

## EVALUATION AND ACCREDITATION DOCUMENTS

### **M.Sc. Bioinformatics and Genomics**

Africa Centre of Excellence in Phytomedicine  
Research and Development (ACE PRD)  
University of Jos

Nigeria

**September 2019**

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## EVALUATION REPORT

### **M.Sc. Bioinformatics and Genomics**

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Research and Development (ACE PRD)  
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**JUNE – 2019**

The University of Jos has mandated the Hcéres to perform the evaluation of its Master Bioinformatics and Genomics programme. The evaluation is based on the "External Evaluation Standards" of foreign study programmes, adopted by the Hcéres Board on October 4<sup>th</sup>, 2016. These standards are available on the Hcéres website ([hceres.fr](http://hceres.fr)).

**For the Hcéres<sup>1</sup> :**

Michel Cosnard, President

**On behalf of the experts committee<sup>2</sup> :**

Dominique Laurain-Mattar, President of the committee

In accordance with the decree n°2014-1365, November 14<sup>th</sup>, 2014,

<sup>1</sup> 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). □

<sup>2</sup> The 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).

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## I. STUDY PROGRAMME IDENTITY SHEET

1. University/institution: University of Jos, Africa Centre of Excellence in Phytomedicine Research & Development (ACEPRD)
2. Component, faculty or department concerned: Faculty of Pharmaceutical Sciences, Department of Pharmaceutical Chemistry
3. Programme's title: MSc in Bioinformatics and Genomics
4. Training/specialty: Master of Science degree in Bioinformatics and Genomics
5. Year of creation and context: 2014
6. Site(s) where the programme is taught (Town and campus): Africa Centre of Excellence in Phytomedicine Research & Development (ACEPRD), University of Jos
7. Programme director:
  - a. Surname, first name: Aguiyi, John Chinyere
  - b. Profession and grade: Professor
  - c. Main subject taught: Pharmacology and Genetic Engineering

## METHODS AND RESULTS OF THE PREVIOUS ACCREDITATION(S)

### 8. Methodology and agency

The Africa Center of Excellence in Phytomedicine Research and Development (ACEPRD) was established in 2014 through a World Bank alliance between the regional governments of West Africa, to harness the untapped potentials collaborations amongst African researchers with the focus of creating a sustainable agenda for health innovation in Nigeria and Africa.

### 9. Results

The MSc & PhD programmes in Pharmacognosy, Clinical Pharmacy, Pharmaceutical microbiology, Biotechnology, and Bioinformatics & Genomics have been evaluated and accredited by the National Universities Commission in 2017.

## HUMAN AND MATERIAL RESOURCES DEDICATED TO THE PROGRAMME

### 10. Human resources

The human resources including the number and the level of teachers, and representatives if the different disciplines are in good accordance with the needs for training, research and mentoring internships.

Clinical Pharmacy: 4 Professors, 1 Senior Lecturer, 10 Lecturers

Biotechnology: 11 Professors, 2 Senior Lecturers, 1 Lecturer II, 4 Readers

Bioinformatics and genomics: 9 Professors, 3 Senior Lecturers, 1 Reader

Pharmaceutical microbiology: 6 Professors, 3 Senior Lecturers, 1 Reader

Pharmacognosy: 8 Professors, 1 Senior Lecturer, 2 Lecturers, 2 Readers

### 11. Material resources

Recent equipments to perform sophisticated analyses have been acquired:

- Genetic analysis system: Beckman Coulter Genome Lab GeXP;
- High performance separation-Es Module with OptiMS Technology: Beckman Coulter's CESI 8000 Plus;
- Pharmaceutical analysis system: Beckman Coulter PA 800 Plus;
- Gas Chromatography-Mass Spectrophotometer: Scion 456-GC;
- Multi EA 4000: Analytkjena Elemental Analyser;
- Thermal Cycler: Jenway UV Spectrophotometer, PCR;
- Beckman Coulter- Allegra X15 Cold Centrifuge;
- Production of distilled and de-ionized water: Milli-Q Lab Water System;

- Electrophoresis equipment;
- Dissecting Microscope Triton Research Fluorescence Microscope.

## STUDENT POPULATION: EVOLUTION AND TYPOLOGY OVER THE LAST 4 YEARS

| S/No | YEAR      | TOTAL/YEAR | FEMALES | MALES | INTERNATIONAL STUDENTS | NATIONAL STUDENTS | TOTAL |
|------|-----------|------------|---------|-------|------------------------|-------------------|-------|
| 1    | 2015/2016 | -          | 2       | 12    | 4                      | 10                | 14    |
| 2    | 2016/2017 | -          |         |       |                        |                   |       |
| 3    | 2017/2018 | 7          |         |       |                        |                   |       |
| 4    | 2018/2019 | 9          |         |       |                        |                   |       |

Numerical inconsistencies are to be noted in the table of the MSc Bioinformatics & Genomics.

## II. ON-SITE VISIT DESCRIPTION

### COMPOSITION OF THE EXPERTS PANEL

- Dominique LAURAIN-MATTAR, Professor, University of Lorraine, committee leader
- Valérie SCHINI-KERTH, Professor, Strasbourg University
- Frédéric RELAIX, Professor, Paris-Est University
- Mathilde COLAS, Student graduated from University of Technology of Troyes.

Hcéres was represented by Pierre COURTELLEMONT, science advisor.

### ON-SITE VISIT DESCRIPTION

- Date of the visit: June the 10<sup>th</sup>, 2019.
- Organization of the visit: the visit was made the 10<sup>th</sup> of June, on the NUC site, during one day. On-site meetings with the management team, academic staff, closed meetings by videoconferencing 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 (on NUC site):

John C. Aguiyi, director ACEPRD  
 Ndidi C. Ngwuluka, Head of Department Pharmaceutics  
 Ikoni Ogaji, Dean, Faculty of Pharmaceutical Sciences  
 Dayom D. Wetkos, Head of Department, Clinical Pharmacology  
 Dafam D. Gwatau, Head of Department, Pharmacognosy  
 Ezekiel O. Afolabi, PG coordinator, Head of Bioinformatics  
 Patrick O. Olorunfemi, Head of Department Pharmaceutical Microbiology  
 Goni Dogo, ACEPRD laboratory  
 Mark Kparamak, Project Administrator  
 Taiwo E. Alemika, Deputy Centre Leader  
 Patricia O. Odumosu, Head, Department of Pharmaceutical & Medicinal Chemistry

18 students (Arinze Umera (PhD Biochemistry), Akinsanmi Augustina Oduje (PhD Biochemistry), Chioma Eze (PhD Applied Microbiology), Amaka Ubani (MSc Bioinformatics and genomics), Francis Akpadja Kodjo\* (MSc Pharmaceutical Microbiology), Adama Denou\*\* (PhD Pharmacognosy), Rafiatou Ousmane\* (MSc Biotechnology), Sariem Comfort (PhD Clinical Pharmacy), Daouda Labarou\*\*\* (PhD Bioinformatics and genomics), Agwom Francis (PhD Pharmaceutical Chemistry), Tougoma Atehezi\* (PhD Physiology), Atchrimi Komi Sagnan\* (PhD Physiology), Morenikeji Oluwatoyin

(MSc Bioinformatics and genomics), Lapang Dominic (MSc Bioinformatics and genomics), Rwiann Victor (MSc Bioinformatics and genomics), Hamza Abdulraham (MSc Bioinformatics and genomics), Samuel Isaac (MSc Bioinformatics and genomics), Ammanuel Dabwer Ben (MSc Biotechnology))  
 \* from Togo, \*\* from Mali, \*\*\* from Niger. Other: Nigerians.

Partners and alumni by videoconferencing.

### III. PRESENTATION OF THE STUDY PROGRAMME

#### 1 – PRESENTATION OF THE STUDY PROGRAMME

- The institution delivering the programme is the University of Jos, Nigeria and the Africa Centre of Excellence in Phytomedicine Research and Development (ACE PRD).
- The Masters programme offers training in Bioinformatics and Genomics, addressing the study of the theoretical and practical expertise in the field for integrative analysis for genomics data to answer specific biological questions. The MSc in Bioinformatics and Genomics creates advanced algorithms, computational and statistical techniques and theory to solve formal and practical problems rising from the management and analysis of biological data. It is a multi-disciplinary programme with the aim of connecting computing, biology and medicine for diagnostic testing, and management to provide better patient care, education, research and administration.
- The specific features include: Enrollment of students (including regional) for various postgraduate programmes, English for Special Purposes (ESP) for regional students from Francophone countries, E-learning development with subscription to Science Direct and NgREN, and Internships for students in industries to forge academia-industry partnerships.
- The program is developed within the Department of Pharmaceutical Chemistry for teaching and they will develop their research in the laboratory facilities at the ACE PRD or associated partners, which is situated at the University of Jos, and also at the Faculty of Pharmaceutical Sciences. No sub-specialization is indicated for the MSc of Bioinformatics and Genomics. Students enrolled must possess a Bachelor of Pharmacy or any other degree such as second-class degree in biological sciences, informatics, medicine, nursing and computer sciences from any National Universities Commission approved universities.
- The Masters study training programme is structured in Training of students and technical experts/policymakers through short courses on the study of biology, mathematics, statistics and computer sciences to offer modern integrative training across genomics and bioinformatics with opportunities to specialize in experimental and computational disciplines.
- Its position in the local, regional and national university landscape is not mentioned.
- The aims of this training programme are to acquire skills in the use and development of modern informatics technologies in the health sciences and the ability to integrate such knowledge into solving their particular problems.
- To provide specialization that addresses regional and national health challenges and strengthening capacity and application of phytomedicine research and development as well as knowledge dissemination.
- To facilitate an enabling environment that will stimulate promising research and training, facilitating dissemination, storage and sharing of academic, socio-economic and cultural development in Africa.

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

The Committee that worked for & prepared the Accreditation report to Hcéres comprised of the following:

1. Prof. Taiwo E. Alemika - Deputy Centre Leader (Chairman)
2. Prof. Ikoni J. Ogaji - Dean, Faculty of Pharmaceutical Sciences
3. Dr. Patrick O. Olorunfemi - Head, Department of Pharmaceutical Microbiology & Biotechnology
4. Dr. Ndidi C. Ngwuluka - Head, Department of Pharmaceutics



5. Dr. Wetkos D. Dayom - Head, Department of Clinical Pharmacy & Pharmacy Practice
6. Dr. Dalen G. Dafam - Head, Department of Pharmacognosy & Herbal Medicine
7. Dr. Patricia O. Odumosu - Head, Department of Pharmaceutical & Medicinal Chemistry
8. Prof. Ezekiel O. Afolabi - Department of Pharmaceutical & Medicinal Chemistry
9. Mr. Mark Kparamak - ACEPRD Admin Officer (Secretary)

## IV. EVALUATION REPORT

### 1- AIMS OF THE STUDY PROGRAMME

The MSc Bioinformatics and Genomics course at the Africa Centre of Excellence in Phytomedicine Research & Development in the University of Jos is positioned in order to provide students with quality knowledge and skills required to produce graduates knowledgeable in biology and computer science. Objectives with regard to knowledge and skills to be acquired are clearly stated. The name of the study programme is clear with regard to its objectives however the curriculum could be more detailed. ACEPRD provides an information booklet for students containing the objectives and content of the programme and policies (Students' Handbook for the Africa Centre of Excellence in Phytomedicine Research & Development). The MSc programme in Bioinformatics and Genomics is well positioned in terms of job opportunities. Overall the aims of the study programme are good and well communicated to students.

The MSc in Bioinformatics and Genomics of the Africa Centre of Excellence in Phytomedicine Research & Development in University of Jos, Nigeria, provides students with knowledge and skills required to produce graduates knowledgeable in the use and development of modern informatics technologies in the health sciences and the ability to integrate such knowledge into solving their peculiar problems.

Objectives include to provide (a) in the theory and encourage thinking and research in Bioinformatics and Genomics, (b) high level and specialized manpower for Pharmaceutical Research Institutions, Institutions of Higher Learning and Quality Control Industries. The aim is to produce graduates who can pursue M.Phils. and doctorate degree in Bioinformatics and Genomics.

The students' handbook provides information regarding the curriculum which are not so detailed. The study programme is clearly positioned in terms of further study programmes (PhD). Information of job opportunities is not provided to the students at the beginning of their enrollment. The study programme is positioned with regard to the business world in which graduates will eventually be employed.

### 2 – POSITION OF THE STUDY PROGRAMME

The MSc programme in Bioinformatics and Genomics has several academic and industrial partnerships mostly local and also a few regional and international ones but their precise contribution to the programme is not provided. Several national and international socio-economic partners support the programme. The programme offers a limited number of components of teaching through research and proposes several components in association to research such as internship, seminars, and workshops. Mechanisms to encourage the mobility of students, teaching and administrative staff mobility are indicated. Overall positioning of the programme has to be detailed.

No information about the position of the MSc programme in Bioinformatics and Genomics within local, national, regional and international range of study programme is provided in the transmitted documents.

The programme involves collaboration with universities within the country and international universities. Guest lecturers from partner universities are involved in the training of the students. International Advisory Board includes academics from Salford University, Manchester, Université de Lyon, France, Sheffield Hallam University, UK, Université de Lomé, Université de Abomey-Calavi, Benin Republic Université de Sciences Techniques and Technology of Bamako, Mali, Université du Burkina Faso, Ouagadougou, Salford University, UK. Partnerships are well identified, including active national (National Veterinary Research Institute, National Agency for Food and Drug Administration and Control), regional and international academic and Industrial/Sectoral partners involved in education and research. National and international socio-economic partners include Council for Advancement and Support of Education (CASE), USA, World Bank, USA, Association of African Universities, (AAU), Ghana.

All students enrolled in the Center's MSc programs will undertake a 1-month internship program at an industry related environment; they will be expected to identify a challenge for which a solution can be proffered. This should take place at the end of the first semester for Master students. Some students are performing their Master thesis research in a Central Laboratory (ACE), industries, and also in hospitals. For example in the MSc in Clinical Pharmacy, 9 students performed their Master thesis in the Department of Clinical Pharmacy and Pharmacy Practice, 11 MSc in Bioinformatics and Genomics in the Department of Pharmaceutical Chemistry, 9 MSc in Pharmacognosy in the Department of Pharmacognosy and Traditional Medicine, 3 MSc in Pharmaceutical Microbiology in the Department of Pharmaceutical Microbiology and Biotechnology, and 2 MSc of Biotechnology in the Department of Pharmaceutical Microbiology and Biotechnology.

Internship placement for MSc students:

- a. Juhel Industries Ltd, Awka
- b. Pauco Pharmaceuticals Ltd, Awka
- c. Gauze Pharmaceuticals Ltd, Awka
- d. ECWA Pharmaceuticals
- e. Gwalgwalada Specialist Hospital
- f. Plateau Specialist Hospital
- g. Jos University Teaching Hospital

Seminars: Research project proposal; selected topics on current trends in Pharmacy practice, and any relevant subjects chosen by the student. Workshops: Three were indicated in the documents in relation with phytomedicine.

No detailed information is provided regarding the contribution of associate or guest lecturers or researchers to support strong links between teaching and research.

There are partnership agreements between the institution and businesses, associations or institutions involved in an activity linked to the study programme. However, Memorandum of understanding have to be provided. Cooperation agreements or partnerships (regardless of whether they award qualifications) have been signed with foreign institutions and are adapted to the aims of the study programme. However, Memorandum of understanding have to be provided.

During the discussion with students, one student indicated having been three times and each time for 3-month period in Oslo for analysis of natural products by using chromatographic techniques. He was supported by his country of origin (Mali). Senior and junior faculty of Pharmacy members of all the disciplines are sponsored for workshop, conferences, and professional meetings. Workshop and conferences are organised by ACE PRD.

### 3 – STUDY PROGRAMME TEACHING STRUCTURE

The MSc in Bioinformatics and Genomics programme trains students for knowledge and skills in the use and development of modern informatics technologies in the health sciences and the ability to integrate such knowledge into solving their peculiar problems. No detailed information regarding the relevant core and electives courses is provided, and their positioning in the study programme to determine that students can gradually specialize is not provided. Research methods in Bioinformatics and Genomics are not developed in the student handbook. Online pedagogical materials is available with 24-internet in all facilities. Internship programme allow students to acquire relevant skills.

Following the course content of the programme and the resulting examination, the students are enrolled in internships that lasts 4 weeks in an institution outside the location of the programme, for example in Pauco Pharmaceuticals, Gauze Pharmaceuticals, Juhel Pharmaceuticals, ECWA Pharmaceuticals, Gwalgwalada Specialist Hospital, Plateau Specialist Hospital, Jos University Teaching Hospital. The objectives, methods and assessment of the projects and internships are defined and communicated. The study programme encourages international mobility through established partnership.

The study programme (MSc in Bioinformatics and Genomics) includes a set of teaching units such as integrative analysis for genomics data to answer specific biological questions, statistical techniques, that is consistent with the objectives defined. The core components train students for knowledge and skills in Bioinformatics and Genomics. The duration of each module (in hours) and the workload expected of students (in hours) are explicitly stated and known and reported in Student's Handbook.

No detail regarding the positioning of the different core and elective courses regarding the MSc program is provided. In case of research, the Master thesis project is based on teaching courses, seminars and the student's interest.

No lifelong training is included in the documents provided. E-learning and a computer laboratory are available to all students. Online pedagogical materials are available with 24-internet in all facilities, and all students have personal computers and internet access.

English for Special Purposes (ESP) for regional students from Francophone countries is provided. The study programme includes components that prepare students for employment. These include course delivery that emphasizes the special needs of the working world, the participation of industry partners in curriculum development, review and teaching, and the fielding of students for industry experience as requirement before graduation. Students are expected to identify a research topic of interest in interaction with the teaching staff, write a research proposal after literature review and defend the proposal in front of their teachers and colleagues. In addition, they are exposed to conferences, seminars, international forums and have access to the international literature. Following review, the students conduct various parts of the research before writing a research thesis. The research thesis is defended before a panel of internal and external experts and rated on the basis of originality and quality.

The study programme includes components to prepare students for employment and inform them about the working world. Students are exposed to people from the industry and hospital when they contribute to teaching, and during mentorship of internship. It is important to note that in the last ten years, the University of Jos Faculty of Pharmaceutical Sciences has been in the forefront of the research on anti-snake venom vaccine, anti-fertility drugs, mushroom and *Artemisia annua* cultivation. The University is engaged in the commercial North Central zone for the cultivation of *Artemisia annua* and the key plant in Artemisinin-based combination therapy at the Centre's Farm in Langtang South LGA, of Plateau State.

The study programme includes components that focus on understanding the world of research and its results. Such as during the elaboration of the research proposal, development of Master thesis research and writing of thesis under the supervision of a scientist. They will also be exposed to the world of research during their 1-month internship in an industry-related environment at the end of the first semester.

The study programme includes practical work components. Practical training can be acquired during the Hospital Pharmacy Practice depending on the host Clinical Departments. In addition, research dedicated practical work is obtained during the 1-month internship at the Centre or in an industry-related environment at the end of the first semester, seminars at the level of the Department and University, and during their Master thesis research. The study programme includes teaching components in one foreign language. For International students from French speaking Countries, English courses are provided.

The objectives, methods and assessment of projects and internships are explicitly stated and understood by students. The supervisor and external supervisor help the student to find the appropriate internships. Little information is provided to students regarding their career plans.

Students are trained for additional skills such as scientific writing, oral communication, computer skills, access to data bases to obtain scientific information on lead compounds from natural resources, seminars including discussion with their supervisors. Students have access to e-learning in a dedicated computer laboratory wifi access all over the Campus, access to data bases such as Science Direct. Innovative teaching practices include E-learning and project-based learning to define their Master thesis research project. There are refresher courses for some students starting the study programme, for English language.

The student will benefit from the input of the scientific supervisor and a supervisor of the Department during the project research proposal, seminars, Master thesis research, writing and defence.

The study programme prepares students for the international environment. Some students can spend research time with the international partners such as Norway, and Germany to execute additional research experiments by using equipment not available at the Centre. International students have the possibility to improve their English when arriving in Nigeria. Courses are taught in English. The study programme encourages international mobility through sending and receiving students via international partnerships. During the on-site visit, the information was provided that one student went to Oslo and one to Germany however the information of student's level and track was not indicated.

## 4 – PROGRAMME MANAGEMENT

The study programme is well implemented by a formally identified teaching team with roles and responsibilities clearly defined and presented in the Centre's website. Methods for testing knowledge are explicitly stated and consistent with the expected results of the study programme. Student recruitment methods are clearly defined and are transparent. The flow of national and international students is limited until now but clearly identifiable. Overall the programme management can be improved in particular regarding graduates outcome, and evaluation of teaching and of the programme to further develop the programme.

The programme has an appropriate number of teachers including Professors, senior Lecturers, Lecturers and Readers to cover the different specialties. The role of each staff teaching member is clearly identified and described on the Pharmaceutical Sciences internet site (<http://aceprd.unijos.edu.ng/medicinal-plants>) and also in the Students' Handbook. The teaching resources including classrooms, libraries, one computer room are appropriate to execute the study program. During seminars, Master project proposal defense and Master thesis defense, teaching and research members are attending.

The list of teachers is contained in the Students' handbook and can be assessed at the PRD website. The role and responsibilities of members of the teaching team are clearly defined. The involvement of teachers in the different teaching courses is well defined. In addition, information of relevant Centre staff and Faculty including Program Manager, Deputy Center Leader, Dean Faculty of Pharmacy, Deputy Dean, Internship Coordinator, Students' Welfare officer, Animal House Manager and Director Health Center are provided in the PRD Student's Handbook.

The composition and roles of the Department Academic Board, Post-graduate Academic Board, the Senate and the examination board are well outlined by the University in the Academic Regulations and Teacher's Code.

Courses evaluation include: continuous assessment, seminars, written examination, a project report in approved research area examined by an external examiner. The rules for validation of skills are clearly stated. Students will be assessed based in the regulation governing examination and assessments of the school of the post-graduate studies. Every enrolled student shall have attended a minimum of 75 % of total lectures and 100 % of practical sessions to be eligible for examination.

Teaching and practical professional sessions in this programme are expressed as skills. For the MSc of Bioinformatics and Genomics, skills include theoretical and practical expertise in the field for integrative analysis for genomics data to answer specific biological questions, advanced algorithms computational and statistical techniques and theory to solve formal and practical problems rising from the management and analysis of biological data. No detailed information is provided whether the study programme uses a skills portfolio or similar tool to help students formally record skills acquired.

For the MSc in Bioinformatics and Genomics, a second-class degree in biological sciences, informatics, medicine, pharmacy, nursing and computer sciences from a recognized University is required for admission. Candidates from the University of Jos and other recognized Universities are eligible to apply. To attract international students of West and East Africa, the staff members of the Faculty of Pharmaceutical Sciences promote on site the different programmes proposed. As a result, 55 applications were received in Liberia, 3 in Kenya, 16 in Togo, 23 in Mali, 22 in Cameroun, 19 in Niger and 17 in Uganda. However, the number of students enrolled in the MSc in Bioinformatics and Genomics was not provided.

Recruitment policies and admission criteria including academic prerequisite (undergraduate degree from a recognized University), English skills are in lines with aims of the programme and final qualification of the programme. The flow of international students is identified: from 2016-2018 4 foreign students were enrolled. However, the country of origin is not provided.

Information regarding false declaration are provided.

## V. CONCLUSION

The Masters programme offers training in Bioinformatics and Genomics, since October, 2013. The MSc Bioinformatics and Genomics course at ACE PRD is well structured, with an adequate number of qualified staff, appropriate communication regarding learning and job outcomes. The MSc Bioinformatics and Genomics course provide students with knowledges and skills in the use and development of modern informatics technologies in the health sciences and the ability to integrate such knowledge into solving their peculiar problems. Objectives with regard to knowledge and skills to be acquired are clearly stated. ACE PRD provides an information booklet for students containing the objectives and content of the programme and policies. Communication regarding learning are available at the ACE PRD's website. The MSc programme in Bioinformatics and Genomics is positioned with very high success in terms of job opportunities (all the students have been engaged in hospitals, teaching in Universities, working in industries and NGO's).

The MSc programme in Bioinformatics and Genomics is positioned within local, national, regional and international range of study programmes through collaborations with universities within the country and international universities. Guest lecturers from partner universities are involved in the training of the students, co-supervision of students, internship locations and collaborative research/publications. Appropriate mechanisms are implemented to encourage the mobility of students, teaching and administrative staff. Online pedagogical materials is available with 24-internet in all facilities, and all students have personal computers and internet access. Students are expected to identify a research topic of interest in interaction with the teaching staff, write a research proposal after literature review and defend the proposal before their teachers and colleagues. Following the course content of the programme and the resulting examination, the students are enrolled in internships that lasts 4 weeks in an institution outside the location of the programme. The study programme encourages the use of digital technologies via adequately trained staff, full internet access and appropriate classroom equipment.

Overall the study programme teaching structure is good. The study programme is implemented by a formally identified teaching team with roles and responsibilities defined. Teachers and technologists are engaged in regular training locally. The program is advertised in the University. Student recruitment methods are clearly defined and are transparent. The flow of national, regional and international students is limited.

The methods for student evaluation of teaching and to provide feedback to teachers from students are not yet established.

## STRENGTHS

- Job opportunities in hospitals, pharmaceutical industries, and universities
- Interesting Business Plan with the development for anti-snake venom vaccine and Scabi-Plus products
- Appropriate industrial and hospital partners proposing internships and contributing to teaching
- National and regional academic partnerships, with industry and organizations relevant to Bioinformatics and Genomics
- Multi-disciplinary approach to program delivery.

## WEAKNESSES

- Low number of students enrolled in MSc Bioinformatics and Genomics
- No information about laboratory for research
- To establish self-evaluation process of the study programme, including positioning of the study programme, tracking incoming and outgoing students and follow-up of the piloting of the training
- Limited involvement of associate or guest lecturers or researchers to support strong links between teaching and research
- Limited number of partnerships with foreign education institutions
- Limited national and international exposure of students to start build a network enabling internship and job opportunities
- Limited comprehensive information on graduate outcomes that contributes to the attractiveness of the programme
- Updated alumni of graduates is missing to facilitate networking for mentoring, internship and job opportunities
- Absence of detailed evaluation of teaching by students and of the programme curriculum by students and external evaluators that helps to optimize the content of the programme for better professional integration.

## RECOMMENDATIONS

- Improve teaching and research networks with regional, national and international partner Universities
- Mention the position of the MSC in Bioinformatics and Genomics in the local, regional and national university landscape
- Keep and develop your appropriate business plan to support sustainability
- Improve the recruitment of local and foreign students
- Implement guidelines for graduates tracing as well as a platform for the follow-up of alumni
- Enhance visibility of the program within the national and regional students and partners.

## VI. COMMENTS OF THE INSTITUTION

UJ/ACEPRD/O102/03

August 25, 2019

Prof. François PERNOT

Directeur/Director

Département Europe et International

Europe and International Department

[francois.pernot@hceres.fr](mailto:francois.pernot@hceres.fr)

Dear Sir

### COMMENTS OF THE INSTITUTION

The Africa Centre of Excellence in Phytomedicine Research and Development (ACEPRD), Faculty of Pharmaceutical Sciences, University of Jos has submitted 9 postgraduate programmes.

The HCERES has considered the programmes for evaluation and consequent accreditation, with the report made available to the Centre for comments.

The team of the ACEPRD/Faculty that considered the report and made comments available are:

- |                             |                                      |
|-----------------------------|--------------------------------------|
| 1. Prof. John C. Aguiyi     | Director/Centre Leader               |
| 2. Prof. Ikoni Ogaji        | Dean, Faculty of Pharmacy Sciences   |
| 3. Prof. Taiwo E. Alemika   | Deputy Director, ACEPRD              |
| 4. Prof. Patrick Olorunfemi | Head, Biotechnology and Microbiology |
| 5. Dr. Wetkos Dayom         | Head, Clinical Pharmacy and Practice |
| 6. Dr. Dalen Dafam          | Head, Pharmacognosy                  |
| 7. Dr. Patricia Odumosu     | Head, Bioinformatics and Genomics    |
| 8. Mr. Mark Kparmak         | Project Administrator                |

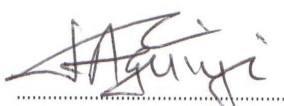
Members of the team considered the report of each of the postgraduate programmes and made its comments as follows:

### M.SC BIOINFORMATICS AND GENOMICS

The weaknesses of the programme highlighted by the agency is hereby commented upon by the ACEPRD team of as follows:

1. Laboratory for the programme. The programme has computer laboratories at the Faculty and ACEPRD with appropriate software's.
2. The establishment of self—evaluation of programme, tracking of incoming and outgoing students as advised is noted for consideration.
3. The programme will work assiduously to establish partnerships with other international partners to enhance the programme quality.

Thank you.



**Prof. John C. Aguiyi**

Director/Centre Leader, ACEPRD

For: Team, ACEPRD

### NB: URL TO LABORATORIES

[http://aceprd.unijos.edu.ng/viewing\\_image/322fc987-4e53-455a-9063-2de163ab2ee7/](http://aceprd.unijos.edu.ng/viewing_image/322fc987-4e53-455a-9063-2de163ab2ee7/)

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## ACCREDITATION DECISION

### **M.Sc. Bioinformatics and Genomics**

Africa Centre of Excellence in Phytomedicine  
Research and Development (ACEPRD),  
University of Jos, Nigeria

**JUNE – 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](http://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 MSc Bioinformatics and Genomics course at the Africa Centre of Excellence in Phytomedicine Research & Development in the University of Jos is positioned in order to provide students with quality knowledge and skills required to produce graduates knowledgeable in biology and computer science. Objectives with regard to knowledge and skills to be acquired are clearly stated. The name of the study programme is clear with regard to its objectives. However the curriculum could be more detailed. ACE PRD provides an information booklet for students containing the objectives and content of the programme and policies (Students' Handbook for the Africa Centre of Excellence in Phytomedicine Research & Development). The MSc programme in Bioinformatics and Genomics is well positioned in terms of job opportunities.

## 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

The MSc programme in Bioinformatics and Genomics has several academic and industrial partnerships mostly local and also a few regional and international ones but their precise contribution to the programme is not provided. Several national and international socio-economic partners support the programme. The programme offers a limited number of components of teaching through research and proposes several components in association to research such as internship, seminars, and workshops. Mechanisms to encourage the mobility of students, teaching and administrative staff mobility are indicated. Overall positioning of the programme has to be detailed.

## 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

The MSc in Bioinformatics and Genomics programme trains students for knowledge and skills in the use and development of modern informatics technologies in the health sciences and the ability to integrate such knowledge into solving their peculiar problems. No detailed information regarding the relevant core and electives courses is provided, and their positioning in the study programme to determine that students can gradually specialize is not provided. Research methods in Bioinformatics and Genomics are not developed in the student handbook. Online pedagogical materials is available with 24-internet in all facilities. Internship programme allow students to acquire relevant skills.

Following the course content of the programme and the resulting examination, the students are enrolled in internships that lasts 4 weeks in an institution outside the location of the programme, for example in Pauco Pharmaceuticals, Gauze Pharmaceuticals, Juhel Pharmaceuticals, ECWA Pharmaceuticals, Gwalgwalada Specialist Hospital, Plateau Specialist Hospital, Jos University Teaching Hospital. The objectives, methods and

assessment of the projects and internships are defined and communicated. The study programme encourages international mobility through established partnership.

## 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

The study programme is well implemented by a formally identified teaching team with roles and responsibilities clearly defined and presented in the Centre's website. Methods for testing knowledge are explicitly stated and consistent with the expected results of the study programme. Student recruitment methods are clearly defined and are transparent. The flow of national and international students is limited until now but clearly identifiable. Overall the programme management can be improved in particular regarding graduates outcome, and evaluation of teaching and of the programme to further develop the programme.

## ACCREDITATION DECISION

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

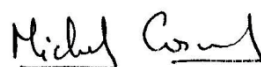
### **“Five-year unreserved accreditation decision”**

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

- Improve teaching and research networks with regional, national and international partner Universities.
- Mention the position of the MSC in Bioinformatics and Genomics in the local, regional and national university landscape.
- Keep and develop your appropriate business plan to support sustainability.
- Improve the recruitment of local and foreign students.
- Implement guidelines for graduates tracing as well as a platform for the follow-up of alumni.
- Enhance visibility of the program within the national and regional students and partners.

### **SIGNATURE**

For HCERES and on behalf of



Michel COSNARD,

President

Date: Paris, September 4<sup>th</sup>, 2019

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