ANNOUNCEMENT CPPGMA/IMECC, No. 02/2023

SELECTION PROCESS FOR FIRST SEMESTER 2024
MASTER'S DEGREE AND Ph.D. PROGRAM IN APPLIED MATHEMATICS OF THE INSTITUTE OF MATHEMATICS, STATISTICS AND SCIENTIFIC COMPUTING (IMECC) OF THE UNIVERSIDADE ESTADUAL DE CAMPINAS (UNICAMP)

The Committee of the Graduate Program in Applied Mathematics (**CPPGMA**) of the Institute of Mathematics, Statistics and Scientific Computing (**IMECC**) of the Universidade Estadual de Campinas (UNICAMP), in the use of its legal attributions, makes public and normatizes the selection process to admit Master's and Ph.D. students in Applied Mathematics.

The Master and Ph.D. Graduate Programs in Applied Mathematics at IMECC/UNICAMP are ranked as Academic Excellence Programs (Proex) evaluated by the Coordination for the Improvement of Higher Education Personnel (CAPES). We are currently grade 6 (six) of excellence degree. To preserve the CAPES/Proex excellence, it is necessary to comply with distinctive blend of academic achievements, as stated at CAPES Ordinance No. 034, of May 30, 2006 https://www.gov.br/capes/pt-br/centrais-de-conteudo/01122017-portaria-34-2006-atualizada-versao-para-consulta-historica-pdf

The version in Portuguese of this announcement was approved by the **CPPGMA** in a meeting on October 5th, 2023, and it was subsequently approved by the IMECC Graduate Committee in a meeting on October 17th, 2023.

1. DEADLINES AND APPLICATION REQUIREMENTS

1.1. Applications for Master and Ph.D. Graduate Programs in Applied Mathematics at IMECC/UNICAMP for admission in the first semester of 2024 will be accepted during the period from October 17th, 2023 to November 20, 2023. Registration implies that the candidate accepts and submits unrestrictedly to this notice in accordance with the rules, requirements and compliance with the PPGMA/IMECC regulations and available at the link: https://www.ime.unicamp.br/pos-graduacao/matematica-aplicada/regulamento. All documentation must be sent in PDF format and in a clear and legible for reading and analysis and conform with the requirements, rules and criteria of this selection process.

1.2. Applications for the **Master's degree** are open to candidates that have concluded their undergraduate courses in applied mathematics, mathematics or related fields.

1.2.1. Undergraduate students about to conclude their courses in applied mathematics, mathematics, or related areas may apply, as long as they prove the real possibility of completing the degree by the registration date for students entering the first semester of 2024, according to the calendar of the Unicamp Academic Directory https://www.dac.unicamp.br/portal/. Students who do not meet this requirement will no longer be considered for admission in the 1st semester of 2024, a situation that cannot be reversed.

1.2.1.1. The following documents will be accepted in accordance with items 1.2 e 1.2.1:

a) Undergraduate diploma and transcript demonstrating complete completion of the

aforementioned undergraduate course issued by the higher institution of origin,

or

b) In the absence of an undergraduate diploma for the reason of a minor bureaucratic task, an official Certificate of Graduation Completion (for example, in the form of a letter or a Declaration) along with proper academic transcripts must be presented, demonstrating the fully completion of the aforementioned undergraduate course, issued by the institution superior of origin, until at most the last working day of February 2024.

1.3. Applications for the **Ph.D. program** are open to candidates who possess a Master's degree in applied mathematics or related fields.

1.3.1. Students completing a master's degree will be able to enroll in the selection process to fill vacancies in the Doctoral courses in Applied Mathematics at IMECC-UNICAMP, as long as they present an official declaration from their supervisor, endorsed by the Coordination of the origin Postgraduate Program from their Higher Institution (**according to the model declaration in Annex I of this Notice**), and which also states the expected date of the defense of the corresponding master's thesis, but under the following possible situations:

a) students completing a master's degree, accepted for the Doctorate course at PPGMA, and who will not compete for an institutional scholarship, must defend their dissertations at the beginning of March 2024 and this date cannot be later than two weeks after the beginning of the first semester of 2024, according to the Unicamp Academic Directory calendar link https://www.dac.unicamp.br/portal/.

b) students completing a master's degree, accepted for the Doctorate course at PPGMA, **and still considered on the classification list to receive an institutional scholarship**, in view of their performance in the admission exam, must defend their respective master's theses until at most the last business day of February 2024, presenting all expected documentation. Students classified in **item b)** and who do not meet this requirement will no longer be considered in the classification to receive an institutional scholarship and will be removed from the aforementioned list, a situation that can not be reversed, however they may be considered for entry into the PPGMA under the same criteria and terms as in item 1.3.1 letter a).

1.3.2. In exceptional cases, the CPPGMA may accept candidates who have an undergraduate degree in applied mathematics, mathematics, or related areas, even without a master's degree, for application in the Doctorate Graduate Program in Applied Mathematics. Such students will be designated as direct doctorate candidates and their registration and evaluation will follow the current selection process, in accordance with items 3.1 to 3.5.5. Thus, after evaluating the merits of the documents presented for such exceptional cases, the CPPGMA may decide, for each possible application, to reject the request for a doctorate or, if applicable, considering the academic merits, treat the said application to the level of Master's degree, following the same criteria and rules as in item 1.2.1, with respect to the items 3.3.1, 3.3.2 and 3.3.3, in addition to items 3.4.1 to 3.4.10. In any case, the candidate will be formally informed when the final result of the aforementioned selection process is announced.

2. APPLICATION

2.1. All candidates for the Master and Ph.D. courses in Applied Mathematics must fill in the

application form, available online at the university academic board (*Diretoria Acadêmica* – DAC - www.dac.unicamp.br - Estude na Unicamp - Pós-Graduação), by means of the academic management system SIGA (*Sistema de Gestão Acadêmica*). This system is available at DAC's website https://sistemas.dac.unicamp.br/siga/ingresso/candidato/efetuar_login_candidato.xhtml?Code=1497038006922. The application form must be completely filled in (the **registration situation** needs to stick with the status "**COMPLETA**"). Incomplete or late applications will automatically be disregarded. Note: the **delivery status of the documents** will remain with the status "**PENDENTE**" given the fact that the documents must be sent by using the link indicated in item 2.2.

2.1.1. Instructions for filling the Registration Form, access the link: https://www.ime.unicamp.br/administracao/areas/posgrad/procedimento/instrucoes-inscricoes-programas-pos-graduacao-no-sistema.

2.2 In addition to the online form at DAC, all the candidates must provide, at the website of the Program (http://www.ime.unicamp.br/posgrad/inscricao), the documents listed below. These documents must be digitalized and sent in PDF format, each document in a single file, with a maximum size of 5MB. Required documents include:

2.2.1. Application form.

2.2.2. Official transcript of the undergraduate records. The Ph.D. candidates must also provide the official transcript of the Master records, except for those who are applying for the direct Ph.D. For foreign educational institutions with grade systems different from the Brazilian grade systems, please specify the grades criteria.

2.2.3. Certificate of university degrees (undergraduate and/or graduate) or an official declaration specifying the probable date of degree conferral **(see model declaration in Annex I of this Announcement)**.

2.2.4. Updated *curriculum vitae (CV).* Students coming from undergraduate or Master's courses in Brazil should send their updated Curriculum Lattes. Foreign students must provide a detailed CV in Portuguese, Spanish or English. CV's in other languages will be disregarded. The activity described in the CV that does not appear in official transcript records and can be used in the selection (items 3.4.4, 3.4.6, 3.4.7, 3.4.8, 3.4.9, 3.5.3, 3.5.4 and 3.5.5 below) must be proven with an appropriate document.

2.3. In addition to the above documents, candidates for the Master Course must provide at least two; candidates for the Ph.D. course at least three recommendation letters. These letters should be written by professors, researchers or other professionals, and sent directly by them. For that purpose, the candidates must provide the recommenders' e-mail addresses in the application at the link http://www.ime.unicamp.br/posgrad/inscricao/ and click to confirm an invitation e-mail sent by the system to the recommenders, such that the latter can fill in the online recommendation letter. Letters sent by the candidates themselves will be disregarded.

3. SELECTION

3.1. There will be 15 positions for the Master program and 20 positions for the Ph.D program for admission in the first semester of 2024, without the need to fill all of them. This filling will depend on the qualified demand. The positions cover all areas of the Applied Mathematics Program.

3.2. The candidates for the Master and Ph.D. programs in Mathematics will be selected by the CPPGMA, through the analysis of the documentation sent by the candidate and of the recommendation letters.

3.3. The candidates will be selected exclusively by their academic merits and the selection process will be based on the following:

3.3.1. Analysis of official transcript records. *(40%)*
3.3.2. Analysis of curriculum vitae (CV) *(40%)*, considering the following items
  (a) Score at the PPGMA/IMECC entrance exam for admission to the 1st Semester of 2024;
  (b) Academic official transcript records presented in the Registration Form;
  (c) Extra Muros Exam score http://www.provaextramuros.org.br/index.php/pt and/or GRE score - Graduate Record Examination in the area of Mathematics (https://www.ets.org/gre/test-takers/subject-tests/about/content-structure.html)", such that for both cases the exams were carried out no earlier than 12 (twelve) months before the date of registration, and only if such scores, with the corresponding supporting documents, are available and are sent together with the other data in the candidate's Registration Form, within the period of registration of this selection process for admission for the 1st semester of 2024, in accordance with item 1.1.
3.3.3. Analysis of the recommendation letters. *(20%)*
3.4. For Master's candidates, in the analysis of items 3.3.1, 3.3.2 and 3.3.3, the following points will be considered:
3.4.1. The quantity, quality and level of difficulty of the subjects studied in the undergraduate programs by the candidate, as well as the grades obtained;
3.4.2. Time taken to complete the Graduation;
3.4.3. The institution where the candidate studies (or studied): if it is recommended by CAPES and its ranking; in the case of foreign candidates: the level of academic recognition of the university of origin;
3.4.4. Courses already taken at Master's level;
3.4.5. Number of failed courses;
3.4.6. Performance in summer courses in recognized institutions in Brazil and/or from abroad, especially in courses that have already been or are offered in the Summer Program in Applied Mathematics and/or Mathematics at IMECC/UNICAMP, as well as any other regular courses may be considered in the analysis at the discretion of CPPGMA. In any case, it is the candidate's full responsibility to present the appropriate supporting documents and provide such detailed information in writing in the appropriate fields available on the registration form.
3.4.7. Facts that demonstrate the candidate's ability to develop research in mathematics, along the lines of research of the faculty of the PPGMA; in the same line of the above item 3.4.6. it is the candidate's full responsibility to present the appropriate supporting documents and provide such detailed information in writing in the appropriate fields available on the registration form.
3.4.8. Undergraduate research studies with scholarships;
3.4.9. Medals at the Brazilian Mathematical Olympiad (OBM), or at the Brazilian Mathematical Olympiad of the Public Schools (OBMEP), or at the national mathematics overseas competitions, or at the International Mathematical Olympiad (IMO);
3.4.10. Quality, strengthen and depth of the recommendation letters and if they were issued by qualified specialists, with good scientific production in mathematics or related fields. It is strongly recommended that the students in this selection process consider this

subject matter highly relevant and also emphasize this need for strength in writing qualified recommendation letters to the recommending professors along with the signature.

3.5. For the Ph.D. candidates, in the analysis of items 3.3.1, 3.3.2 and 3.3.3, in addition to items 3.4.1 to 3.4.10, the following points will also be considered:

3.5.1. The quantity, quality and level of difficulty of the courses taken in the Master's degree by the candidate, as well as the obtained grades;

3.5.2. Time taken to complete the Master's degree;

3.5.3. Courses already taken at the Ph.D. level;

3.5.4. Attending scientific events with presentation of work in the area of Applied Mathematics, Mathematics or related areas;

3.5.5. Published and/or accepted research articles, Conference Papers and Preprints, in the area of applied mathematics, mathematics and related areas.

4. ADMISSION AND CLASSIFICATION EXAM

4.1. An Admission and Classification Exam will be offered, mandatory and classificatory to those candidates applying for an institutional scholarship. It is mandatory that all candidates take the Admission and Classification Exam, which is one of the options for the performance evaluation analysis, as established in the item 3 of this selection process, in particular under the terms of item 3.3.2 letter a).

4.1.1. For those candidates who apply for an institutional scholarship, and are approved by considering i) the merit analysis, in view of all the sub-items listed in item 3. SELECTION, and ii) the performance in the mandatory Entrance Exam of the item 4.1, they will also be classified with the score of the mandatory Admission Exam for the purpose of granting a CAPES and CNPq institutional scholarship in an ordered list from highest to lowest priority, also observing all sub-items of the item 1.2 for the eventual implementation, or not, of said scholarship.

4.1.1.1. Regarding the duration of the CAPES and CNPq institutional scholarship, it is worth noting that according to the already well-established rules of the aforementioned funding agencies, the scholarship is valid from the month of Graduate registration in the Unicamp system and it is valid for 12 months, and can be renewed annually. It should also be clarified that, by virtue of the PPGMA regulations and the CAPES and CNPq institutional rules, CPPGMA has the prerogative to renew, or not, the scholarship granted, whether at the Master's level or at the Doctorate level, here considering the performance of the student and in accordance with their academic production, according to UNICAMP's general regulations. In any case, in the master's degree, the maximum duration is 24 months and in the doctorate it is 48 months, with this period being counted continuously or in the sum of the months by temporary concession, and there being no extension beyond these limits, except in cases of maternity leave, as scheduled.

4.1.2. The PPGMA will make an effort to provide the application of the admission entrance exam in person mode at the following centers listed below, but only if there are applicants from locations close to them: UFAC, UFAL, Unifap, UFAM, UEA, UFBA, UFRB, UFCE, UnB, UFES, IFES, UFG, UFCAT, UFMA, IFMA, UFMT, UFMS, UFGD, UFMG, UFJF, UFLA, UFMT, UFSJ, UFU, UFV, Unifei, Cefet-MG, UFPA, UNIFESSPA, UFPB, UFCG, UFPR, UTFPR, UEM, UEL, Unioeste, UFPE, URFPE, UNIVASF, UFAPE, UFPI, IFPI, UFRJ, UFF, UFRPE, UFRN, UFRGS, UFSM, UNIPAMPA, UFSC, UNESP, UFS, UNSA/Peru, UPTC/Colombia.

4.2. The date of Scholarship Exam is December 4th, 2023, in a place and time to be announced on the IMECC graduate page, at https://www.ime.unicamp.br/pos-graduacao/matematica-aplicada/admissao. Instructions for the Scholarship Exam will be sent to the electronic address provided in SIGA.

4.3. The Admission and Classification Exam will cover the contents of the disciplines "**Differential and Integral Calculus, and Linear Algebra: theoretical aspects and applications**", according to the content available at https://www.ime.unicamp.br/pos-graduacao/matematica-aplicada/admissao and it is included here for guidance and completeness of information:

Contents of the mandatory exam for Masters and Doctorate institutional scholarships:

* Linear algebra: Resolution of linear systems, Gaussian elimination; vector spaces and subspaces, linear dependence and independence, Basis and dimension, coordinates, Range and Null Space, Rank-Nullity Theorem, Linear transformations, inner product, Orthogonal Projections and Orthonormal Bases, adjoint of a linear transformation; invariant subspaces, similarity, eigenvalues and eigenvectors; quadratic forms; self-adjoint operators. Normal and self-adjoint operators. Spectral Theorem for normal operators.

Bibliography list:
-- E. L. Lima, Álgebra Linear, IMPA, 2020, ou qualquer edição a partir de 1996.
-- L. Boldrini, S.I.R. Costa, V.L. Figueiredo, H.G. Wetzler. Álgebra Linear. 3ª ed. revista e ampliada, Harbra Ltda, ou qualquer edição a partir de 1980.
-- B. Noble, Álgebra Linear Aplicada, Guanabara, Rio de Janeiro, 1984.
-- K. Hoffmann and R. Kunze, Linear Algebra, 2nd., Ed., Prentice Hall.

* Differential and Integral Calculus: Real numbers, real functions, limit and continuity, derivative and integral; functions of several variables, limit and continuity, integration and differentiability, Multiple Integrals and applications of multiple integrals, curves in R2 and R3, vector functions, integration of vector functions and line Integrals, vector analysis, surface integrals, integral theorems, Gauss and Stokes theorems; sequences, infinite series; ordinary linear equations of first and second order. initial value problem involving ordinary differential equations.

Bibliography list:
-- H. L. Guidorizzi, Um Curso de Cálculo - Volumes 1, 2, 3 e 4, quaisquer edições a partir de 1987.
-- T. M Apostol, Calculus, Volumes 1 e 2. Second Edition, 1991.
-- W. E. Boyce e R. C. DiPrima, Equações Diferenciais Elementares e Problemas de Contorno, 9ª edição. LTC – Livros Técnicos e Científicos, Rio de Janeiro, 2010.
-- M. Spivak, Calculus 3th or 4th Edition.

4.4. Enrolled Master and Ph.D. students in the PPGMA who are applying for an institutional scholarship CAPES and CNPq and keeping in mind the institutional criteria mentioned in item 4.1.1.1, but have not been awarded yet, may submit to the Scholarship Exam for this purpose.

4.5. The list for awarding CNPq and CAPES institutional scholarships, based on performance in the Admission Exam for the Master's and Doctorate Graduate Courses in Applied Mathematics, for entry in the first semester of 2024, according to the criteria established in this selection process, is valid only in the period related to the first academic semester of 2024, according to the calendar of the Unicamp Academic Board link https://www.dac.unicamp.br/portal/. There will be two lists, one for the Master's degree and one for the Doctorate.

5. RESULTS

5.1. After the analysis of items 3.3.1, 3.3.2 and 3.3.3, each candidate will receive a grade N, varying from 0 to 100, for the Master's and Doctorate Graduate Courses in Applied Mathematics, for entry in the first semester of 2024, given by

$$N = (4 \times N1 + 4 \times N2 + 2 \times N3) / 10,$$

where *N1*, *N2* and *N3* are, respectively, the grades in items 3.3.1, 3.3.2 and 3.3.3.

5.2. The candidates will be classified in one of the following situations:
   a) Accepted with the possibility for awarding CNPq and CAPES institutional scholarships, depending on the result of the Admission and Classification Exam;
   b) Acceptance depending on the performance in the Summer Program (only for Master's candidates);
   c) Accepted without scholarship (do not apply for a scholarship from the program);
   d) Not accepted.

5.2.1. The minimum score for classifying candidates in the groups in item 5.2 will depend on the qualified demand in each situation with respect to the available positions in the Master's and in the Doctorate course, in accordance with the item 3.1.

5.2.2. The candidates in group 5.2. a) will be classified in a priority order, according to their grade of the Admission and Classification Exam, but in accordance with item 1.2. and with item 4.1 of this selection process, to obtain a CNPq and/or CAPES institutional scholarship among those available from PPGMA.

5.2.3. In the case of a draw, a priority is given to the candidate with the best grade in item 3.3.1. If the draw persists, then a priority is given to the candidate with the best grade in item 3.3.2. If the draw persists, a priority preference will be given to the oldest candidate.

5.2.4. The candidates for the Master program, accepted after the Summer Program (recommended by CPPGMA when applicable), will be classified in priority order, according to their grade in the summer course, after the ones in group 4.2. a).

5.3. Candidates who have already been dropped from the PPGMA, for performance or failure in courses and/or the Qualifying Exam, will not be able to apply for scholarships.

5.4. The CPPGMA will prepare a list with the scholarship classification of candidates according to their score in the selection process, but in accordance with item 5.2.2. The list will be published by December 11, 2023 at the IMECC Graduate website at

   https://www.ime.unicamp.br/pos-graduacao/matematica-aplicada/admissao

Moreover, each candidate will receive a message with the result of the selection process in the registered electronic address on system SIGA.

5.5. For the students who were recommended to attend a summer discipline, the result will be announced until February 22th, 2024.

6. LODGING AN APPEAL

6.1. Formal requests of appeal will only be accepted if filled and presented within three (3) business days from the date of announcement of the results. Such appeals must be presented by e-mail, on duly substantiated grounds, to the graduate office of IMECC-UNICAMP, indicating the data of this announcement and selective process, and including a foundation for the request and explaining the reasons for requesting to reexamine the result.

6.2. The results of the appeals will be announced within twenty (20) calendar days from the presentation date, on the graduate-studies page of IMECC, at:

https://www.ime.unicamp.br/pos-graduacao/matematica-aplicada/admissao

7. FINAL DISPOSITIONS

7.1. The application implies that the candidate accepts this announcement without any restriction, which means that the candidates formally declares that they agree with the conditions of this notice and therefore submit themselves unrestrictedly to all items contained therein. In addition, in case of acceptance for the Master's and Doctorate Graduate Courses in Applied Mathematics for entry in the first semester of 2024, enrollment will be carried out, according to the calendar of the Unicamp Academic Directory link https://www.dac.unicamp.br/portal/.

This also implies that candidate accepts and will submit unrestrictedly to the rules, requirements and full compliance with the current PPGMA/IMECC academic regulations and in line with the current general regulations of Unicamp Postgraduate Studies, available at the links:

* General Regulations of Stricto Sensu Postgraduate Programs and Lato Sensu Courses at Unicamp
  https://www.pg.unicamp.br/norma/3862/0

* Regulation of IMECC Postgraduate Programs
  https://www.pg.unicamp.br/norma/3570/0

* Regulations of the Stricto Sensu Postgraduate Program in Applied Mathematics
  https://www.pg.unicamp.br/norma/3794/0

The candidates formally declares that when registering for the PPGMA selection process, the candidate state to be aware of the regulations indicated above and of Ordinance CAPES/PROEX no. 034, of May 30, 2006 https://www.gov.br/capes/pt-br/centrais-de-conteudo/01122017-portaria-34-2006-atualizada-versao-para-consulta-historica-pdf.

7.2. Omitted cases will be submitted by the CPPGMA to the IMECC Graduate-Studies Committee (CPG).

Campinas, October 17th, 2023.

Committee of the Graduate Program in Applied Mathematics (CPPGMA)
Institute of Mathematics, Statistics and Scientific Computing
University of Campinas

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ANNEX I - Model Statement on Probable Master's Defense

<u>Declaration</u>

I declare that (STUDENT´S NAME) is my student of Master and has completed all credits/requirements, with the exception of defense Dissertation for obtaining the Master's degree at the Institute _____ of University _____.
The defense of the Master's dissertation is scheduled for the month//day/year.

(DATE),

_____(SIGNATURE)_____
Advisor