

Europe and International Department

EVALUATION AND ACCREDITATION DOCUMENTS

M.Sc. Materials science and engineering

African University of Science and Technology (AUST) - Pan African Materials Institute (PAMI), Abuja

Nigeria

September 2019

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International evaluation and accreditation

EVALUATION REPORT

M.Sc. Materials science and engineering

African University of Science and Technology (AUST) - Pan African Materials Institute (PAMI), Abuja

Nigeria

MAY 2019



The AUST has mandated the Hcéres to perform the evaluation of its MSc. in Materials Science and Engineering programme. The evaluation is based on the "External Evaluation Standards" of foreign study programmes, adopted by the Hcéres Board on October 4th, 2016. These standards are available on the Hcéres website (hceres.fr).

For the Hcéres¹:

Michel Cosnard, President

On behalf of the experts committee²:

Pierre Haldenwang, President of the committee

In accordance with the decree n°2014-1365, November 14th, 2014,

²The evaluation reports "sont signés par le président du comité". (Article 11, alinéa 2) — "are signed by the president of the committee" (article 11, alinea 2).

¹ The president of Hcéres "contresigne les rapports d'évaluation établis par les comités d'experts et signés par leur président." (Article 8, alinéa 5) — "countersigns the assessment reports made by the experts' committees and signed by their president" (article 8, alinea 5).



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I. STUDY PROGRAMME IDENTITY SHEET

- University/institution: African University of Science and Technology (AUST)
- Component, faculty or department concerned: Pan African Materials Institute (PAMI), administered by the Materials Science and Engineering Department
- Programme's title: Master of Science in Materials Science and Engineering
- Training/speciality: Sub-specializations in Biomaterials, Energy materials, Minerals and Multifunctional materials
- Year of creation and context: 2007, creation of a MSc. and a PhD in materials sciences and engineering.
- Site(s) where the programme is taught (Town and campus): Galadimawa, Abuja
- Programme director: ONWUALU Peter Azikiwe, Professor, specialized in Mechanical properties of materials

METHODS AND RESULTS OF THE PREVIOUS ACCREDITATION(S)

Methodology and agency

All of the postgraduate programmes of AUST were accredited in April 2017 by the NUC (National Universities Commission), for 5 years

A gap analysis was also made by the ABET (American Board of Engineering and Technology) in June 2017Results

Results

The NUC accredited the MSc Science & Engineering with the best score (87.8%) of the AUST programmes. The NUC reports some strengths: Academic contents, course evaluation, staffing, course delivery and facilities, library and two main weakness: funding and the low involvment of junior staff in writting research grant for the programme ; the low ratio of academic staff that benefit from the staff development programme.

The ABET concluded that the M.Sc. program in Materials Science and Engineering produces graduates who are well prepared to contribute to the development of industrial applications in the effective use of natural materials resources in Africa. ABET also provided some recommendations, that can be summarized as follows:

- Ensure that all students that graduate have sufficient credits in basic sciences and basic engineering topics,
- Establish a closer relationship with industry
- Increase the number of resident lecturers and professors (to many invited faculties)
- Continue to develop the laboratory spaces (staff, material, safety measures)
- The communication about programme's objectives, student enrollment and outcomes must be done, preferably on the programme's web site.
- A stable electrical power must be provided.

HUMAN AND MATERIAL RESOURCES DEDICATED TO THE PROGRAMME

1. Human resources

The teaching staff is composed of 19 professors and associate professors. Only 3 of them are currently resident faculties, and 16 are invited faculties, mainly from USA and Europe. 2 new residents will reinforce the PAMI teaching staff in July 2019

The non-teaching staff is composed of two lab-technologists, Two ICT assistants and one administrative assistant.

2. Material resources

Students have access to two physical libraries and an e-library, modern computers and scientific softwares in a computer center; a Materials Science Building with an auditorium, several classrooms and 8 lab spaces.

The material characterization labs are very well equiped, with new devices as for example nanoindenter, SEM and X-ray defractometer.



STUDENT POPULATION: EVOLUTION AND TYPOLOGY OVER THE LAST 4 YEARS

YEAR		TOTAL NO. AT					
	FULL-TIME		PART-TIME		NATIONALIITIES		ENROLMENT
	Male	Female	Male	Female	Nigerian	Non- Nigerian	
2018/19	NC	NC	NC	NC	NC	NC	23
2017/18	16	8			18	6	24
2016/17	9	7	-	-	15	1	16
2015/16	8	7	-	-	5	10	15

The enrolment during the last four years in the MSc is as follows:

The target of the PAMI is to enroll 100 MSc. per year.

II. ON-SITE VISIT DESCRIPTION

COMPOSITION OF THE EXPERTS PANEL

President:

• Pierre HALDENWANG, <u>pierre.haldenwang@univ-amu.fr</u>, Professor Emeritus at Aix-Marseille Université (Specialty: Physics, Mechanics). Expert for the department in charge of the evaluation of institutions (DEE), and for the department in charge of the evaluation of research (DER) of Hcéres.

Expert members:

- Catherine XUEREB, <u>catherine.xuereb@inp-toulouse.fr</u>, CNRS Research Director, (Specialty: Chemical Engineering), Vice President of Toulouse Polytechnic National Institut. Expert for the department of the evaluation of institutions (DEE) and for the department in charge of the evaluation of clusters of Higher Education and Research institutions (DECT) of Hcéres.
- Thibaud LECOMPTE, <u>thibaut.lecompte@univ-ubs.fr</u>, Assistant Professor at Université Bretagne Sud, habilité à diriger des recherches (Specialty: Mechanics des matériaux, eco materials, génie civil). Expert for the department in charge of the evaluation of programmes (DEF).
- Anass NAGIH, <u>anass.nagih@univ-lorraine.fr</u>, Professor at Université de Lorraine (Specialty: Computer Science). Expert for the department in charge of the evaluation of programmes (DEF) and for the Europe and international department (DEI) of Hcéres.
- Valentin LE BOEUF, <u>valentin.le-boeuf@ens-paris-saclay.fr</u>, Student Expert. Ecole Normale Supérieure Paris Saclay Graduate. (Specialty: Electrical Engineering). Expert for the department in charge of the evaluation of programmes (DEF) and for the Europe and international department (DEI) of Hcéres.

The Hcéres institution was represented by: Pr. Pierre COURTELLEMONT, Science Advisor



On-site visit description

- Date of the visit: May the 21st, 2019.
- Organization of the visit: the visit was made the 21st of May, on the site of the African University of Science and technology (AUST) in Abuja, during one day. Meetings with the management team, academic staff, closed meetings with partners, alumni and students.
- Cooperation of study programme and institution to be accredited: perfect cooperation by all stakeholders, with the support of NUC team.

People met:

Peter Onwualu, Professor, Co Centre Leader Abdulhakeem Bello, Assistant Professor Kenfack Anatole, Associate Professor (Berlin) Rajesh Prasad, Associate Professor (New Delhi) S. Ma'aruf Minjibir, Post-doc Obi Ben Okonkwo, Finance Officer Onyebuchi Ekpolomo, Head Library Services Oroha Inewbendre, Academic Registrar Augustine I Keagwu, Internal Auditor Atulomah Obioha, Communication Officer

Students of Material Science Engineering: In MSc:

Abu Usman Onuminya, Ayuk Corlbert Ayuk, Ndeh Yvette Neh (Cameroon), Uba Chukwudalu, Obi Uchenna (Niger), Eya Henry Igwebuike, Mohammed B. Dukury (Liberia), Waidi Yusuf Olatunji, Udofia Benjamin Etim, Aliyu Joseph Oluwafemi In PhD:

Bukar Y Abdullahi, Kalu-Uka Godwin M, Olarewaju Yusuf Afolabi, Ezealigo Uchechukwu Stella, Ngasoh Fayen Odette (Cameroon), Kingsley Ikechukwu Orisekeh, Itohan Ojeaga, Ezenwafor Theresa, Ekwe Nneka Blessing, Anosike Esther Nneka, Toyin Aina, Numfor Linda Bih (Cameroon), Daniel Iremofu Amune, Akpan Udom Mark, Emmanuel Ogo Onche, Gina Chukwu Odochi

III. PRESENTATION OF THE STUDY PROGRAMME

1 – PRESENTATION OF THE STUDY PROGRAMME

The Master of Science in "Materials Science and Engineering" study programme consists of 18 months of courses, with an internship of 1 to 3 months in industry or in research laboratory.

Year 1: fundamental graduate level courses (3 modules of mathematics, 4 modules introducing the materials sciences, 4 elective modules among 6 of specialization)

Year 2: Thesis research project, plus 3 graduate courses in their specialisation area, 2 graduate seminars and 1 language course (English, French or an African language)

2 - PRESENTATION OF THE PROGRAMME'S SELF-EVALUATION APPROACH

A quite complete self-evaluation was made by the institution in two files called "Self evaluation form" and "self evaluation report".

These documents describe the identity of the PAMI, the academic and non-academic staff, the facilities, the lab equipment, and the enrolments for years 2013 to 2018. It gives a brief history of the programme, with three highlights:

- First enrolments in 2008 in PhD as in MSc
- A lot of partnering institutions from abroad
- The diversity of the enrolled students, and the multidisciplinary programme



The aim of the programme is well defined as "to train the next generation of Materials Scientists and Engineers that will solve the resource curse problem of Africa"

IV. EVALUATION REPORT

1- AIMS OF THE STUDY PROGRAMME

The objectives of the study programme are clearly presented and well understood by all stakeholders. The four specializations are consistent with AUST research activities, as well as with the teaching staff specialities. Peculiar efforts are made to gather these four topics in a single MSc. with an excellence aim. However, each of these specializations are very specific, so that it is not easy to relate them to each other. The study programme has seemingly been built in a very academic manner; to improve its impact, a recommendation would be to better integrate the industrial sector needs and base a part of the programme on its main scientific problematics.

The study programme was build according a pan-african academic policy. It has explicit objectives with regard to knowledge and skills to be acquired. The PAMI website specifies that PAMI aims to train a "critical mass" of materials scientists and engineers to add value to the minerals and materials resources of West and Central Africa. These objectives are known and clearly understood by the students. The name of the study programme, "Materials Science and Engineering" is also clear with regard to these objectives.

The PAMI auto evaluation report explicitly develops the objectives of the programme, including:

- To provide a Pan African environment for faculty and students to develop and use knowledge of Materials Science to solve engineering problems of value addition to natural resources of Africa.

- To provide a Pan African environment for faculty and students to develop and use knowledge of Materials Science to solve infrastructure problems of Africa including healthcare, energy, building, roads, transport, water, industrial raw materials and manufacturing.

- To use the highest level of knowledge and laboratory to produce world class Materials Engineers that will form the next generation of Materials Scientists and Engineers to drive Africa's renaissance in higher education.

-To foster partnerships for education and research among African universities and between African universities and the developed world.

- To foster academia industry partnerships in research and education in Materials Science and Engineering.

The four specializations: Minerals, Multifunctional Materials, Biomaterials and Energy are very specific and distinct topics of Science. It's naturally related to the research activities already set by the teaching staff (resident and invited). However, it makes difficult to teach strong common core courses on materials, or create bridges between the 4 specializations.

The study program is consistent with some Nigerian industrial sectors and challenges. However, the analysis of the alumni jobs shows that almost all MSc students become PhD students, and then get an academic position. Students that were interviewed are aware about further studies in terms of PhD program. As for the job opportunities, the industrial employments are not enough fostered.

2- POSITION OF THE STUDY PROGRAM

PAMI programme is characterized by strong academic partnerships from abroad. The link with research is strong and consistent. PAMI succeeded to attract very high valuable students from a really pan-African origin. The local embedding with efficient sustainable industrial partnership, however, seems to be feeble in terms of study programme building, as well than in possibilities of internships, students' outcomes or funding.

The study programme possesses a clearly identified position within the local, regional, national or international range of study programmes. PAMI has figured out its current or future partnerships in the programme. For example, agreements between AUST and Africa Bank and AUST and Total are in place, but not specifically in the framework of the MSc. in Materials Science and Engineering. Actually, the linkages with local industry appear to be very tiny. Agreements eventually exist in the frame of MSc thesis and internships, but the relationships with businesses and industrial partners must clearly be reinforced.



Concerning the academic positions, several universities of Abuja, other areas of Nigeria, and even neighbour countries (Cameroon, Ghana, Liberia, Rwanda, Burkina Faso, Sierra Leone) provide PAMI with bachelors for the Master's degree: as a result, the PAMI students are the best pan-african students of the area (minimum 3.5/4 in bachelor of science).

Owing to a rich contribution of non-resident faculties, the study programme has a clear position with regard to the world of research. The research centers and international institutions that support the study programme are clearly listed. The partnerships with foreign education institutions is a strength of this MSc., with more than 80% of invited faculties, coming from USA, Europe and Brazil. As a consequence, one of the main demands of the students is to obtain more scholarships to go abroad for their MSc thesis.

3- STUDY PROGRAMME TEACHING STRUCTURE

PAMI MSc. Programme is supported by a strong pedagogic supervision. It possesses very valuable specialization courses, which follow a series of refresher and fundamental courses. The latter deserve to be reinforced, as well as to develop the basic practical works. The link with industry must be increased thanks to Industrial internships that need to be longer (at least three months). The students benefit from a positive scholarship policy.

The MSc. Program very soon leads to specialization. The students starting with the study program follow refresher courses. They, however, come from very different formations, in terms of contents as well as in terms of scientific level. The way to achieve a minimum shared scientific level is obviously a key point, that could be improved thanks to several actions: individual supports like personal tutors (teacher or older student); division into ability groups; possibilities for a change of career plan. The common core courses duration is only 6 months of intensive sub-programmes that should allow students with different initial graduations and backgrounds to reach a same level of knowledge. The presented educational way to achieve this target is not clear. Theoretical (particularly in Mathematics, in Mechanics, and to some extent in Physics) educational pathway does not appear to be fostered so far. Furthermore, the basic concerns in material sciences (for example, material mechanics and resistance, multiscale approaches, durability) are not explicitly treated, or very rapidly. Furthermore, the research lab spaces are very well equipped with modern and accurate devices, which are really impressive; however, there is seemingly a lack of practical work and training on fundamental techniques of material characterization and standards in the programme (e.g. sieving, mechanics of materials, thermal characterisation, optical microscopy). The effective schedule of the MSc. includes 18 months, with one semester of upgrading in fundamental sciences. To match with international standards, a supplementary 6-month courses should be considered, including shared courses and practical works on fundamental materials and engineering topics (mechanics, process, design, standards). It should be feasible thanks to supplementary resident staff recruitments.

Studies are mainly provided by foreign teachers, by educational block of three weeks (courses in the morning and practice in the afternoon). In term of pedagogy, this learning pace is consistent. Some new forms of distance learning and self-learning could also be set to limit the costs and allow the students to reach a shared scientific level.

The study programme prepares students for employment and inform them about the working world, thanks to entrepreneurship and communication courses and a one-month internship. Internship are included in the curriculum, but the internship seems too short for future engineers. Internships should be longer, or more frequent. Moreover, the committee invites its PAMI colleagues to put in place some facilities and services for helping students in looking for internships and developing their career plans.

The study programme also includes training and project sessions in well-equipped research laboratories that allow understanding the world of research and its results, and prepare to PhD studies.

The study programme explicitly includes teaching components in foreign languages in its curriculum. But, only optional courses (after the students) of French language for English natives are proposed. The foreign mobilities are limited for PAMI students. However, several MSc students are coming from neighbour countries (Sierra Leone, Burkina Faso, Ghana, Cameroon, Benin), and a few students receive a scholarship to go abroad for several weeks.

In terms of scholarships, the female students, and the foreigners benefit from a full scholarship. The others can benefit from a full scholarship or a partial one.



4 – PROGRAM MANAGEMENT

A high ratio invited staff / resident staff represents a force to reach the international standards, but a weakness in terms of programme management. The Committee appreciated the good communication between students and teaching residents, and was impressed by the excellent level of the enrolment (best students, good ratio of foreign students and women), but regrets the low implication of the industry partners (and, to some extent, of the students) in the programme structuring.

The number of resident faculties is to low (currently only 3 residents versus 16 invited professors). During the interviews, the University reassured the committee that two resident teacher positions have been opened and filled in 2019. The University's policy for PAMI seems to be to engage 2 teachers every year in the next decade.

Programmes are elaborated and followed by a board that bring together foreign and resident teachers and administrators, but neither student nor industry partners are involved. The presence of industrial, socio-economic or cultural sectors should be reinforced in the study programme.

The role and responsibilities of members of the teaching team are clearly defined. Meetings of resident teachers with students are frequent, and students consider that they can express their demands and recommendations. The composition, role and meeting arrangements of the various examination boards are defined and communicated to students. Methods for testing knowledge are explicitly stated and consistent with the expected results of the study programme. The rules for attributing Educational credits are explicitly stated. As already formulated in the ABET report, the relationship between credits and effective hours should be more explicit.

Student recruitment methods are transparent and clearly defined: student numbers and the different enrolment regimes for the study programme are clearly identified; flows of international students and female students are identified and analyzed. The ratio of foreign students is more than 1/3 over the past 4 years; the study programme has comprehensive information on graduate outcomes, and stakeholders are aware of the pass rates, proportion of graduates who continue their studies and graduate employment rates.

V. CONCLUSION

First of all, the appraisal Committee wants to thank the President of AUST University for the cordial welcome in his renowned institution, for the clear description of the University's policy in what concerns the PAMI MSc. Programme.

The Committee's members greatly appreciated the frank exchanges with their colleagues from the PAMI programme. The Committee's visit on the AUST site hence allows the overall appraisal process to get precious and honest information.

In a general manner, the Committee found the PAMI MSc. programme ambitious and well-structured. The programme presents several important strengths, as its high-level student enrolment which also includes a recruitment policy that supports the female enrolment, as well as the appeal to foreign students. The programme is also supported by an adequate connexion with a research of international level. The latter point is fostered by the University's policy to welcome a strong invited staff of international faculties, thus leading to solid academic partnerships. The last point is evidently supported by the outstanding equipment and facilities of the research laboratories associated to PAMI.

As is often the case, a strength can be associated to its corresponding weakness. Even though the presence of a huge international staff is an impressive support for the PAMI's programme, the overall study organisation presently lies on the shoulders of three resident colleagues. This is clearly insufficient. Even with the two additional resident professors, the overall study organisation will remain difficult for the resident staff. The PAMI programme possesses interesting specializations of high level quality, In contrast, the Committee noted the difficulty to put in place a common core for the fundamental concepts, as well as for the refreshing path at the student entrance, The same remark takes place, as for the standard and basic practical works in Material Science. As if in a mirror, the outstanding equipment appeared supported by a staff too low for the sophistication of certain facilities.

To help our PAMI colleagues, the Committee's members propose several points of recommendation. First of all, PAMI must enrich the ratio of resident staff to international faculty members: a ratio of one half should be a short-time purpose, with "one for one" as final objective. This staff recruitment policy will obviously help to



improve the common core in the standard fundamental and practical learnings in Material Science. Another University's effort can also be performed in terms of technical support for the research equipment. A good balance between theoretical knowledge and technical practice should be achieved with the help of industry partners and alumni. These external stakeholders could also intervene as providers of long-time internships.

As a final consideration, the Committee would say its optimism for the short-term improvement of the PAMI MSc. programme and encourages the Nigerian colleagues in the way of the recommended features.

STRENGTHS

- A good ratio of international and female students
- Enrolment of the best students of the area (Nigeria and neighbor countries)
- Invited international faculties / strong academic partnerships
- Consistency of the programme with research activities.
- Research labs equipment and facilities

WEAKNESSES

- Only 3 resident faculties (+2 in July 2019)
- Lack of refresh and fundamental courses
- Lack of standard and basic practical works
- Lack in staff to manage laboratories (amount and grade)
- Low representativeness of the management and programme structuring (needs of industrials, alumni, student representative)

RECOMMENDATIONS

PAMI must improve some management aspects, and firstly the relation of the programme with industrial sector and alumni.

Concerning the programme, the common core courses have to be reinforced. This should be made possible thanks to the reinforcement of resident faculty. 2 residents will be recruited in July 2019, and this kind of recruitments should be renewed each year during at least a decade to reach a critical resident ratio, and improve the fundamental learnings in material sciences. By this way, refresh courses and basic practical works could be developed in a supplementary semester, to complete the scientific culture of the students.

Recruitment of a high grade technical staff should also be done, to enhance the use of the so-accurate and performant lab equipment, and ensure a proper pedagogical frame to the students.

VI. COMMENTS OF THE INSTITUTION



Pan African Materials Institute (PAMI)

Website:www.pami-aust.edu.ng Email: <u>aonwualu@aust.edu.ng</u> Phone: +234(0)8037432497 26th August, 2019

HCERES Evaluation Team

Dear Colleagues,

COMMENTS ON THE EVALUATION REPORT FOR THE MSc PROGRAMME AT PAMIAUST

We have gone through the report of your team's assessment of the MSc programme at Pan African Materials Institute (PAMI) of African University of Science and Technology. We thank the team for a thorough and professional job. Our comments are as follow:

The report is a fair assessment of the MSc Programme at Pan African Materials Institute (PAMI), Materials Science and Engineering Department, African University of Science and Technology, Abuja.

However, we think that with respect to Strengths, the high level of scientific achievements by the programme as evidenced by high level publications in high impact-factor journals and in the university repository were not highlighted. Also invention disclosures made in preparation for two world-class patents in health related research were excluded.

With respect to the weaknesses, we agree with the comments. As a matter of fact, the two new resident faculty proposed to start in July 2019 have resumed work and are living on campus and the university authority is committed to its promise of sustaining this plan. The original model used by AUST, where visiting faculty formed the bulk of mentors and lecturers at AUST worked successfully in the last 10 years, paving way to the current transition to having resident faculty forming the bulk of teachers and motivators of our students and drawing from a rich pool of graduates from the system.

The Alumni group was inaugurated during the last convocation ceremony in July. They will subsequently be involved in making inputs into the curriculum. Innovative strategies have been put in place to ensure that the curriculum as conceived, is as taught, as received and is as assessed. Such strategies include the use of MOOCs, asynchronous learning and a flexible assessment method.

The Materials Industry Advisory Board is being constituted and the first meeting is scheduled in December, 2019. The peculiarities of the Nigerian economy had slowed down this process and

AUST has found a pool of industries and businesses who need higher education products for their expansion and growth, and have long term interests in the Nigerian economy.

The university inaugurated AUSTInspre in June 2019. This is the university technology business incubator aimed at promoting entrepreneurship culture among the students. The first cohort of three incubatees were selected after an entrepreneurship boot camp executed by faculty and successful entrepreneurs from Innovation Hubs in the country.

All students are currently on one month Internship in Industry. This will be increased to 3 months in subsequent years, based on the successes of the current internship efforts. Thanks.

AAL L.

Prof. Azikiwe Peter Onwualu PAMI Co-Centre Leader

Dr. Shola Odusanya PAMI Co-Centre Leader



International evaluation and accreditation

ACCREDITATION DECISION

M.Sc. Materials science and engineering

African University of Science and Technology (AUST) - Pan African Materials Institute (PAMI), Abuja, Nigeria

September 2019



SCOPE OF THE ACCREDITATION GRANTED BY HCERES

HCERES has built its evaluation process based on a set of objectives that higher education institution study programmes must pursue to ensure recognised quality within France and Europe. These objectives are divided up into four fields among which are the accreditation criteria.

As for the "External Evaluation Standards", the accreditation criteria have been specifically designed for foreign programmes. The accreditation criteria were adopted by the Board on June 2016 and are available on the HCERES website (hceres.fr).

The accreditation committee, meeting his accreditation decision, has wholly taken into account the final evaluation report of the study programme. This accreditation decision is the result of a collegial and reasoned process.

The accreditation decision issued by HCERES shall not grant any rights whatsoever, whether in France or abroad. The decision on training programme accreditation confers an accreditation label and does not infer recognition of the accredited qualifications. The HCERES accreditation process therefore has no impact on the qualifications recognition process in France.



FULFILLMENT OF ACCREDITATION CRITERIA

FIELD 1: AIMS OF THE STUDY PROGRAMME

Accreditation criterion

The objectives of the study programme with regard to knowledge and skills to be acquired are clearly defined and communicated. Students and other stakeholders are aware of outcomes in terms of job opportunities and further studies.

Criterion assessment

The objectives of the study programme are clearly presented and well understood by all stakeholders. The four specializations are consistent with AUST research activities, as well as with the teaching staff specialities. Peculiar efforts are made to gather these four topics in a single MSc. with an excellence aim. However, each of these specializations are very specific, so that it is not easy to relate them to each other. The study programme has seemingly been built in a very academic manner; to improve its impact, a recommendation would be to better integrate the industrial sector needs and base a part of the programme on its main scientific problematics.

FIELD 2: POSITION OF THE STUDY PROGRAMME

Accreditation criterion

The study programme has set a comprehensive positioning suited to its objectives and including a clear link with research, scholarly partnerships and/or with the economic and social world, national and/or international partnerships.

Criterion assessment

PAMI programme is characterized by strong academic partnerships from abroad. The link with research is strong and consistent. PAMI succeeded to attract very high valuable students from a really pan-african origin. The local embedding with efficient sustainable industrial partnership, however, seems to be feeble in terms of study programme building, as well than in possibilities of internships, students outcomes or funding.

FIELD 3: STUDY PROGRAMME TEACHING STRUCTURE

Accreditation criterion

The study programme includes a set of teaching units that are coherent, gradual and adapted to all kind of students. The study programme allows students to acquire additional skills that are useful for employment or further study.

Internships and projects are included in the study programme curriculum. So are Information and Communication Technologies in Education (ICTE) and education innovations. The study programme prepares students for the international environment.

Criterion assessment

PAMI MSc. Programme is supported by a strong pedagogic supervision. It possesses very valuable specialization courses, which follow a series of refresher and fundamental courses. The latter deserve to be reinforced, as well as to develop the basic practical works. The link with industry must be increased thanks to Industrial internships that need to be longer (at least three months). The students benefit from a positive scholarship policy.

FIELD 4: STUDY PROGRAMME MANAGEMENT

Accreditation criterion

The study programme is implemented by a formally identified and operational teaching team including stakeholder and student participation. It is carried out by an educational team which benefits from clear and up-to-date data. Methods for checking knowledge are explicitly stated and communicated to students. Teaching and practical professional units are expressed in terms of skills.



Anti-fraud measures have been implemented.

Criterion assessment

A high ratio invited staff / resident staff represents a force to reach the international standards, but a weakness in terms of programme management. The Committee appreciated the good communication between students and teaching residents, and was impressed by the excellent level of the enrolment (best students, good ratio of foreign students and women), but regrets the low implication of the industry partners (and, to some extent, of the students) in the programme structuring.



ACCREDITATION DECISION

Considering the accreditation criteria analysis detailed above, the accreditation commission takes the following decision:

"Five-year unreserved accreditation decision"

and draws attention to the various recommendations made by the committee of experts in its evaluation report:

- 1. PAMI must improve some management aspects, and firstly the relation of the programme with industrial sector and alumni.
- 2. Concerning the programme, the common core courses have to be reinforced.
- 3. Recruitment of a high grade technical staff should also be done, to enhance the use of the soaccurate and performant lab equipment, and ensure a proper pedagogical frame to the students.

SIGNATURE

For HCERES and on behalf of

Michel Com

Michel COSNARD,

President

Date: Paris, September 4th, 2019

The evaluation reports of Hceres are available online : <u>www.hceres.com</u>

Evaluation of clusters of higher education and research institutions Evaluation of higher education and research institutions Evaluation of research Evaluation of doctoral schools Evaluation of programmes Evaluation abroad



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