



AUTONOMUS UNIVERSITY OF AGUASCALIENTES
DOCTORATE IN APPLIED SCIENCE AND TECHNOLOGY
PROGRAM¹

I. PROGRAM IDENTIFICATION

Responsible academic center:	Center for Basic Sciences and Center for Engineering Sciences
Responsible academic department:	Computing, Statistics, Mathematics and Physics, Electronic Systems, Information Systems, Automotive Engineering, Biomedical Engineering, Robotics Engineering
Modality:	On-campus
Level:	Doctor's Degree
Program orientation:	Investigation
Program engagement:	Full time
Duration:	4 years, divided into 8 semesters.
Academic credits:	200 (including ten credits of the degree exam)
Type of academic program:	Institutional Program
Approval date by the HCU ² :	2021

II. QUALITY CERTIFICATION

National:	National Postgraduate System (SNP)
Level:	Recent Creation

III. PROGRAM OBJECTIVE

Overall objective

Forms doctors of a high academic level with solid theoretical foundations in the areas of applied sciences and technology in order to generate, transmit, apply and innovate cutting-edge knowledge in the approach, analysis and innovative resolution of current problems in the fields of applied scientific research, as well as the application and technological development; designing and implementing research projects with national and international scope in strategic areas of social welfare, conducting themselves with professional ethics and social responsibility, and always keeping in mind a vision of sustainable development.

Date of actualization: December 2022

¹ (Web version)

² Honorable University Council

Specific objectives

Form doctors:

- That they have knowledge of the state of the art in their areas of scientific and/or technological training, in such a way that they are able to identify the most recent international advances in solving problems of global relevance in their areas of applied research and/or development. technological.
- That they have a broad vision of the existing methodologies in their areas of scientific and/or technological training, as well as to discern the optimal methodology for the analysis and innovative resolution of social problems within the confines of their area of training.
- Capable of writing innovative scientific articles efficiently, which can be published in high-impact indexed international journals within their training areas, reporting in them efficient proposals in solving national or international strategic problems.
- Interested in updating their knowledge, skills and techniques through the efficient search for updated information, reading advances in their areas of scientific and/or technological training, participation in specialized forums for the dissemination of advances, and continuous improvement in the use of technological tools for scientific and technological support.
- Willing to work in interdisciplinary and multidisciplinary research groups, as well as independently, on problems of international relevance within or outside their area of scientific and technological training, always paying attention to quality, relevance, significance, impact, depth, social importance, sustainable development, with social responsibility and professional ethics.
- That they collaborate with national and international funding bodies for applied scientific research and/or technological development, and that have all the elements required to write a properly structured research proposal, with a solidly-based theoretical framework, a scientific methodology, and/or relevant and innovative technology, and optimal experimental design when relevant.
- • That they have the skills required to direct and/or coordinate the development of research theses at least at the master's level.

IV. LINES OF RESEARCH

1. Technology Sciences
2. Computer Sciences
3. Applied Mathematics

V. APPLICANT AND GRADUATE PROFILE

APPLICANT	GRADUATE
<p><i>Knowledge:</i></p> <ol style="list-style-type: none"> 1. Basics of the area corresponding to the Research Line in which the research project that the candidate intends to develop is located (assessed through a knowledge test, certificate of studies and interview). 2. Notions of the scientific method to generate and apply basic knowledge in Information and Communication Technologies (evaluated through Curriculum Vitae and magazine). 	<p>The graduate of the Doctorate in Applied Sciences and Technology will be able to perform as a full professional, highly trained in the fields and scientific tools that comprise their chosen Line of Generation and Application of Knowledge, with a humanistic and innovative perspective; as well as with the following knowledge, skills, attitudes and values that provide a unique identity:</p> <p><i>Knowledge:</i></p> <ol style="list-style-type: none"> 1. In the state of the art of their area of specialization according to their line of research, as well as the areas related to the problem of the doctoral thesis. 2. Of the techniques and their foundation for simulation and optimization with support or development of specialized systems, as well as in theories related to algorithms. 3. From the theoretical bases and experimental methods, developing a broad knowledge of the phenomena of a statistical nature. 4. To master the techniques, methodologies, and tools for the development of theoretical models and technological projects. 5. To master research methodologies as a tool to prepare various types of publications. 6. Knowledge and application of the scientific method. 7. Know databases and search relevant information.

<p><i>Skills</i></p> <ol style="list-style-type: none"> 1. Identify and propose research problems, evaluated through an essay. 2. Abstract problems and propose solutions, evaluated through an essay. 3. Communicate correctly orally and in writing, evaluated through an essay and interview. 4. Apply logic and/or mathematical techniques for the analysis and solution of problems, evaluated by a knowledge test (corresponding to each LGAC). 5. Properly use Information and Communication Technologies, evaluated through an interview and knowledge test. 6. English language proficiency with at least 450 TOEFL points or its equivalent. 7. Writing scientific texts at a basic level, which will be assessed by prior participation in congress or magazine articles during the interview. 8. Organized and efficient administration of time, an aspect evaluated through the interview. 9. Knowing how to work under stressful situations, an aspect evaluated during the interview. 	<p><i>Skills for:</i></p> <ol style="list-style-type: none"> 1. Analytical capacity, achieving a balance between the ability to solve technological problems and the ability to develop basic research, to participate in the generation of frontier knowledge and its application in their area of specialization. 2. Ability to join and function professionally in the academic and business sectors, and in public and private institutions; with optimum performance. 3. To contribute to the enrichment of the sciences in their area of specialization, being able to identify in the needs or problems, the innovative aspects that could form basic or applied research projects. 4. Ability to propose research and/or technological development project and carry out various activities to develop it. 5. Ability to participate and/or lead in multidisciplinary teams focused on research work and development of applications for the creative resolution of problems specific to their discipline. 6. To communicate in written and oral form in a fluent and articulate manner, in Spanish or English, their research results in different academic forums. 7. Skill in writing scientific texts to be published in high-impact media. 8. Ability to apply specialized techniques in the development of systems and the management of scientific analysis tools appropriate to their area of expertise. 9. Ability to carry out an efficient literature search. 10. Maintain updated knowledge in your field of knowledge. 11. Efficiently manage the resources necessary to develop the research project. Including advanced skills for planning and managing your own time.
<p><i>Attitudes</i></p> <ol style="list-style-type: none"> 1. Be self-managing of the knowledge necessary to solve the problem of your doctoral thesis, evaluated through an essay and interview. 2. Develop new skills necessary to solve the research problem of your doctoral thesis, evaluated through an essay and interview. 3. Willingness to work in interdisciplinary teams (interview). 	<p><i>Attitudes</i></p> <ol style="list-style-type: none"> 1. Critically analyze disciplinary phenomena. 2. Demonstrates professional and research ethics. 3. Self-taught. 4. Criticism. 5. Reflexive. 6. Analytics. 7. Proactivity. 8. Teamwork. 9. Leadership. 10. Commitment. 11. Initiative. 12. Creativity.

<p>4. Facing new challenges with a critical attitude, evaluated through an interview and knowledge test. (corresponding to each LGAC).</p>	
<p><i>Values</i></p> <ol style="list-style-type: none"> 1. Ethics, evaluated through an interview. 2. Social responsibility, evaluated through an interview. 3. Discipline, evaluated through an interview. 4. Punctuality, evaluated through an interview. 5. Professionalism, evaluated through the interview and the CV. 	<p><i>Values</i></p> <ol style="list-style-type: none"> 1. Autonomy and social responsibility. 2. Pluralism. 3. Humanism. 4. Quality. 5. Equity and equality. 6. Respect for ideas. 7. Ethics. 8. Social responsibility. 9. Critical thinking 10. Attitude to change 11. Leadership and self-management

VI. ADMISSION AND SELECTION REQUIREMENTS

National applicants

1. Have a minimum average of 8.0 in the studies of the previous level.
2. Professional title related to the postgraduate course.
3. Master's Degree in a discipline related to the Line of Generation and Application of Knowledge (LGAC) that you wish to enter.
4. Pass the EXANI III exam with a minimum score of 1,000 points.
5. Accredited the TOEFL exam with 450 points; however, if you have 400 you will be able to enter the postgraduate course, but you will have to achieve the 450 points established before finishing the first year.
6. Present the *Diagnosis of skills for the Graduate* applied by the Meritorious Autonomous University of Aguascalientes (BUAA).
7. Deliver Curriculum Vitae, according to the requirements established by the Academic Council.
8. Deliver a letter of explanatory reasons with a maximum length of two pages.
9. Submit a preliminary project related to the LGAC. Write in the form of a 5-page essay about the topic chosen by the student and that agrees with the lines of research of the program. (Requires a prior interview with a professor of the basic academic nucleus of the doctorate).
10. Present the personal interview with the Graduate Academic Council. In this interview, the preliminary project will be presented, which must be consistent with one of the LGAC of the doctorate. (Requires a prior interview with a professor or professor member of the Basic Academic Nucleus, this does not ensure admission to the doctorate or the appointment of that professor as tutor).
11. Present all the administrative documentation requested by the Department of School Control of the BUAA.
12. All applicants must fully comply with the process indicated by the university authorities in a timely manner.

Foreign applicants

The admission process is in accordance with the provisions established by the BUAA in the General Teaching Regulations in article 40, clause VI, and must also consider the following:

1. Have a minimum average of 8.0 (or its equivalent) in the studies of the previous level, consistent with the education that the postgraduate course will provide.
2. It is necessary to have the revalidation of the subjects of the previous level by the Ministry of Public Education.
3. Certificate of complete studies of the previous level (photocopy letter size), apostilled or legalized.
4. Have a degree from the previous level related to the doctorate. This must be accredited by presenting an apostilled and certified professional title, validated by the Department of School Control.
5. Professional license to practice in the Mexican Republic or authorization document to practice the profession in the country where the studies were carried out (front and back photocopy letter size), apostilled or legalized.
6. Accreditation of the TOEFL exam with a score of 450; however, you can enter with a score of at least 400 points, but you will need to reach the set 450 points before the end of the first year. In the case of English-speaking foreigners, they must take the DELE level B-2 exam; however, standardized certificates with international validity equivalent to the language may be accepted.
7. Present the *Diagnosis of skills for the Graduate* exam, applied by the BUAA. The design, application and modality is carried out by the Admission Committee proposed by the Academic Council.
8. Deliver Curriculum Vitae, according to the requirements established by the Academic Council.
9. Deliver a letter of explanatory reasons with a maximum length of two pages.
10. Deliver a letter of commitment to dedicate full time to the postgraduate course, to those who are going to apply for a CONACYT scholarship.
11. Present a preliminary project related to the Lines of Generation and Application of Knowledge (LGAC).
12. Meet with the Academic Committee to evaluate qualitative aspects of the admission profile. The modality in which the interview is carried out is determined by the Academic Committee.
13. Present all the administrative documentation requested by the Department of School Control of the BUAA.
14. All applicants must fully comply with the process indicated by the university authorities in a timely manner.

VII. CURRICULAR STRUCTURE AND ORGANIZATION OF THE PROGRAM

Program organization

FORMATION AX	DESCRIPTION OF THE FORMATION AX
Optative	These subjects may be taken inside or outside the institution at a national or international level, in person or online, during the first through fifth semesters. These may be chosen by the student with the support of her tutor, with the approval of the Academic Council. These are courses that delve into postgraduate topics or content, since their objective is to be a space for students to develop and/or master their professional learning according to their line of generation or application of knowledge, which are defined in operating strategies. The electives scheduled by the academic council will last 5 hours (2 HT, 3 HP) per week.
Terminal	They are the set of research seminars that allow the student to develop his thesis with the advice of the tutoring thesis committee. This axis also includes Electives and Complementary Activities.
Complementary activities	They may be carried out between the first and the seventh semester of the doctorate and may be covered by participation in national and international conferences, national or international research stays, publications (book chapters, books, refereed and indexed journals), among others determined by the Academic Council. . The complementary activities are selected based on the needs and requirements of the students, which will depend on their reception work and the Lines of Generation and Application of PhD Knowledge.
Institutional identity subjects and activities	They are online self-managed subjects taught by the BUAA, from a catalog that will be offered permanently, which are a degree requirement, and must prove a minimum of two courses.

Curricular Map

Ejes de formación	SEMESTRE							
	Primero	Segundo	Tercero	Cuarto	Quinto	Sexto	Séptimo	Octavo
Terminal	Seminario de inv. I	Seminario de inv. II	Seminario de inv. III	Seminario de inv. IV	Seminario de inv. V	Seminario de inv. VI	Tesis I	Tesis II
	Optativas: Estas materias podrán tomarse dentro o fuera de la institución a nivel nacional o internacional de manera presencial o en línea.							
	Actividades complementarias: Podrán cubrir las con participaciones en congresos nacionales e internacionales, estancias de investigación nacionales o internacionales, publicaciones (capítulos de libros, libros, revistas arbitradas e indexadas), entre otras que determine el Consejo Académico.							
Materias y actividades de identidad institucional	Son materias autogestivas sin valor curricular que se deberán cursar mínimo dos durante la formación del doctorado. Estas se imparten en línea y se contemplan como requisito de egreso.							

* Movilidad de dos semanas como mínimo para las y los estudiantes de Planes de Estudio adscritos al PNPC.

VIII. PERMANENCE REQUIREMENTS

The requirements that the student must meet for their permanence and continue with their postgraduate studies will be respecting the provisions of the General Teaching Regulations in force at the Benemérita Universidad Autónoma de Aguascalientes, in addition to considering the following:

- Each subject must be accredited in the regular period with a minimum grade of 7.0 (seven) or in an extraordinary exam, considering only one opportunity to pass the subject due; This last element does not apply to seminars.
- Maintain a minimum general average of 8.0 (eight), in addition to accrediting all subjects.
- Have the accreditation of English with 450 points from the TOEFL exam before finishing the first year.
- The students deliver to the Academic Council a written report of the activities and progress, endorsed by the tutor. The report reflects the progress of the thesis or practical work, as well as progress in completing credits: electives and complementary activities. The dates of delivery of the report by the student will be indicated by the Academic Council and the assigned tutor.
- In relation to Complementary Activities and Seminars, the following is indicated:
 - Complementary activities.
 - The Academic Council, according to the activity, the orientation and level of the postgraduate program, will define the number of credits that will be granted. The registration in the school file is carried out, according to the established procedure.
 - Seminars: Considering that the seminars are tutorials and not subjects, or courses or subjects, it is indicated that:
 - They are evaluated by the Tutoring Committee taking into account compliance with the work plan (activities) prepared at the beginning of the semester by the student and the tutor of the Basic Academic Nucleus (NAB).
 - The grade must be established according to the formats established by the Academic Council.
 - The Exam Review established in the General Teaching Regulations is not applicable since they are not subjects and are not evaluated with an exam.
- Due to the nature of all those activities of the study plan related to the development of the thesis or practical work, these can only be accredited in the ordinary period programmed for that purpose. Therefore, there will not be the possibility of appealing in another period, nor as a special course, nor to take an extraordinary exam or as a proficiency exam, since the grade awarded corresponds to all the performance of the student during the semester, in the which includes all activities for the advancement and development of the thesis or practical work, tutorials, compliance with the activities determined in the study plan, as well as in the proposed work plan.
- The student will be definitively withdrawn from the program in the following cases, in addition to what is established by the General Teaching Regulations and current institutional policies:
 - At the request of the student.

- For not obtaining the degree within the period established in the General Teaching Regulations
 - Failing to pass the grade exam.
 - Due to non-compliance with the requirements established in the Institutional Regulations.
 - That the student presents serious misconduct or professional ethics towards the institution, tutors, professors, university personnel, colleagues, and/or causes intentional damage to university facilities.
 - For not passing the thesis or practical work progress seminars.
- As part of the complementary activities, participate in at least one academic event inside or outside the BUAA presenting a paper regarding your research work.
 - Participate on at least one occasion in the International Congress of Postgraduate Research.
 - Carry out relevant social and academic remuneration activities if you are a scholarship recipient.
 - Comply with the Institution's current university legislation.
 - Cover the school fees provided by the institution.
 - Formally register the tutoring committee formed according to institutional requirements, as well as the policies of the Center for Basic Sciences. The process must be carried out no later than the end of the second semester.
 - Submit the doctoral research protocol, no later than the end of the second semester. Said report must be endorsed by the thesis tutor, and ratified by the Academic Council, and must be consistent with one of the Lines of Generation and Application of Knowledge of the DCAT.
 - Pass a pre-doctoral exam, at the end of the fifth semester of the doctorate.

IX. REQUIREMENTS FOR OBTAINING THE DEGREE

To obtain the doctoral degree, the following requirements must be fulfill:

1. Accredited all the subjects, seminars and activities indicated in the study plan.
2. Comply with the complementary academic activities (optional credits and complementary activities) according to what is indicated in the study plan.
3. Obtain a minimum overall grade point average of 8.0 (eight).
4. Take at least two institutional identity courses (Gallo subjects).
5. Present and defend the degree work in a public degree exam and approve it in a timely manner as established in the Postgraduate Guidelines and Procedures Manual for the preparation of Thesis or Practical Work.
6. Comply with what is indicated by the General Teaching Regulations and current institutional regulations on obtaining the degree.
7. The student must obtain the acceptance of 2 articles indexed in JCR or Scopus and one sent
8. The student must have completed their degree thesis, the content of which must constitute an original contribution to the field of the LGAC to which they belong.
9. Proficiency in the English language, accredited with 450 points in the TOEFL exam.

X. NÚCLEO ACADÉMICO BÁSICO

Grado	Nombre	Institución del último grado	Disciplina de último grado	Cuerpo académico	PRO DEP	S.N.I .	LGAC
D	Alfaro Gómez, Mariana	Centro de Investigación en Óptica	Física (Óptica)	No pertenece		I	Ciencias de la Tecnología
D	Álvarez Rodríguez, Francisco Javier	UNAM		Objetos de Aprendizaje e Ingeniería de Software		I	Ciencias de la Computación
D	Bazán Trujillo, Ivonne	CINVESTAV-IPN y el Consejo Superior de Investigaciones Científicas de Madrid. España	Ingeniería	Investigación Tecnológica Aplicada		I	Ciencias de la Tecnología
D	Chávez Olivares, Cesar Alejandro	CIEP-UASLP Facultad de Ingeniería, SLP, México	Ingeniería	Investigación Tecnológica Aplicada		I	Ciencias de la Tecnología
D	Delgadillo Alemán, Sandra Elizabeth	CIMAT	Matemáticas Aplicadas	No pertenece		I	Matemáticas Aplicadas
D	González Quijano, Diego Javier del Jesús	CINVESTAV - IPN	Ingeniería	Investigación Tecnológica Aplicada		I	Ciencias de la Tecnología
D	Guerrero Díaz de León, José Antonio	CIMAT	Ciencias de la Computación	Análisis Matemático y Simulación		I	Matemáticas Aplicadas
D	Guzmán Valdívila, Cesar Humberto	Centro Nacional de Investigación y Desarrollo Tecnológico (CENIDET)	Ingeniería	Investigación Tecnológica Aplicada		I	Ciencias de la Tecnología
D	Ku Carrillo, Roberto Alejandro	CIMAT	Matemáticas Aplicadas	No pertenece		I	Matemáticas Aplicadas
D	Macías Díaz, Jorge Eduardo	Tulane University	Matemáticas	Análisis Matemático y Simulación		III	Matemáticas Aplicadas
D	Macías Ponce, Julio Cesar	CIMAT	Matemáticas Aplicadas	No pertenece		I	Matemáticas Aplicadas
D	Mora Tavárez, José Manuel	UNAM		Gestión e Ingeniería de Sistemas y Tecnologías de Información		II	Ciencias de la Computación
PD/D	Muñoz Arteaga, Jaime	UT1		Objetos de Aprendizaje e Ingeniería de Software		I	Ciencias de la Computación
D	Rubio Cerda, Eduardo	UNAM	Ingeniería	Investigación Tecnológica Aplicada		I	Ciencias de la Tecnología
D	Salinas Gutiérrez, Rogelio	CIMAT	Ciencias de la Computación	No pertenece	Sí	I	Ciencias de la Computación
D	Sánchez Cruz, Hermilo	UNAM	Ciencias de la Computación	Sistemas Inteligentes	Sí	I	Ciencias de la Computación
D	Villa Morales, José	CIMAT	Probabilidad	Análisis Matemático y Simulación		II	Matemáticas Aplicadas

PD=Postdoctorado; D = Doctorado; S.N.I. = Sistema Nacional de Investigadores; LGAC = Línea de Generación o Aplicación del Conocimiento.

XI. PROGRAM FLEXIBILITY

In coherence with the Educational Model of the Benemérita Universidad Autónoma de Aguascalientes (BUAA) and with national and international trends in the design of educational programs, the doctorate offers flexibility in several important aspects. The Basic Academic Nucleus of the doctorate has a wide relationship with doctors from other national and international institutions; this is evidenced in the list of Collaborators and Collaborators presented for the postgraduate course. The foregoing will encourage the participation of external and external professors in the Thesis Committees of the postgraduate students, promoting agreements with other institutions that allow the realization of stays by the students and professors of the doctorate.

The student who carries out a mobility and takes a subject related to his doctoral thesis project in another postgraduate program inside or outside the institution, will be recognized a certain number of credits defined by the Academic Council. The doctorate has optional credits, which can be covered both inside and outside the BUAA, nationally or internationally, always endorsed by the tutors and the postgraduate Academic Council. In the case of subjects within the BUAA (whether they are subjects of the DCAT or of another academic program), the subject must have a minimum of ten students to be taught within the academic load; Otherwise, the subject will be taught in a tutored manner. The elective credits can be covered between the semesters from the first to the fifth.

The students will be able to carry out their complementary activities with participation in national and international congresses, national or international research stays, publications, among others determined by the Academic Council. The complementary activities are selected based on the needs and requirements of each student, which will depend on their reception work and the Lines of Generation and Application of Postgraduate Knowledge. Complementary activities may be carried out between the semesters from the first to the seventh.

Intercambio, movilidad y actividades de aprendizaje “en casa”. Ésta podrá realizarse de manera presencial o virtual dentro de la universidad.

Exchange and Mobility “Outwards”. This may be in person or virtually outside the university at a national or international level. Students who have been granted special conditional tuition in favor of CONACYT scholarship holders must carry out at least one professional stay and participate in at least one national or international event as speakers.



Dr. Francisco Javier Avelar González

Rector

M. en C. Jorge Martín Alférez Chávez

Dean of the Center for Basic Sciences

Elizabeth Casillas Casillas

General Director of Research and Postgraduate

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*Member of the redesign committee of the
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