

I - scientific, literary, philosophical, or artistic production;

II - university didactic activity;

III - activities related to the provision of services to the community;

IV - professional or other activities, when applicable;

V - diplomas and other university dignitaries.

DIDACTIC EXAM

The didactic exam will be public, with a minimum duration of forty and a maximum of sixty minutes, and will deal with the program of the aforementioned area of knowledge, under the terms of article 137 of the General Regulations of USP.

JUDGMENT OF THE 2nd STAGE

At the end of the assessment of the exams, each candidate will receive a final score from each examiner, which will be the weighted average of the grades awarded by her/him in both phases.

The exam scores may vary from zero to ten, with an approximation to the first decimal place.

The result of the selection process will be proclaimed by the judging commission immediately after its conclusion, in a public session.

Candidates who obtain a minimum final grade of seven from the majority of examiners will be considered qualified.

The nomination of candidates will be made by an examiner, according to the grades given by him/her.

The candidate who obtains the highest number of nominations from the judging committee will be proposed for appointment.

The tenure of the nominated candidate will be subject to approval in a medical examination carried out by the Department of Medical Expertise of the State – DPME, according to Article 47, VI, of Law No. 10,261/68.

The selection process will be valid immediately, and only the candidate nominated for the post in the selection process will be proposed for appointment.

The candidate will be called to assume the position by an official publication in the Official Gazette of the State (Diário Oficial do Estado).

4. Further information, as well as the rules relevant to the selection process, are available to those interested in the Academic Technical Assistance of the Institute of Geosciences of the

University of São Paulo, at Rua do Lago, 562 - sala 306 - Butantã, São Paulo – SP, email: atacigc@usp.br.

ANNEX – JUSTIFICATION FOR GRANTING OF THE TEACHER POSITION

General Objective of the Assistant Professor Hiring

The Assistant Professor hiring aims to develop the Geotechnics area at the frontier of knowledge (research, teaching and extension) and the teaching of subjects on Geotechnics at undergraduate (1) and postgraduate levels (2), in addition to the creation of electives disciplines (5) for the Geology and Engineering courses, especially Mining and Petroleum Engineering, on (i) Soil Geology, (ii) Rock Geology, (iii) Applied Fluid Mechanics, (iv) Monitoring of Geotechnical Works, and (v) Applied Geotechnics. This development area aligns with the department's long-term objectives and goals, which foresee skills development in student training and scientific research based on concepts in solving problems demanded by modern society.

Individualized Plan

Teaching – Goals

In the undergraduate course, the assistant professor will teach classes on Engineering Geology (GSA0419), Introduction to Geostatistics (GSA0602), and Introduction to Geology (0440208). He will also propose interunit electives courses (two short-term and three medium-term) in soil Geology, Rock Geology, Applied Fluid Mechanics, Monitoring of Geotechnical Works, and Applied Geotechnics.

In postgraduate studies, the assistant professor will be involved in the subjects of Mechanics of Unsaturated Soils (GSA5961) and Advanced Hydrogeology (GSA5910) and should develop courses on applied subjects, including Monitoring of Geotechnical Works and Mechanics of Soils and Rocks.

Research and Innovation – Goals

In Research and Innovation, the assistant professor will work in the short term on the department's research lines, such as assessment of risk areas, stability of containment structures, effectiveness and stability of urban solid waste landfills, mining and waste disposal, including more advanced technologies, safe and sustainable, and hydrogeology studies in different types of engineering works (tunnels, dams, slope stability), among others.

In the medium term, he should develop research on the mechanical and hydraulic behavior of porous materials, natural or artificial, including maintenance projects, alterations, and the implementation of infrastructure for society and collaborate in ongoing projects about 'Assessment of Water Retention in Filtered Tailings through Instrumented Columns'.

Culture and Extension – Goals

In the short and medium term, the assistant professor must contribute to disseminating knowledge through courses, lectures, interviews, and articles in different media aimed at the

lay public, university students, and the technical environment. Geotechnics plays a vital role in society, reducing natural risks related to infrastructure works and urbanization. Some activities can be developed in the extension curriculum, such as relationship issues with society through support and dissemination programs on geological risks in urbanized areas and land use and occupation.

Expected Impact of Hiring

Human resources training in Geotechnics at the undergraduate level is expected shortly. In the medium term, there will be a substantial impact on postgraduate studies and scientific and applied research. Moreover, in the medium term, professionals are expected to be trained to use tools to monitor and recommend actions to prevent or mitigate potential risks associated with landslides, sudden floods, and flooding intensified by extreme events. This training will help address complex problems with significant social and environmental implications, such as dam safety, the effectiveness of municipal solid waste landfills, water resources management, and forensic investigation. These efforts are consistent with a shift in the focus of science, technology, and innovation policy (CTI) towards mission-oriented innovation policies (MOIP).