

## EVALUATION AND ACCREDITATION DOCUMENTS

M.Sc. Biotechnology

Africa Centre of Excellence in Phytomedicine  
Research and Development  
University of Jos

Nigeria

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**September 2019**

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## EVALUATION REPORT

### **M.Sc. Biotechnology**

Africa Centre of Excellence in Phytomedicine  
Research and Development  
University of Jos  
Nigeria

Jun – 2019

The Jos University has mandated the Hcéres to perform the evaluation of its Masters 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, The Africa Centre of Excellence in Phytomedicine Research & Development (ACEPRD)
2. Component, faculty or department concerned: Department of Pharmaceutics and Pharmaceutical Technology, Faculty of Pharmaceutics Sciences
3. Programme's title: Master in Biotechnology
4. Training/speciality: Master of Science degree in Biotechnology
5. Year of creation and context: ACEPRD was established in 2014 through a World Bank alliance between the regional governments of West Africa. The MSc in Biotechnology enrolled the first students in 2017.
6. Site(s) where the programme is taught (Town and campus): At the Faculty of Pharmaceutics Sciences with the support of the Africa Centre of Excellence in Phytomedicine Research & Development (ACEPRD), University of Jos.
7. Programme director:
  - a. Surname, first name: Aguyi John C.
  - b. Profession and grade: Professor
  - c. Main subject taught: Pharmacology and Biotechnology

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

## HUMAN AND MATERIAL RESOURCES DEDICATED TO THE PROGRAMME

### 9. Human resources

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

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

### 10. 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 Tritech Research Fluorescence Microscope

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

Programme	Male	Female	Foreign students	Apprenticeship	Total Male & Female students
M.Sc. Biotechnology	5	6	5	2	11

## II. ON-SITE VISIT DESCRIPTION

### COMPOSITION OF THE EXPERTS PANEL

- Dominique LAURAIN-MATTAR, Professor, committee leader
- Valérie SCHINI-KERTH, Professor
- Frédéric RELAIX, Professor
- Mathilde COLAS, Student

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 Abdulrahman (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 (ACEPRD). The Master of Science (M.Sc.) in Biotechnology is a training programme established in 2017 at the Faculty of Pharmaceutical Sciences of the University of Jos. The curriculum is a multidisciplinary programme designed to prepare students for Leadership and careers in the biotechnology industries and pharmaceuticals and with knowledge and training in the scientific and practical aspects of Biotechnology. It aims to train and produce specialized personnel to catalyse the development and advancement of the science and practice of genetic engineering and biotechnology in the area of healthcare, agriculture and environment. These scientists will not only meet the need for personnel in research but also in the industry.

The specific objectives of the programme include: Familiarize students with the molecular and genetic tools used to analyse genomes, modify genetic material and techniques for modifying organisms to produce desired products; Plan for and manage formulation and execution of protocols and innovative technologies and/or products; Educate the students on basic philosophical and ethical considerations regarding genetic data, genetic manipulation and Biosafety issues, while exploring emerging technologies, innovations, and new products in the field of genomics and proteomics. Specific features include the possibility for foreign students who may need to undergo language proficiency training can come 3 to 4 months earlier, attend and pay for it before they can continue the regular studies; E-learning development with subscription to Science Direct and NgREN; Internships for students in industries to forge academia-industry partnerships.

The program is developed within the Department of Pharmaceutics and Pharmaceutical Technology, Faculty of Pharmaceutics Sciences for teaching. It will also involve several courses from Computer Sciences, Plant sciences, Pharmaceutical sciences, Agriculture, Medical sciences, and Arts and Education to cover all the different aspects of this multidisciplinary programme. Students 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 Biotechnology. Students enrolled must possess at least a second class (Lower division) degree in Botany or Biological Science (Plan Science) from an approved university with a minimum CGPA of 3.0/5.0. Candidates from Medical, Pharmaceutical, Veterinary, Agricultural and other relevant applied sciences are qualified to apply. Also a postgraduate diploma in biotechnology may be considered for admission. Candidates who are not pharmacy graduates will be required to undertake pre-requisite courses from the undergraduate programme during the training programme. The mode of study for MSc Biotechnology is full time over a minimum of 12-18 months and a maximum of 24 months.

The Master study training programme is structured to permit students to acquired knowledge and skills in different aspects of biotechnology throughout the study. Candidates are required to register a minimum of 40 credit units. The programme offers 28 credit units of core courses and 8 credits of elective courses. The core courses cover the major aspects of biotechnology with courses dedicated to basic knowledge in biotechnology, concepts of genetic engineering, molecular biology and cytogenetics, industrial and agricultural biotechnology, medical and pharmaceutical biotechnology, to professional oriented courses such as advanced entrepreneurship studies, ICT and research methodology and pedagogy, and to research oriented courses such as research method, biostatistics and biomathematics, seminar and research project. The 8 credits of elective courses cover topics dedicated predominantly to different techniques and technologies including laboratory techniques in biotechnology, analytical techniques for biotechnology products, enzyme technology and formulation/processing of biotechnology products.

The research training in Biotechnology includes 10 credits of core courses. Research method, Biostatistics and Biomathematics aims to train students to the different criteria regarding data sampling and collection, data analysis, the different kinds of graphical representation, and the different methods used for statistical analyses. Each student must give at least two seminars on an approved topic in biotechnology during the course of study. In addition, each student is expected to carry out independent original research. The topic must be approved by the university senate, dean of the Faculty, head of department or the supervisor. The research work must be carried out under the supervision of a qualified staff member. Such study is to be based on the application of biotechnology in a chosen area.

To obtain professional expertise in the field of Biotechnology, all students will undertake a one-month internship program at an industry related environment at the end of the end of the first semester. During the internship, they will be expected to identify a challenge for which a solution can be proffered. Students can obtain support for transportation and partial living expenses for internship within Nigeria.



The evaluation of students will be assessed based on regulations governing examinations and assessments of the School of the Postgraduate studies. Course evaluation consists of: continuous assessment, seminars, written examination and a project report in an approved research area, including an oral examination.

Its position in the local, regional and national university landscape is not mentioned.

Its main objectives are:

- To achieve excellence in educational training and applied research in drug discovery, production and management of phytomedicine, clinical pharmacy, biotechnology, pharmaceutical microbiology, proteomics, genomics and bioinformatics.
- 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 HCERES 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 in Biotechnology programme at the African Center of Excellence in Phytomedicine Research and Development in the University of Jos is positioned to offer scientific students with advanced education on the principle of Biotechnology with particular interest in genome modulation to develop innovative products, which have a very broad field of application in the area of healthcare, agriculture and environment. The programme enables students to obtain strong knowledge and expertise at the molecular and cellular level and of the different concepts and techniques used for genetic engineering. Specific courses are dedicated to the field of Industrial, Agricultural, Medical and Pharmaceutical biotechnology. The programme will also provide training of practical aspects of Biotechnology including the different laboratory and analytical techniques, enzyme technology as well as formulation and processing of biotechnology products. It also provides expertise in administrative and managerial aspects and the requisite skills and knowledge to undertake original research in different aspects of Biotechnology to be able to enter the professional world or engage into a PhD programme in Biotechnology. Objectives regarding knowledge and skills to be acquired are clearly presented. The name of the programme is clear with regard to its objectives and content. 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 Biotechnology is well positioned in terms of job opportunities. Overall the aims of the study programme are appropriate and well communicated to students.

The MSc Biotechnology of the African Center of Excellence in Phytomedicine and Research in University of Jos, provides students with the knowledge and skills in the scientific and practical aspects of Biotechnology in particular in molecular Biotechnology, biomedical technologies and biopharmaceutical biotechnology to

provide students flexibility to tailor their degree to their background, interest and career goals in the area of healthcare, agriculture and environment.

Objectives include 1) to obtain advanced knowledge at the level of the genome and its targeted modulation to produce desired and innovative products, 2) to be able to develop plans for and manage formulation and execution protocols and innovative technologies and/or products, 3) to obtain basic philosophical and ethical considerations regarding genetic material and Biosafety issues, 4) to acquaint with requisite skills and knowledge to practice of genetic engineering and to undertake innovative research in the different aspects of Biotechnology. The students' handbook provides detailed information regarding the curriculum. 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 enrolment. 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 Biotechnology 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. The programme offers a limited number of components of teaching through research and proposes several components in association to research such as internship, seminar, and workshops. Courses appear to be taught mostly in the form of lectures. An extension of the duration of the internship to 3 months in an industry related environment would further strengthen the expertise in skills and the professional experience for this attractive track for Agricultural, Medical and Pharmaceutical industries. Integration of training for scientific communication (oral, poster) would further increase the competitiveness of the track and optimize the curriculum for subsequent PhD enrolment. Mechanisms to encourage the mobility of students, teaching and administrative staff mobility are indicated.

The position of the study programme within the local, regional, national or international range of study programmes is not provided. Potential competitor programmes from either academia or private organisms have not been provided. Nevertheless, it is worth to acknowledge that the programme attracts foreign students (5 out of 11 students) mostly from West African Region indicating a clear attractiveness and quality of the teaching programme within this part of Africa.

The ACE PRD study programme can benefit from the input of current partnerships including several National partners: Nnamdi Azikiwe University, Awka; National Veterinary Research Institutes (NVRI), Vom; National Institute for Pharmaceutical Research and Development (NIPRD), Abuja; Juhel Industries Ltd, Awka; Pauco Pharmaceuticals Ltd, Awka; Gauze Pharmaceuticals Ltd, Awka; Gwalgwalada Specialist Hospital ; Plateau Specialist Hospital ; and Jos University Teaching Hospital. It can also benefit from several International partners: Salford University, Manchester; Université de Lyon, France; Sheffield Hallam University, UK; Université de Lomé; Université de Abomey-Calavi, Benin Republic; Université des Sciences, Techniques et Technologies of Bamako, Mali; and Université de Burkina Faso, Ouagadougou. Moreover, it will benefit in the near future from the input of several new partnerships including Salford University, UK; National Veterinary Research Institute (NVRI), and National Agency for Food and Drug Administration and Control (NAFDAC). However, the type of partnership (teaching, internships, exchange programmes) regarding the MSc in Biotechnology is not provided.

The training programme is supported by National and international socio-economic partners including Council for Advancement and Support of Education (CASE), USA; World Bank, USA, and Association of African Universities, (AAU), Ghana.

The MSc Biotechnology programme includes several core courses permitting students to acquaint skills and expertise for research activities, and the possibility to enrol after the MSc into a PhD programme. During the MSc programme, students have the ability to work with scientists from academia and industry with regard to the world of research. The list of Nigerian laboratories from academia, government agencies and industries supporting the programme has not been provided.

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, 11 MSc in Bioinformatics in the Department of Bioinformatics and Genomics, 9 MSc in Pharmacognosy in the Department of Pharmacognosy, 3 MSc in Pharmaceutical Microbiology in the Department of Pharmaceutical Microbiology, and 2 MSc of Biotechnology in the Department of 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. Gwalgalada Specialist Hospital
- f. Plateau Specialist Hospital
- g. Jos University Teaching Hospital

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

The study programme includes components of teaching through research in particular in the core course entitled « Research Methods in Biotechnology » and also in association with research such as project proposal on the application of biotechnology in a chosen area, and a seminar on an approved topic in biotechnology. In addition, students have also the possibility to participate to local Workshops such as for example the short course on the Applications for cell lines in Phytomedicine research (February 12-16, 2018, ACE PRD Conference Center).

Partnership agreements between the institution and businesses, associations or institutions involved in an activity linked to the study programme have been mentioned during the on-site visit but have not been provided in detail. The list of MOU has not been 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. The detailed contribution of the partner to the programme (i.e., teaching, internship) is not been provided.

Mechanisms are implemented to encourage the mobility of students, teaching and administrative staff. During the discussion with students, one student indicated having been three times and each time for a 3-month period in Oslo for analysis of natural products by using chromatographic techniques. He was supported by his country of origin (Mali). No detailed information is provided.

### 3 – STUDY PROGRAMME TEACHING STRUCTURE

The MSc in Biotechnology programme trains students for knowledge and skills on the principle of Biotechnology with regards to Molecular and Cellular Genetics, Genetic Engineering, Bioinformatics and Environmental, Agricultural, Medical and Pharmaceutical Biotechnology. The teaching of this multidisciplinary curriculum is done by members of the Faculty of Pharmaceutical Sciences and also of Computer Sciences, Plant sciences, Pharmaceutical sciences, Agriculture, Medical sciences, Arts and Education. Students have access to online internet to retrieve scientific information 24-h per day in all facilities. Internship programme allows students to acquire relevant skills, which is scheduled at the end of the first semester. The 1-month internships can take place in an institution outside the location of the programme, for example in Pauco Pharmaceuticals, Gauze Pharmaceuticals, Juhel Pharmaceuticals, and ECWA Pharmaceuticals. The objectives, methods and assessment of the projects and internship are clearly defined and communicated. The study programme includes the possibility of national and international mobility through established partnership. It is important to note that the University of Jos Faculty of Pharmaceutical Sciences is engaged in the research and commercial aspect on anti-snake venom vaccine, anti-fertility drugs, mushroom and Artemisia annua cultivation.

The study programme (MSc in Biotechnology) includes a set of core courses including Introduction of Biotechnology and Bioinformatics, Concepts of Genetic engineering, Molecular Biology and Cytogenetics, Environmental Biotechnology, Industrial and Agricultural Biotechnology, Medical and Pharmaceutical Biotechnology, and professional and research-oriented courses, which are consistent with the objectives defined. 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. The positioning of the different core and elective courses during the MSc programme is not provided. Therefore, it is not possible to appreciate that the study programme is organized so that students can gradually specialize. In case of research, the Master thesis project is based on teaching courses, seminars and the student's interest on a topic related to the application of Biotechnology in a chosen area. Critical reading of scientific articles (10 peer reviewed articles) and scientific communications provide further training of students in the field of research.

No information is provided in the study programme to consider the challenges associated with lifelong learning. E-learning and a computer laboratory are available to all students. Internet access is provided 24-h a day in all facilities.

Courses are taught in English. The study programme is accommodating students with special language needs. International students have the ability to improve their English when arriving in Nigeria. English for Special Purposes (ESP) for regional students from Francophone countries is provided. Special requirements for disability, students with sporting commitments or in employment, etc. are not detailed. The study programme includes teaching components in a foreign language for International students from French speaking Countries since English is the language of courses.

The study programme includes some components to prepare students for employment and inform them about the working world by interacting with people from the industry when they contribute to teaching, and during mentorship of internship. The study programme includes components that focus on understanding the world of research and its results during the elaboration of the research project, development of Master thesis research and writing of thesis under the supervision of a scientist, during their 1-month internship in an industry-related environment at the end of the first semester, during seminars at the level of the Department and University, and during their Master thesis research.

Internships and projects are included in the study programme curriculum with students performing a 1-month internship at an industry-related environment after the first 6 months, and during their Master Thesis research. The objectives, methods and assessment of projects and internships are explicitly stated and understood by students. A service is in place to support students in looking for internships in particular with the help of their supervisor and external supervisor. Little information is provided to students regarding the development of their career.

The study programme allows students to acquire additional skills that are useful for employment or further study and students are made aware of their monitoring and validation or certification methods. Students are trained for additional skills such as general management, financial management, entrepreneurship development, feasibility studies, marketing and managerial problem solving, seminars including discussion with their supervisors.

Students have access to E-learning in a dedicated computer laboratory with Wi-Fi access all over the Campus, and access to data bases such as Science Direct. Interactive (e.g. online courses and exercises, collaborative tools, etc.) or innovative teaching practices (e.g. project-based learning, serious games, active learning in lecture theatres, etc.) are encouraged. Innovative teaching practices include E-learning and project-based learning to define their Master thesis research project.

The study programme offers specific tools for successful programme completion. Refresher courses are proposed for some students starting the study programme, and English as foreign language for students from French speaking countries. Students receive individual support via 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 equipments not available at the Centre.

No information is provided whether the study programme implements tools for successful programme completion (tutoring, division into ability groups, etc.). No information is provided whether there are opportunities to transfer to other study programmes for a change of career plan.

The study programme encourages international mobility by 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 managed 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 for this curriculum, which started in 2017. The methods for student evaluation of teaching are appropriate. Overall the programme management can be improved.

The study programme is managed and has sufficient administrative and teaching resources (administration office, classrooms, libraries, computer rooms, etc.) to enable it to fulfil its mission. The teaching staff includes Professors, senior Lecturers, Lecturers and Readers to cover the different disciplines. 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, and one computer room are appropriate to execute the study program.

During seminars, Master project proposal defence and Master thesis defence, all study programme players (teaching and research members) meet together.

The list of teachers is contained in the Students' handbook and can be assessed at the ACE PRD website. The role and responsibilities of members of the teaching team 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 ACE PRD Students' Handbook. The proportion of teaching entrusted to external teachers from the industrial, socio-economic or cultural sectors consistent with the study programme is not provided. Similarly, their skills and responsibility level is not provided.

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.

Course evaluations include: continuous assessment, seminars, written examination, and 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 Biotechnology, skills include laboratory techniques, analytical techniques, enzyme technology and formulation/processing of Biotechnology Products. No detailed information is provided whether the study programme uses a skills portfolio or similar tool to help students formally record skills acquired.

Student numbers for the study programme are monitored regularly. Detailed information regarding students' numbers for each year is provided. In 2017, the number for MSc in Biotechnology was 4 and 2018, 7 including 6 Female and 5 foreign students. The flow of international students is identified: 2017-2018 5 foreign students were enrolled. However, the country of origin is not provided.

To be eligible for the MSc in Biotechnology, a candidate shall possess a least a second class (Lower Division) degree in Botany or Biological Science (Plant Science) from an approved university with a minimum of CGPA of 3.0/5.0. Candidates from Medical, Pharmaceutical, Veterinary, Agriculture and other relevant applied sciences are qualified to apply. Also, postgraduate diploma in Biotechnology may be considered for admission. To attract international students of West and East Africa, the staff members of the Department of Pharmaceutical Sciences promote on site the different programmes proposed. As a result, 55 applications were received in Liberia, 30 in Kenya, 16 in Togo, 23 in Mali, 22 in Cameroun, 19 in Niger and 17 in Uganda. The number of international students in the MSc of Biotechnology is 5 out of 11 for the first 2 years. Recruitment policies and admission criteria including academic prerequisite (undergraduate degree from a recognized University), and English skills are in lines with aims of the programme and final qualification of the programme

No precise information is provided whether the study programme collects and tracks graduate data to collect information about their situation, employment level and business sector. No precise information is provided



whether stakeholders are aware of the pass rates, proportion of graduates who continue their studies and graduate employment rates.

No precise information is provided regarding methods for student evaluation of teaching, analysis of this evaluation and any follow-up actions. No precise information is provided regarding student and graduate evaluation of the study programme and how it is considered in the self-evaluation process. No precise information is provided whether the study programme is subject to regular and periodic external evaluations.

Information regarding false declaration is provided

## V. CONCLUSION

The Master programme offers advanced training in Biotechnology for students with a second-class degree in Botany or Biological Science with a minimum CGPA of 3.0/5.0, and also for students from Medical, Pharmaceutical, Veterinary, Agriculture and other relevant applied sciences.

The MSc in Biotechnology training programme is a well-structured, multidisciplinary teaching track that provides students with advanced knowledge and skills on various components of Biotechnology including Molecular Biology and Cytogenetics, Concepts of Genetic Engineering, Bioinformatics, Industrial and Agricultural Biotechnology, Medical and Pharmaceutical Biotechnology, Laboratory and Analytical Techniques in Biotechnology, and professional components such as Advanced Entrepreneurship studies, and also courses dedicated to the different aspects of research including seminars and project proposal and defence. Objectives with regard to knowledge and skills to be acquired are clearly stated.

ACE PRD provides an information booklet for students containing detailed information regarding the objectives and content of the programme and policies. Graduates have good job opportunities in a broad domain in the area of healthcare, agriculture and environment and also teaching at the University. The MSc in Biotechnology is positioned within local, national, regional and international range of study programmes through collaborations with universities within the country and also several international universities. The attractiveness of the training programme is indicated by the enrolment of about 45% international students mostly from West and East Africa.

Guest lecturers from partner universities contribute to the training of the students, co-supervision of students, internship locations and collaborative research/publications. Additional training is provided through workshops and short courses on special topics offered by ACE PRD. The internationalization of the programme can be further developed such as by including video-conferences of leading experts and, if possible, short-term training periods in foreign countries, which will further increase the motivation of students, initiate their international network building and their competitiveness on the job market. Students will also get training on understanding the world of research and its results during the elaboration of the research proposal on a topic of interest in interaction with the teaching staff, the development of the Master thesis and writing of thesis under the supervision of a scientist, and during a 1-month internship in an industry-related environment at the end of the first semester.

The environment includes appropriate teaching facilities, a computer room, and 24-h internet access throughout the campus and all facilities. The multidisciplinary teaching team is appropriate to cover the courses of the different disciplines and to mentor students for the research project. The gathering of information regarding the outcome of graduates, and the evaluation of the teaching courses and the programme by students and external examiners would help to further strengthen the appropriateness of this relatively young curriculum with regard to the needs of the professional market.

## STRENGTHS

- Job opportunities in Agricultural, Medical and Pharmaceutical industries, and Universities
- Involvement of several local industrial and hospital partners, and also of a few national and international partners for internships and contribution to teaching
- Attract several students from West Africa Region and provide them with financial student support
- Appropriate number and composition of teaching staff, and of teaching facilities for this multidisciplinary curriculum.

## WEAKNESSES

- Low number of enrolled students, and MSc graduates continuing their education into PhD
- Limited involvement of associate or guest lecturers or researchers to support strong links between teaching and research
- Increase the number of privileged partnerships with industries
- Partnerships with foreign education institutions should be further expanded
- 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
- No detailed evaluation of teaching by students, of programme curriculum by students, and of external evaluators likely to help optimize the content of the programme for better professional integration.

## RECOMMENDATIONS

- Continue to increase the attractiveness of the curriculum for national and international students
- Support further internationalization of the curriculum with involvement of leading international experts to teaching and a short-term international training period for students
- Improve teaching and research networks with regional, national and international partner Universities
- Provide manpower to track the outcome of the curriculum for improved attractiveness, mentoring and network building.

## 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. BIOTECHNOLOGY

The team's response to the report on the programme is based on the summary of the weaknesses herein identified by the agency as follows:

1. The programme is new; this explains the number of students enrolled in the programme. Strategies will be advanced to attract more scholars into the programme as more have been enrolled this session.
2. Efforts will be intensified to have more Guest Lecturers and Researchers to be involved in the programme. Meanwhile, Dr. Obishaki and Dr. Yakubu are lecturers from NVRI Vom
3. Partnerships will be sought across biotechnology companies in Europe and America.
4. Partnerships with foreign education institutions is currently available with Salford University, UK where an anti-snake venom vaccine protein was expressed in the institution's laboratory. Others include New York university, University of Science and Technology Bamako, Mbarara University, Uganda, University of Lomé, Togo, Albomey Calavi University, Cotonou Benin Republic. Efforts will be intensified to have divergent perspectives of researches in more Universities and companies internationally.
5. Currently, students have national exposures through internship placements in some few industries, research institutes with production units. At the international front, some students were hosted for internship at the University of Togo. Attention will be given to more students for international internship placements, conference participation, and exchange programmes.



6. Because it is a new programme, there is nothing much on alumni activities for mentoring, internship and job opportunities. However, efforts are being made to work with sister departments and institutions in Nigeria to open up the programme for networking of the students and job opportunities.
7. The student evaluation practice is noted and will be included in the evaluation of the programme.

Other things raised by the agency concerning the programme include:

Position of the Course in National landscape:

The ranking that will enable the programme evaluate the position is not available. The National Universities Commission (NUC), may do ranking in the future.

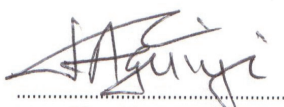
The University of Jos is the only University in the North-Central Nigeria that offers the programme at MSc. level. Close to it in the North-West is the military University, the Nigerian Defence Academy (NDA) Kaduna that offers Genetic Engineering and Biotechnology.

On the matter of the Nigerian Laboratories from academia, plans are being put in place to liaise with pharmaceutical industries to teach the programmes. This will be an extension of the internship programme.

The career plan for students in biotechnology will be included in the curriculum. Biotechnology is all-embracing. It provides a broad background for all disciplines in biotechnology field.

More efforts will be intensified through the video conferencing materials at the ACEPRD and smart boards at the Department to connect students to webinars and international guest lecturers towards discussion of some development in the fields.

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/)  
<http://aceprd.unijos.edu.ng/playing-video-d6aea9cb-613a-4b36-889b-bb29a145bd69/>

## ACCREDITATION DECISION

### **M.Sc. Biotechnology**

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

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**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](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 in Biotechnology programme at the African Center of Excellence in Phytomedicine Research and Development in the University of Jos is positioned to offer scientific students with advanced education on the principle of Biotechnology with particular interest in genome modulation to develop innovative products, which have a very broad field of application in the area of healthcare, agriculture and environment. The programme enables students to obtain strong knowledge and expertise at the molecular and cellular level and of the different concepts and techniques used for genetic engineering. Specific courses are dedicated to the field of Industrial, Agricultural, Medical and Pharmaceutical biotechnology. The programme will also provide training of practical aspects of Biotechnology including the different laboratory and analytical techniques, enzyme technology as well as formulation and processing of biotechnology products. It also provides expertise in administrative and managerial aspects and the requisite skills and knowledge to undertake original research in different aspects of Biotechnology to be able to enter the professional world or engage into a PhD programme in Biotechnology. Objectives regarding knowledge and skills to be acquired are clearly presented. The name of the programme is clear with regard to its objectives and content. 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 Biotechnology is well positioned in terms of job opportunities. Overall the aims of the study programme are appropriate and well communicated to students.

## 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 Biotechnology 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. The programme offers a limited number of components of teaching through research and proposes several components in association to research such as internship, seminar, and workshops. Courses appear to be taught mostly in the form of lectures. An extension of the duration of the internship to 3 months in an industry related environment would further strengthen the expertise in skills and the professional experience for this attractive track for Agricultural, Medical and Pharmaceutical industries. Integration of training for scientific communication (oral, poster) would further increase the competitiveness of the track and optimize the curriculum for subsequent PhD enrollment. Mechanisms to encourage the mobility of students, teaching and administrative staff mobility are indicated.

## 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 Biotechnology programme trains students for knowledge and skills on the principle of Biotechnology with regards to Molecular and Cellular Genetics, Genetic Engineering, Bioinformatics and Environmental, Agricultural, Medical and Pharmaceutical Biotechnology. The teaching of this multidisciplinary curriculum is done by members of the Faculty of Pharmaceutical Sciences and also of Computer Sciences, Plant sciences, Pharmaceutical sciences, Agriculture, Medical sciences, Arts and Education. Students have access to online internet to retrieve scientific information 24-h per day in all facilities.

Internship programme allows students to acquire relevant skills, which is scheduled at the end of the first semester. The 1-month internships can take place in an institution outside the location of the programme but the list of the industrial partners is not provided. Students obtain information regarding the development of their career by interacting with the teaching staff and people from the industry and hospital, yet a specific information session dedicated to the different job opportunities and additional training possibilities offered by this multidisciplinary programme to graduates would be pertinent. The objectives, methods and assessment of the projects and internship are clearly defined and communicated. A service is in place to support students in looking for internships in particular with the help of their supervisor and external supervisor. Students have access to online internet to retrieve scientific information 24-h per day in all facilities. The study programme includes the possibility of national and international mobility through established partnerships.

## 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 managed 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 for this curriculum, which started in 2017. The methods for student evaluation of teaching are appropriate. Overall the programme management can be improved.

## ACCREDITATION DECISION

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

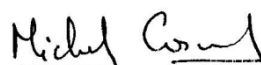
### **“Five-year unreserved accreditation decision”**

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

- Continue to increase the attractiveness of the curriculum for national and international students.
- Support further internationalization of the curriculum with involvement of leading international experts to teaching and a short-term international training period for students.
- Improve teaching and research networks with regional, national and international partner Universities.
- Provide human resources to track the outcome of the curriculum for improved attractiveness, mentoring and network building.

### **SIGNATURE**

For HCERES and on behalf of



Michel COSNARD,

President

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

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are available online : [www.hceres.com](http://www.hceres.com)

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