Field	Description
Faculty	**Mathematics and Computer Science**
Department	**Mathematics**
Position in the job title list	56
Role	Assistant - indefinite period
Academic disciplines in curricula	- Numerical Analysis (in English) - Probability and Statistics (in English) - Numerical Calculus (in English)
Scientific area	Mathematics
Job description	The academic position of assistant involves: • teaching activities; • scientific research; • administrative activities; • performing specific tasks for the academic community. *Necessary language skills*: Candidates must demonstrate proficiency in English, either through documents submitted to the file (level C1 or documents attesting studies or research internships accumulated for at least 9 months abroad, in educational or research institutions where the communication was made in English) or by taking the oral test in English before the competition committee.
Related duties	a) *Teaching activities*: lectures, seminars, labs, projects, office hours, quizzes, exams, preparation of teaching material for academic disciplines included in the curricula; supervising diploma theses; supervising students in attending research groups and student competitions. b) *Scientific research activities*: participation in at least one research seminar organized by the faculty; at least one scientific event once every 3 years, with a scientific contribution sustained / published in the volume of the event; participation in competitions to obtain research grants; publication of at least one paper per year in journals / proceedings indexed in Clarivate Analytics (Web of Science); publication of at least one textbook or monograph, over a 5-year period; other research activities according to the job description. c) *Administrative tasks*: performing administrative duties related to the position, involvement in administrative activities at the department / faculty / university level. d) *Service for the academic community*: participation in the activities organized by the department, faculty and university; cooperation with the economic environment, promoting admission to BA.
Date and time of the lecture	July 8th 2021, starting at 4.30 p.m.
Place of the contest	*Mathematica* building, Ploiesti street 23-25, Cluj-Napoca, Room "*pi*".

Stages of the contest, date, time and place	The contest consists of the following tests: **1**. evaluation of the candidate's file; **2**. taking a written test; **3**. taking an oral test (in English). The tests are held on July 8th 2021, starting at 3 p.m., at the *Mathematica* Building, Ploiesti street 23-25, Cluj-Napoca, Room "*pi*". In the evaluation of the individual file, both the scientific criterion (with the weight of 30%) and the didactic one (with the weight of 70%) will be taken into account. The individual file, the oral test and the written test count in equal proportions to the final mark awarded in the individual assessment report prepared by each member of the competition committee. **Written test**: July 8th 2021, 3 p.m., *Mathematica* building, Ploiesti street 23-25, Cluj-Napoca, Room "*pi*". **Oral test:** July 8th 2021, starting at 4:30 p.m., *Mathematica* building, Ploiesti street 23-25, Cluj-Napoca, Room "*pi*". The oral test consists of the presentation of a laboratory project from the disciplines of the position, in English. The competition committee establishes the title based on the competition theme and bibliography and announces it to the candidate / candidates 48 hours before these exams by e-mail and by posting them on the faculty website, stating the date and time of posting, signed by the chairman of the contest committee. Candidates will take the oral test in alphabetical order. The test must also include a questions and answers session from the committee and / or the public.
The subjects and bibliography of the competition tests	**Test 1 - Written test.** Topic: *Probability and statistics* 1. Events, field of events, classical and axiomatic definition of probability. 2. Conditional probability, independent events, random variables and random vectors, classical probabilistic models. 3. Cumulative distribution function, probability density function, operations with random variables; common distributions. 4. Numerical characteristics of random variables; convergence (in probability, almost surely, strongly, in distribution) of sequences of random variables; laws of large numbers; limit theorems (central limit theorems, Moivre-Laplace theorems). 5. Descriptive statistics; estimation theory (unbiased, consistent, efficient, minimum-variance estimators). 6. Method of moments; method of maximum likelihood. 7. Confidence intervals (for the mean, the variance, difference of means and ratio of variances). 8. Hypothesis testing; tests for the mean, the variance, for comparing means and comparing variances; type I and type II errors. ***References*** [1] H. Lisei, S. Micula, A. Soos, *Probability Theory through Problems*

	and Applications, Cluj University Press, 2006. [2] F.M. Dekking, C. Kraaikamp, H.P. Lopuhaä, L.E. Meester, *A Modern Introduction to Probability and Statistics: Understanding Why and How*, Springer, 2005. [3] S. Micula, *Probability and Statistics for Computational Sciences*, Cluj University Press, 2009. **Test 2 - Oral test**. Topic: *Numerical Analysis* and *Numerical Calculus* 1. The use of Matlab or Octave software (candidate's choice). 2. Linear systems: direct methods. 3. Linear systems: iterative methods. 4. Method of least squares. Orthogonal polynomials. 5. Polynomial (Lagrange, Hermite, Birkhoff and spline) interpolation. 6. Numerical integration formulas (Newton-Cotes and repeated quadrature formulas). Romberg's algorithm. 7. Nonlinear equations and systems of equations: Newton's, successive approximation, secant and bisection methods. ***References*** [1] T. Cătinaş, I. Chiorean, R. Trîmbiţaş, *Analiză numerică*, Presa Universitară Clujeană, 2011. [2] W. Gander, M.J. Gander, F. Kwok, *Scientific Computing*, Springer Internat. Publishing, 2014. [3] R. Trîmbiţaş, *Numerical Analysis in MATLAB*, Presa Universitară Clujeană, 2011.
Job application contest procedures	On July 6th, 2021, at 3 p.m. by e-mail and by posting on the faculty website, the competition committee announces to the candidates the topic of a laboratory teaching activity in English, which will take place on July 8th, 2021. The theme will be from the subject of the disciplines included in the didactic norm of the position. On July 8th, 2021, at 3 p.m., the candidates present themselves for the written test. The oral test takes place from 4.30 p.m. The individual file, the oral test and the written test count in equal proportions to the final mark awarded in the individual assessment report prepared by each member of the competition committee. The chairman of the competition committee draws up a report on the competition, based on the assessment reports drafted by each member of the competition committee and in compliance with the hierarchy of candidates decided by the committee. **The report nominates the candidate who has achieved the best results and makes the proposal to fill the position.**

Director de departament,

Prof. Dr. Agratini Octavian