

## **EVALUATION AND ACCREDITATION DOCUMENTS**

### **M.Sc. Power Engineering**

Africa Centre of Excellence for Sustainable  
Power and Energy Development (ACE-SPED)

University of Nigeria Nsukka (UNN)

Nsukka, Nigeria

**June 2024**

Rapport publié le 12/07/2024

# CONTENTS

Evaluation report	pages 1 to 13
Comments of the institution	page 14
Accreditation decision	following pages

## EVALUATION REPORT

### M.Sc. Power Engineering

Africa Centre of Excellence for Sustainable  
Power and Energy Development (ACE-SPED)

University of Nigeria Nsukka (UNN)

Nsukka, Nigeria

**May 2024**

The University of Nigeria Nsukka has mandated the Hcéres to perform the evaluation of its Power Engineering MSc programme. The evaluation is based on the “External Evaluation Standards” of foreign study programmes, adopted by the Hcéres Board on 31<sup>st</sup> January 2022. These standards are available on the Hcéres website ([hceres.fr](http://hceres.fr)).

On behalf of the experts committee<sup>1</sup> :

Olivier Boutin, President of the committee

In the name of Hcéres<sup>1</sup> :

Stéphane Le Boulter, Acting President

<sup>1</sup>In accordance with articles R. 114-15 and R. 114-10 of the Research Code, evaluation reports are signed by the chairman of the experts committee and countersigned by the President of Hcéres.

# CONTENTS

<b>I. STUDY PROGRAMME IDENTITY SHEET .....</b>	<b>2</b>
<b>II. PRESENTATION OF THE STUDY PROGRAMME.....</b>	<b>3</b>
1 – Presentation of the study programme .....	3
2 – Presentation of the programme's self-evaluation approach .....	3
<b>III. COMPOSITION OF THE EXPERTS PANEL .....</b>	<b>4</b>
<b>IV. VISIT DESCRIPTION .....</b>	<b>4</b>
<b>V. EVALUATION REPORT .....</b>	<b>5</b>
1 – Training policy and characterisation .....	5
2 – Pedagogical organisation of the study programme.....	6
3 – Attractiveness, performance and relevance of the study programme .....	7
4 – Academic programme management and continuous improvement .....	8
<b>VI. CONCLUSION.....</b>	<b>10</b>
Strengths.....	10
Weaknesses .....	10
Recommendations .....	11
<b>VII. COMMENTS OF THE INSTITUTION .....</b>	<b>12</b>

## I. STUDY PROGRAMME IDENTITY SHEET

- University: University of Nigeria Nsukka (UNN), Nsukka, Nigeria
- Title of the programme: MSc Power Engineering
- Year of creation and context: 2019. The programme M.Sc. Power Engineering has been supported by ACE-SPED since its creation. It was established from two previous M.Sc. programmes hosted by the Faculty of Engineering.
- Site where the programme is taught (town and campus): University of Nigeria Nsukka (UNN), Nsukka, Nigeria

### PROGRAMME DIRECTORS

- Surname, first name: Eke, Mkpamdi Nelson
- Profession and grade: Senior Lecturer
- Main subject taught: Thermodynamics
- Surname, first name: Ogbuefi, Uche Chinwoke
- Profession and grade: Associate Professor
- Main subject taught: Power systems analysis

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

- In 2022, the programme was evaluated by the National Universities Commission (NUC). The programme received its full accreditation by the NUC for 5 years, from April 2022 to April 2027.
- No previous international accreditation.

### HUMAN AND MATERIAL RESOURCES DEDICATED TO THE PROGRAMME

#### – Human resources

<b>Academic staff</b>	Professors	Associate Professors	Senior Lecturers	Lecturers	<b>Total</b>
	<b>4</b>	<b>3</b>	<b>8</b>	<b>2</b>	<b>17</b>
<b>Technical staff</b>	Chief Laboratory Supervisor	Assistant Chief Technologist	Technologists and Senior Technologists	Others	<b>Total</b>
	<b>1</b>	<b>1</b>	<b>20</b>	<b>3</b>	<b>25</b>
<b>Administrative staff</b>	Deputy Bursars	Principal and Higher Executive Officers	Assistant Registrar	System Analyst	<b>Total</b>
	<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>7</b>

**Material resources:** the M.Sc. Power Engineering programme provides students with an extensive array of cutting-edge laboratory and workshop equipment, ensuring a thorough and hands-on learning experience in the field of electrical engineering. Here's an overview of the specific resources available:

- Laboratory Equipment:

AC and DC Machines: Including single-phase and three-phase machines with comprehensive test panels, allowing students to explore the principles and applications of electrical machinery.

Machines Laboratory: Featuring digital oscilloscopes, AV.O. meters, transformers, electric motors/generators (DC and AC), and other instruments essential for understanding machine behaviour and characteristics.

Machines Workshop: such as electrical winding machines, transformers, drilling machines, and welding equipment, facilitating hands-on experience in machine assembly and maintenance.

High Voltage Laboratory: Equipped with advanced testing transformers, ignition amplifiers, and various capacitors, providing a dedicated space for students to study high-voltage phenomena and applications.

Power Electronics Control and Instrumentation Laboratory: Equipped with a range of instruments including standard resistances, LF frequency generators, oscilloscopes, and power supplies, enabling students to delve into power electronics and control systems.

- Software Resources:

Matlab, and Scilab, modeling, and analysis in power engineering. Students can utilize industry-standard software for circuit design such as PSCAD, power system simulation, and control system analysis.

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

		2019/2020	2020/2021	2021/2022	2022/2023
<b>Enrolment</b>	Male	1	2	4	10
	Female	0	0	2	2
	<b>Total</b>	<b>1</b>	<b>2</b>	<b>6</b>	<b>12</b>
	<i>including foreigners</i>	0	0	1	5
<b>Graduates</b>	Male	-	-	1	2
	Female	-	-	0	0
	<b>Total</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>2</b>
	<i>including foreigners</i>	-	-	0	0

## II. PRESENTATION OF THE STUDY PROGRAMME

### 1 – Presentation of the study programme

The Africa Centre of Excellence for Sustainable Power and Energy Development (ACE-SPED) is a World Bank supported Centre of Excellence located on the main campus of the University of Nigeria, Nsukka, in Enugu State, Nigeria. Established in 2019, the primary objective of the Centre is to address the energy and power challenges prevalent in the West and Central Africa sub-regions by leveraging effective research and training initiatives in the sector. The Centre offers a diverse range of academic programmes at both the master's and Ph.D. levels, covering various aspects of sustainable energy and power developments. These programmes include Renewable & New Energy Systems, Power Engineering, Sustainable Energy Materials, Control & Instrumentation Engineering, Industrial Electronics & Power Devices, Energy Policy, Regulation & Management, Engineering Design & Product Development, and Management of Technology & Innovation.

The Power Engineering master's programme consists of 17 courses divided into two semesters, with eight courses in semester one and nine courses in semester two. Each course has a duration of 45 hours, except for the project and internship, which require 90 hours and 15 hours respectively.

In the first semester, there are five compulsory core courses and three ancillary courses, each worth three credits. To successfully complete the first semester, a student must earn a total of 24 credits. Credits are assigned based on the number of hours in each module, with 1 credit equivalent to 15 hours of study.

The second semester includes compulsory core courses, elective core courses (student choose two), and compulsory thesis-based courses. To pass the second semester, a student must obtain 25 credits.

This teaching programme encompasses a curriculum centred on Engineering and Renewable Energy technologies. It comprises courses such as engineering research methodology and ICT, engineering systems design methods and analysis, introduction to renewable and new energy technologies, advanced thermodynamics, solar energy conversion, power systems analysis, power systems monitoring and protection, alongside industrial internships and master's projects. Additionally, it addresses topics including advanced fluid mechanics, power grid technology and substation design, power system communication and control, advanced heat and mass transfer, and direct energy conversion.

### 2 – Presentation of the programme's self-evaluation approach

Although the Faculty of Engineering has a committee on quality assurance, no information was provided on the way self-evaluation was conducted. The submitted self-evaluation report was comprehensive, with appendices providing qualitative and quantitative data. A few additional documents were requested, and all were received within the week.

### III. COMPOSITION OF THE EXPERTS PANEL

- **Olivier BOUTIN**, Chair of the panel, Full professor, Aix-Marseille University, France
- **Renaud BOUCHET**, Full professor, INP Grenoble, France
- **Melika HINAJE**, Full professor, University of Lorraine, France
- **Julie FINKEL**, Ph.D. candidate, University of Montpellier, France

Hcéres was represented by **Zakia MESTARI**, project manager, Europe and International Department.

### IV. VISIT DESCRIPTION

- **Date of the visit:** the visit occurred on Friday 19<sup>th</sup> January 2024.
- **Summary of the proceedings:** before the visit, the experts received the self-evaluation report and numerous appendices. Two preparatory meetings were held between the Director of the Hcéres Europe and International Department, the project manager, and the panel of experts in Paris on 20<sup>th</sup> December and online on 8<sup>th</sup> January. The on-site visit lasted for one day and followed a schedule agreed upon by ACE-SPED, the National Universities Commission, and the panel. During the visit, the experts requested a few more documents to obtain quantitative data, all of which have been received.
- **Organisation of the visit:** due to safety reasons, the visit was arranged in hybrid mode in Abuja, and the panel was unable to visit the Centre in Nsukka. The Centre leaders, the programme director, and the postgraduate coordinator of the University of Nigeria, Nsukka, met the panel in Abuja, as along with some students and academics.
- **Cooperation of study programme and institution to be accredited:** ACE-SPED has been cooperative throughout the process. The self-evaluation report was submitted as per the agreed schedule, and all questions asked before and during the visit were answered clearly and precisely. The panel is satisfied that the conclusion reached is based on available and relevant information. Moreover, the involvement of the National Universities Commission has been very helpful throughout the process.
- **People met:** the panel had the opportunity to meet with 31 individuals from various panels:

	Session	Audience
8:00 – 9:30	Presentation of the programme and discussion with the top management	Centre Leaders, programmes directors and their teams
9:30 – 10:30	Academic staff	Representative panel of academics from both programmes
10:45 – 11:45	Quality assurance	Quality assurance representatives
11:45 – 12:45	Alumni	Representative panel of alumni
13:45 – 14:45	Socio-economic partners and employers	Representative panel of socio-economic partners and employers
14:45 – 15:45	Students	Representative panel of students from both programmes
16:30 – 17:00	Closing session	Centre Leaders, programmes directors and their teams



## V. EVALUATION REPORT

### 1 – Training policy and characterisation

**The M.Sc. Power Engineering adheres closely to the University of Nigeria Nsukka's postgraduate regulations, thereby reflecting the university's overarching training strategy.** The Africa Centre of Excellence for Sustainable Power and Energy Development (ACE-SPED) is located within the University of Nigeria, Nsukka, Enugu State, Nigeria, and it was established in 2019. Among its array of programmes, the M.Sc. Power Engineering stands out as one of the six offerings under the Centre's umbrella. These programmes are intricately designed to complement each other within the broader field of Energy. The Power Engineering programme aligns with regional strategy and maintains close ties with the industrial sector. The programme is multidisciplinary, incorporating various scientific fields such as Electrical Engineering, Thermodynamics and Fluid Mechanics. The curriculum is designed by experts and delivered by local lecturers who tailor it to the local context. Practical exercises may take place in laboratories or on industrial settings. The curriculum undergoes scrutiny by a committee to prevent overlap with other courses. While the programme lacks interdisciplinarity engagement with socio-economic or humanities fields, such integration can occur through project implementation. Sustainable development principles are well integrated into the curriculum, particularly evident in courses such as "Introduction to Renewable and New Energy Technologies" and "Principles of Renewable and New Energy Technologies".

**Agreements with other African universities have facilitated the international expansion of the programme and contributed to its increased student enrolment.** For instance, the agreement with University of Cape Town for the Transforming Energy Access – Learning Partnership (TEA-LP) is part of the broader Transforming Energy Access (TEA) programme that is a research and innovation platform that aims to ensure access to affordable, reliable, sustainable, and modern energy for all. TEA-LP aims to address the skills gap in the energy access sector by equipping graduates and professionals with the necessary knowledge and competencies to enhance energy access within their countries. Courses under this partnership were conducted at the University of Cape Town in June 2023. Additionally, the WACEENET Mobility Programme offers grants for international mobility, which in November 2023 funded a one-month stay for five students, and a two-week stay for one university staff. Numbers are not yet finalised and are expected to increase further. This programme has also strengthened ties with Universities in Togo, Ghana, and other countries. In 2021, a sharp increase of the number of students was possible thanks to the arrival of foreign students, mainly from Liberia. This international opening began modestly in 2021 (16% of the graduating class) and has since grown significantly, with further progress expected thanks to the three international partnerships signed (Togo, Ghana and South Africa) and with two other universities in the country.

**The TEA-LP project serves as a prime example of the integration between teaching and research within the programme.** It encompasses a research project that carries six credits and is overseen by a faculty member. This project culminates in a written report and an oral presentation to a jury comprising both internal and external members. Students are equipped with resources such as library access, digital books, subscriptions to scientific journals such as Elsevier, and software such as Matlab and hardware. Encouraging students to publish research papers, under the guidance of both researchers and teaching staff, underscores the programme's commitment to the research community. Assessment procedures, as outlined in the guidelines of the School of Postgraduate Studies of the University of Nigeria, include considerations for scientific integrity. The link between teaching and the Master's degree is further solidified through the involvement of both teachers and researchers in the field.

**The curriculum demonstrates a strong connection to the industrial sector through a month-long immersion experience for each student within one of the Centre's partner companies.** As part of the programme requirements, all ACE-SPED students are mandated to undertake at least a one-month internship in a private company. This approach aims to align courses closely with the skills requirements of industries, thereby facilitating graduate recruitment. The Industrial Liaison Office is tasked with identifying suitable companies for the internships. Following this, students are supervised by appointed staff members during their internship period. Upon completion, students are required to present a written report, typically an ACE-SPED approved logbook, and deliver an oral presentation at the Centre. Additionally, students receive training in CV writing and interview preparation.

**In conclusion, the M.Sc. programme aligns well with regional strategies, integrating various scientific fields like Electrical Engineering, Thermodynamics, and Fluid Mechanics, but showing a need for enhanced interdisciplinarity. Sustainable development principles are effectively woven into specific courses. Internationalisation efforts, notably through partnerships with universities in Togo, Ghana, and South Africa, as well as through collaboration within the country, have led to increased enrolment of foreign students since 2021.**

**The inclusion of a research project, coupled with defined assessment procedures, underscores the programme's academic rigor and its standing within the research community, notably by encouraging students to publish research papers under the supervision of both a researcher and a member of the teaching staff.**

**The programme demonstrates a strong connection to the industrial sector through numerous industrial partnerships, enabling the programme to place its students easily in internships. The duration of the internship, which is only one month, seems too short to enable students to invest fully in their internship and thus in the industrial issues assigned to them. These partnerships also make it possible to adapt programmes to meet skills needs effectively.**

## 2 – Pedagogical organisation of the study programme

**The objectives of each course are clearly defined, ensuring that students understand the knowledge and skills they are expected to acquire.** The multidisciplinary approach to training is supported by individual supervision from two teachers representing different departments, enhancing student success. In case of exam failure, students are provided with opportunities to retake exams, with terms and conditions clearly communicated. Additional support through tutoring is available for students facing difficulties. To further enhance the programme's effectiveness and promote interdisciplinary learning, it would be beneficial to establish connections between programmes. Implementing mechanisms for students to switch programmes or explore new disciplines during their studies can increase flexibility. Transferable credits or a structured pathway within the programme can facilitate interdisciplinary exploration and skill development.

**Moreover, to ensure the success of the programme and alignment with industry needs, the teaching team employs diverse teaching methods.** All courses are as available in either face-to-face or online formats, with the exception of courses delivered by foreign university lecturers. Lecturers record their courses in the ACE-SPED studio, except for those teaching abroad. These recordings are then compressed and distributed directly to students or uploaded onto the Learning Management System (LMS). Additionally, students have the opportunity to take courses outside their own University, as permitted by postgraduate studies regulations. To maintain high-quality teaching and pedagogical consistency, each course involves a minimum of two teachers with expertise in the discipline. For multidisciplinary courses, up to five teachers from different departments may be involved. A coordinating teacher ensures coherence among the teachers and serves as the main contact point for students, facilitating communication.

**No specific preparation is offered for incoming and outgoing mobility, which could be an area for further development and enhancement.** Nevertheless, non-English-speaking students from foreign countries are provided with intensive English courses during the first semester (3 times a week, 4 hours per course at the Language Department), and students have the opportunity to obtain certification upon completion. As Nigeria is surrounded by French-speaking countries, intensive English classes are offered for four hours per week throughout the first semester.

**Every student enrolled in the Centre is mandated to undertake a minimum one-month internship in a private company.** The Industrial Liaison Office, a division within the Centre, assists in identifying suitable internship placements, and each student is supervised by a staff member from ACE-SPED during their internship. Alternatively, students have the liberty to secure their own internships, subject to approval from the Industrial Liaison Office to ensure alignment with programme objectives. Internships outside partner companies have proven beneficial, expanding the Centre's network and generating interest from company staff in participating in short courses derived from the programme. Given the preference of international students to conduct internships in their home countries, the network extends beyond national borders. Each student on internship is assigned a supervisor from the ACE-SPED staff, responsible for overseeing the internship's progress and ensuring alignment with the Centre's objectives. The supervisor conducts site visits to assess the internship's implementation and confirm that the working conditions conducive to successful completion are met.

**In conclusion, the M.Sc. programme presented demonstrates a meticulous and comprehensive approach to learning methods. Clear objectives and prerequisites for each course ensure students are well-prepared for their educational journey. The selection process, which includes transcript evaluation and potential redirection for better alignment, underscores a commitment to student success.**

**The programme's multidisciplinary nature is supported by the guidance of two teachers from different departments for each student, fostering a well-rounded educational experience. Flexible teaching methods, including both face-to-face and online options, cater to diverse student needs and geographical locations. The integration of foreign lecturers and mobility grants for international exchanges enriches the learning environment, as evidenced by the significant number of foreign students.**

**The emphasis on English proficiency is notable, particularly in welcoming students from neighbouring countries in a region surrounded by French-speaking nations, with dedicated classes provided. The involvement of a coordinating teacher and a student representative ensures effective communication and support within the**

programme. Additionally, the inclusive approach to project topics, supervisor selection, and industry internships adds a practical dimension to the curriculum, aligning students with real-world applications of their knowledge. Overall, the programme demonstrates a holistic and forward-thinking approach to education, preparing students for success in their chosen fields.

### 3 – Attractiveness, performance and relevance of the study programme

The programme employs a variety of channels to reach a diverse audience, including distributing flyers, maintaining a dedicated website, networking with universities in Nigeria, South Africa, Togo, and Ghana, and active engagement on social media platforms. Additionally, bi-annual workshops hosted by the Association of African Universities and visits by students and teaching staff to Ghana and Togo, facilitated by WACEENET mobility, serve as opportunities for physical outreach. Regional students play a pivotal role in promoting the programme in their home countries. Notably, the programme's commitment to offering full scholarships to regional students aligns with the World Bank's goal of admitting 25% of regional students. The programme also tackles language barriers through a support initiative tailored for non-native English speakers, culminating in a proficiency certification. While Nigerian students may receive full tuition coverage, the absence of complete scholarships poses challenges. However, the programme's hybrid format, combining digital and in-person elements, accommodates students who opt to continue working while pursuing their studies. The programme's uniqueness stems from its multidisciplinary approach, which integrates electrical engineering and mechanical engineering, distinguishing it within the region. Orientation sessions are provided for all new students upon admission. **The programme attracts few students (compared with other master's programmes at the University), with only one student enrolled in 2019 and six in 2021.** This trend can be attributed to the recruitment pool and the multidisciplinary nature of the programme. Students entering this master's programme typically have backgrounds in mechanical and electrical engineering, necessitating for them, significant investment in unfamiliar disciplines. However, as the course aims to train engineers in tune with today's energy issues, a shift in mindset is necessary, which may take time. A notable increase occurred in 2021 will the number of students doubling, largely due to the influx of foreign students, who comprised 40% of the graduating class, primarily from Liberia. Efforts to attract a diverse student body have yielded positive results, evidenced by the growing number of applicants each year. Notably, in the academic year 2022-2023, out of 140 applicants to the centre, 36 sought admission to this specific programme, resulting in an admission rate of 33.3%.

The programme maintains a robust system for monitoring student success, encompassing various assessment methods such as class quizzes, take-home assignments, practical reports, written examinations, seminar presentations, and project execution and presentations. These evaluations contribute to improve student performance, facilitate self-assessment, and refine support measures. Given the diverse engineering backgrounds from which students may come from, particular attention is paid to those who may require additional support. During internships, students undergo continuous monitoring through daily logbooks and oversight by visiting professors, even when internships are conducted abroad. The programme actively solicits feedback through lecture evaluation surveys, and successful student outcomes are transparently shared on the Centre's website.

The programme adopts the graduate tracer mechanism developed by the Association of African Universities (AAU) to monitor and track the progress of graduates. Beyond academic pursuits, the programme offers additional training to prepare students for integration into the job market, including entrepreneurship courses. An industrial liaison officer provides assistance to students, and the Centre maintains a network of over fifty companies in Nigeria and abroad. Some graduates secure positions with companies where they completed their internships, demonstrating the programme's success in facilitating job-market integration. However, despite these achievements, the number of graduate students remains relatively low, with only three since 2019. Detailed information about graduate students and their contact details is publicly accessible on the Centre's website, ensuring transparency about the programme's outcomes.

In conclusion, the programme employs a variety of strategies, both virtual and physical, to enhance its appeal to different audiences, leveraging participation in African networks such as AAU and WACEENET. A targeted approach to attract regional students, including offering full scholarship and language support programmes, has resulted in different student body from countries like Liberia, Cameroon, and Ivory Coast, alongside Nigerian students. While the absence of full scholarships for Nigerian students present a challenge, the programme's flexibility accommodates students balancing work and studies. Monitoring of the programme's attractiveness reveals a steady increase in applications over the past four years, from three to 36 applicants. Student success is regularly monitored through various methods, aiding self-assessment and tailoring support measures to students from diverse academic backgrounds, such as mechanical engineering and electrical engineering. The programme utilises the graduate tracer mechanism developed by the AAU to track the progress of the graduate students, with both student success and graduate information publicly available on the programme's website. However, the number of graduate students since 2019 remains low with only three graduates.

#### 4 – Academic programme management and continuous improvement

**The organisation of roles and responsibilities within the programme management greatly contribute to its cohesive and efficient operation.** The responsibilities of the teaching team are clearly defined, ensuring clarity and accountability. Regular communication channels are established between the Centre manager, programme coordinator, and teaching team, with monthly meetings facilitating ongoing collaboration and coordination. Moreover, a discussion group has been set up by the teaching team, including students, to ensure regular, ongoing monitoring. Teachers are provided in opportunities to attend monthly seminars or training courses for instance on hardware and software. Moreover, mobility grants, such as the "WACEENET Mobility Program", offer opportunities for staff members to engage in exchanges and broaden their experiences. For example, in November 2023, this grant supported a one-month stay for a university staff member, with expectations for increased participation in the future. The list of programme contributors (exclusively academics) and their status is published in the master's handbook supplied to students. Nearly half of these contributors hold the rank of professor and represent various departments, including Agriculture & Bioresources Engineering, Mechanical Engineering, Electronic, and Electrical Engineering. With a substantial number of 22 contributors covering all fields taught within the programme, there is ample coverage to accommodate potential increases in student numbers or the introduction of work-linked training or continuing education initiatives.

**The programme benefits from ample resources, both in terms of personnel and facilities, despite its relatively small student population.** Adequate staffing levels ensure efficient programme management, with dedicated administrative, teaching, and technical staff. The programme classrooms well-equipped with two classrooms featuring modern technological infrastructure. Rich academic resources enhance the programme's offerings, including access to a library with subscriptions to 92 journals in the field of energy, both in physical and electronic formats. To facilitate project works, the teaching team leverages its network of collaborators to place students in laboratories or research institutes with the necessary facilities. This arrangement is temporary until the Centre establishes its own premises and equips them adequately. Extensive laboratory facilities, equipped with advanced analytical equipment (Soxhlet extractor, dissolved oxygen meter, elemental analyser, X-ray diffractometer, Fourier Transform Infrared Spectroscopy etc.), and specialised tools for renewable energy research provides students with hands-on learning experiences (biogas digester, gasifier plant (100 and 500 kVA), 15kW Solar PV mini grid etc.). Access to essential software tools, such as regression analysis and modelling software, Matlab, ANSYS, FLUENT, etc. Moreover, ongoing infrastructure developments, such as the renovation of foreign students' residence halls and the construction of the permanent ACE-SPED site, underscore the commitment to enhancing the programme's capacity and facilities for student support and accommodation. Some of the teaching staff can benefit from the WACEENET international network to receive training and develop collaborations. Other teaching staffs have received trainings to enhance their teaching practices in Abuja and share their learnings with colleagues. A considerable portion of the teaching staff holds a Ph.D. from a foreign university (China, the United Kingdom, South Africa, etc.). The teaching team is responsible for proposing project topics and assigning supervisors, although students may also suggest topics provided they align with the objectives of the programme. With access to sophisticated laboratory equipment and software resources, M.Sc. Power Engineering students have all the tools needed to conduct in-depth research, practical experiments, and real-world applications. This robust infrastructure prepares graduates to thrive in the dynamic and challenging field of Power Engineering.

**The M.Sc. Power Engineering has implemented continuous improvement initiatives, which include surveys to assess teaching quality, period courses evaluations before and after examinations, and mandatory online surveys for students.** Feedback obtained through these channels is anonymous. While a student representative facilitates information exchange between the teaching team and students and forward requests, they do not hold positions on any of the Centre committees or boards. External evaluation of the courses is achieved by the National Universities Commission, which accredited the programme for a duration of five years.

**The improvement of the programme is ensured by a Quality assurance committee that is common to all specialities within the Centre.** This committee's members collaborates closely with the University of Nigeria's quality assurance committee to ensure consistency between the two entities. Admission requirements adhere to the standards set by the University of Nigeria, with ACE-SPED requiring a minimum CGPA of 2.75 (compared to the University's 2.50 out of 5.00) from an accredited University in relevant Engineering or Physical Science disciplines for entry into the Masters' degree programme. Upon formal application to the Centre and submission of transcripts from their previous university, Prospective students meeting the minimum requirements must formally apply to the Centre and submit transcripts from previous university. Successful applicants are then invited to participate in a written examination followed by an oral interview conducted by the admission committee. The list of successful students is subsequently published on the Centre's website. Upon completion, students are required to submit a written report and deliver an oral presentation in the Centre. The report must

be an original work, not previously submitted for other academic purposes. The University's regulation policy explicitly addresses plagiarism concerns, with anti-plagiarism measures in place, including the provision of a plagiarism test certificate prior to the oral presentation. Students have access to plagiarism detection software to verify their work before submission.

**In conclusion, the ACE-SPED Power Engineering M.Sc. programme exemplifies a well-organised and effective approach to programme management, ensuring coherence and efficiency. Clear roles and responsibilities within the teaching team contribute to a positive and supportive environment, with regular communication among the centre manager, programme coordinator, and teachers.**

**Teachers benefit from support initiatives like discussion groups and opportunities for professional development through seminars and training courses. Mobility grants further enhance the programme's flexibility, allowing staff to participate in international activities. The extensive list of academic contributors, spanning various departments, reflects a diverse and substantial faculty, well-prepared for potential increases in student numbers or new educational offerings.**

**Internship experiences, whether within partner companies or elsewhere, highlight the programme's dedication to translating theoretical knowledge into practical application within the professional environment. The rigorous supervision process, anti-plagiarism measures, and adherence to university regulations ensure the quality and integrity of student work.**

**Quality assurance measures, in collaboration with the University of Nigeria, underscore the programme's commitment to maintaining high standards. Continuous improvement is evident through regular surveys, both internal and external evaluations, and alignment with university admission requirements. The programme's accreditation by the NUC for five years further solidifies its commitment to delivering a high-quality education.**

## VI. CONCLUSION

The Master's programme strategically aligns with regional goals, demonstrating a robust connection to the industrial sector through numerous partnerships. Students undergo a one-month immersion internship in partner companies, aiming to tailor programmes to meet skills requirements effectively. These internships emphasise translating theoretical knowledge into practical application, with stringent supervision and anti-plagiarism measures ensuring the quality of student work.

While the programme's multidisciplinary nature covers scientific fields like electrical engineering and fluid mechanics, there is a recognized need for increased interdisciplinarity, especially with socio-economic and humanities fields, which could be addressed through project implementation. Sustainable development principles are well-integrated into specific courses, enhancing the curriculum's holistic dimension.

The programme stands out in the research community by encouraging students to publish research papers under the joint supervision of a researcher and a teaching team member, highlighting its commitment to academic rigor. The emphasis on English proficiency for students from neighbouring countries, along with the involvement of a coordinating teacher and student representative, ensures effective communication and support within the programme. The inclusive approach to project topics, supervisor selection, and internships adds practical relevance to the curriculum. The programme's holistic and forward-thinking approach, preparing students for success, is notable.

In summary, the Master's programme's meticulous and comprehensive approach to student selection, learning methods, and overall management is evident. Clear objectives and prerequisites ensure students are well-informed, with a selection process that prioritise their success. The multidisciplinary nature, supported by guidance from different departments and flexible teaching methods, enhances the learning environment, further enriched by the integration of foreign lecturers. Despite initially low enrolment, a significant surge in 2021 (doubling student intake) attributed to the inclusion of foreign students (particularly from Liberia) reflects the programme's growing internationalisation through partnerships with universities in Togo, Ghana, and South Africa.

The Power Engineering Master's programme exhibits a well-organised and effective management approach, fostering a positive and supportive environment through clear roles and responsibilities. Teacher organisation, discussion groups, and professional development initiatives contribute to a substantial and diverse faculty, ready for potential growth.

The multidisciplinary Master's project aligns with the programme's holistic approach, while quality assurance measures underscore its commitment to high standards. Continuous improvement through surveys, evaluations, and accreditation further solidify the programme's dedication to delivering high-quality education. ACE-SPED Power Engineering Master's programme stands as a model of excellence, blending practical experiences, academic rigor, and ongoing improvement to prepare students for success in their chosen fields.

### Strengths

- The multidisciplinary approach: the inclusion of diverse scientific fields, such as Electrical Engineering, Thermodynamics, and Fluid Mechanics, represents a significant strength, and this approach extend to student supervision, with each student being assigned two supervisors from different departments
- The availability of multipurpose equipment in a central laboratory for common use, along with flexibility of teaching methods, including face-to-face and online courses, as well as the opportunity for staff to engage in international activities through mobility grants, offers crucial adaptability to the programme
- The rigorous supervision of internships in companies and Master's projects: with internal and external examiners, it ensures the quality of students' work
- The numerous industrial partnerships, which facilitate placement of students in internships
- The expansion of internationalisation through partnerships with universities in Togo, Ghana, and South Africa, along with national collaboration, enhances cultural diversity and exchange opportunities, representing a significant strength

### Weaknesses

- The lack of practical works, particularly during the project phase, poses a challenge: the fact that students come from either mechanical or electrical engineering backgrounds clearly indicates that

Mechanical Engineering students do not have the prerequisites for practical work in Electrical Engineering, and vice versa for Electrical Engineering students

- The too short internship duration (one month)
- The lack of inclusion of the socio-economic actors in the teaching programme, which would better prepare students for the job market or entrepreneurship
- The absence of a policy for work-linked training or continuing education: the numerous partnerships with industry provide fertile ground for work-linked training programmes especially for students from modest social backgrounds and/or with grants that do not cover all expenses
- The lack of a students' representative in the University boards

## Recommendations

- Introduce practical works, particularly during the project phase, to address the gap between students from different engineering backgrounds. Develop a curriculum that harmonises practical skills, ensuring all students, regardless of their engineering specialisation, acquire essential skills in both mechanical and electrical engineering.
- Consider extending the mandatory internship duration beyond one month, as requested by both industrial partners and students. A longer duration, perhaps up to six months, would provide a more comprehensive experience, align better with industry expectations, and improve learning outcomes. Alternatively, combine the Master's project with the industrial internship to extend the duration of industrial experience.
- Integrate real-world projects, case studies, and guest lectures from industry experts into the curriculum to provide students with practical insights and prepare them for the job market or entrepreneurship.
- Develop and implement a policy for work-linked training programmes and continuing education. Leverage existing partnerships with industry to create opportunities for students, especially those from modest social backgrounds or with limited financial means, to gain practical experience and enhance their employability.
- Facilitate students' involvement in decision-making processes by appointing students' representatives to relevant boards or committees. This inclusion would ensure that students have a role in programme development and provide valuable perspectives on improvements.

## VII. COMMENTS OF THE INSTITUTION



The World Bank



AFRICA CENTRE OF EXCELLENCE FOR SUSTAINABLE POWER AND ENERGY DEVELOPMENT

UNIVERSITY OF NIGERIA, NSUKKA  
OFFICE OF THE DIRECTOR

☎: (+234) 812 586 4681  
(+81)90 2700 4888

Date: 2024.05-30.

Ref: UNN/ACE-SPED/PE/24  
.....

*The Acting President,*  
Hcéres Accreditation Agency  
Paris, France.

Dear Mr. Stéphane Le Boulter,

**OBSERVATIONS OF A FACTUAL NATURE ON THE PROVISIONAL REPORT OF THE MASTER'S  
DEGREE PROGRAMME ON POWER ENGINEERING OF ACE-SPED**

I wish to thank you for your response to our comments on your provisional report on the Master's degree programme on Power Engineering of our Africa Centre of Excellence for Sustainable Power and Energy Development, University of Nigeria, Nsukka. The following sections (in green colour) should be used:

**PROGRAMME DIRECTORS:**

- Surname, first name: Eke, Mkpamdi Nelson
- Profession and grade: Senior Lecturer
- Main subject taught: Thermodynamics
  
- Surname, first name: Ogbuefi, Uche Chinwoke
- Profession and grade: replace "Associate Professor"
- Main subject taught: Power systems analysis

Generally, "M.Sc. and M.Eng." throughout the document

"Lectures are conducted both on-site and online."

All through the document: the correct acronym is "ACE-SPED"

Once again, I thank you for your useful comments and provisional report on our programme.

Yours sincerely,



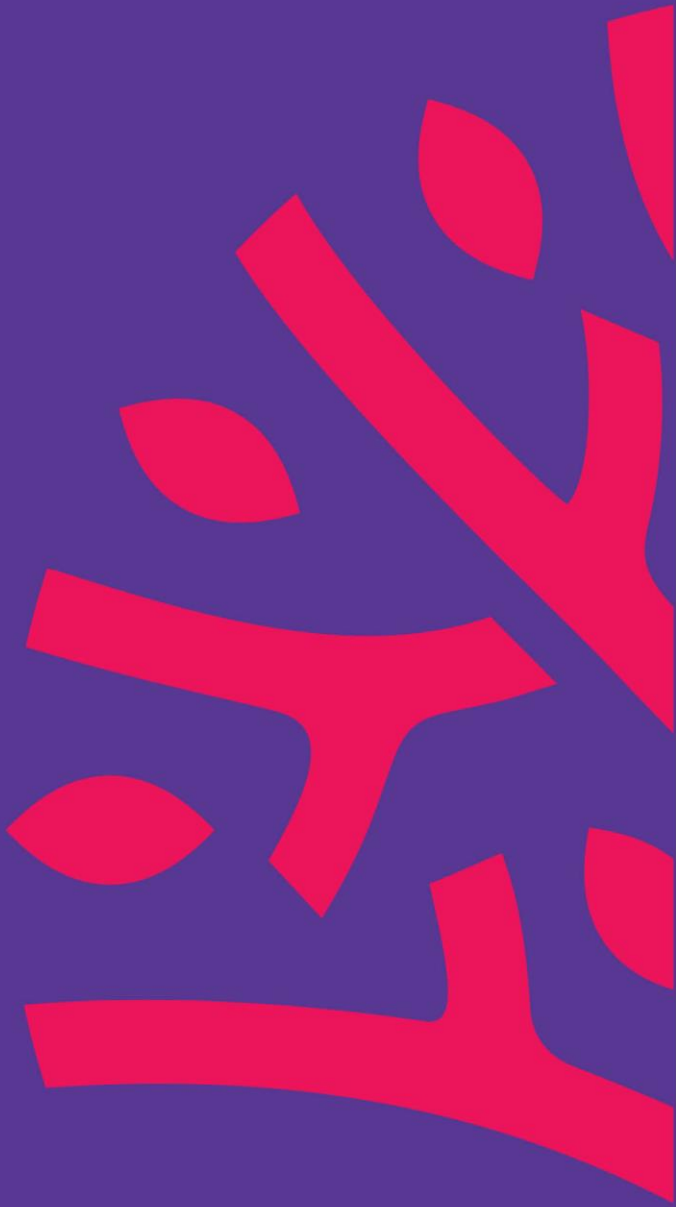
**Engr. Prof. E. C. Ejiogu,**

Director,

Africa Centre of Excellence for Sustainable Power and Energy Development

University of Nigeria, Nsukka.





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## ACCREDITATION DECISION

### M.Sc. Power Engineering

Africa Centre of Excellence for Sustainable  
Power and Energy Development (ACE-SPED)

University of Nigeria Nsukka (UNN)

Nsukka, Nigeria

**June 2024**

## SCOPE OF THE ACCREDITATION GRANTED BY HCÉRES

HCÉRES has based its evaluation process on a set of objectives that study programmes must pursue to ensure recognised quality within France and Europe. These objectives are divided up into four accreditation criteria.

The Accreditation Commission issues an opinion about the accreditation of the study programme after examining the file. The Hcéres President takes the decision based on the Commission's opinion and the final evaluation report of the programme. This accreditation decision, taken in plenary session, is the result of a collegial and reasoned process.

The decision issued by Hcéres regarding the accreditation of the study programme corresponds to the awarding of a label to the evaluated entity.

This decision is independent of the accreditations carried out by the French State and therefore does not entail recognition in France of the institution or the diplomas delivered by it.

## Decision No. EI-2024-38 on the accreditation of the M.Sc. Power Engineering, delivered by the University of Nigeria, Nsukka, Nigeria

### The President of the High Council for the Evaluation of Research and Higher Education,

Considering the Research Code, in particular Articles L. 114-3-1 to L. 114-3-6;

Considering the Board's deliberation of 29<sup>th</sup> September 2022 on the accreditation criteria for courses abroad (excluding doctoral/PhD programmes);

Considering the Decision No. 2023-9 of 16<sup>th</sup> March 2023 on the international accreditation procedure of the High Council for the Evaluation of Research and Higher Education;

Considering the agreement DEI\_2023\_CONV17 of 14<sup>th</sup> June 2023 for the evaluation/accreditation of fourteen training courses, delivered by six Centres of Excellence in Nigeria;

Considering the opinion issued by the Accreditation Commission on 18<sup>th</sup> June 2024;

### Decides:

#### Article 1

Noting that the M.Sc. Power Engineering delivered by the University of Nigeria, Nsukka, in Nigeria meets the four accreditation criteria, voted by the Board of the High Council on 29<sup>th</sup> September 2022, as follows:

#### ACCREDITATION CRITERION 1: TRAINING POLICY AND CHARACTERISATION

The M.Sc. programme in Power Engineering aligns well with regional strategies, integrating various scientific fields like Electrical Engineering, Thermodynamics, and Fluid Mechanics, but showing a need for enhanced interdisciplinarity. Sustainable development principles are effectively woven into specific courses. Internationalisation efforts, notably through partnerships with universities in Togo, Ghana, and South Africa, as well as through collaboration within the country, have led to increased enrolment of foreign students since 2021.

The inclusion of a research project, coupled with defined assessment procedures, underscores the programme's academic rigor and its standing within the research community, notably by encouraging students to publish research papers under the supervision of both a researcher and a member of the teaching staff.

The programme demonstrates a strong connection to the industrial sector through numerous industrial partnerships, enabling the programme to place its students easily in internships. The duration of the internship, which is only one month, seems too short to enable students to invest fully in their internship and thus in the industrial issues assigned to them. These partnerships also make it possible to adapt programmes to meet skills needs effectively.

#### ACCREDITATION CRITERION 2: THE PEDAGOGICAL ORGANISATION OF THE STUDY PROGRAMME

The M.Sc. programme presented demonstrates a meticulous and comprehensive approach to learning methods. Clear objectives and prerequisites for each course ensure students are well-prepared for their educational journey. The selection process, which includes transcript evaluation and potential redirection for better alignment, underscores a commitment to student success.

The programme's multidisciplinary nature is supported by the guidance of two teachers from different departments for each student, fostering a well-rounded educational experience. Flexible teaching methods, including both face-to-face and online options, cater to diverse student needs and geographical locations. The integration of foreign lecturers and mobility grants for international exchanges enriches the learning environment, as evidenced by the significant number of foreign students.

The emphasis on English proficiency is notable, particularly in welcoming students from neighbouring countries in a region surrounded by French-speaking nations, with dedicated classes provided. The involvement of a coordinating teacher and a student representative ensures effective communication and support within the programme. Additionally, the inclusive approach to project topics, supervisor selection, and industry internships adds a practical dimension to the curriculum, aligning students with

real-world applications of their knowledge. Overall, the programme demonstrates a holistic and forward-thinking approach to education, preparing students for success in their chosen fields.

### ACCREDITATION CRITERION 3: ATTRACTIVENESS, PERFORMANCE AND RELEVANCE OF THE STUDY PROGRAMME

The programme employs a variety of strategies, both virtual and physical, to enhance its appeal to different audiences, leveraging participation in African networks such as AAU and WACEENET. A targeted approach to attract regional students, including offering full scholarship and language support programmes, has resulted in different student body from countries like Liberia, Cameroon, and Ivory Coast, alongside Nigerian students. While the absence of full scholarships for Nigerian students present a challenge, the programme's flexibility accommodates students balancing work and studies. Monitoring of the programme's attractiveness reveals a steady increase in applications over the past four years, from three to 36 applicants. Student success is regularly monitored through various methods, aiding self-assessment and tailoring support measures to students from diverse academic backgrounds, such as mechanical engineering and electrical engineering. The programme utilises the graduate tracer mechanism developed by the AAU to track the progress of the graduate students, with both student success and graduate information publicly available on the programme's website. However, the number of graduate students since 2019 remains low with only three graduates.

### ACCREDITATION CRITERION 4: MANAGEMENT AND CONTINUOUS IMPROVEMENT OF THE ACADEMIC PROGRAMME

The ACE-SPED Power Engineering M.Sc. programme exemplifies a well-organised and effective approach to programme management, ensuring coherence and efficiency. Clear roles and responsibilities within the teaching team contribute to a positive and supportive environment, with regular communication among the centre manager, programme coordinator, and teachers.

Teachers benefit from support initiatives like discussion groups and opportunities for professional development through seminars and training courses. Mobility grants further enhance the programme's flexibility, allowing staff to participate in international activities. The extensive list of academic contributors, spanning various departments, reflects a diverse and substantial faculty, well-prepared for potential increases in student numbers or new educational offerings.

Internship experiences, whether within partner companies or elsewhere, highlight the programme's dedication to translating theoretical knowledge into practical application within the professional environment. The rigorous supervision process, anti-plagiarism measures, and adherence to university regulations ensure the quality and integrity of student work.

Quality assurance measures, in collaboration with the University of Nigeria, underscore the programme's commitment to maintaining high standards. Continuous improvement is evident through regular surveys, both internal and external evaluations, and alignment with university admission requirements. The programme's accreditation by the NUC for five years further solidifies its commitment to delivering a high-quality education.

## Article 2

The M.Sc. Power Engineering delivered by the University of Nigeria, Nsukka, in Nigeria, is accredited for a period of five years from the date of this decision.

## Article 3

The decision is accompanied by the following recommendations and comments:

- Introduce practical works, particularly during the project phase, to address the gap between students from different engineering backgrounds. Develop a curriculum that harmonises practical skills, ensuring all students, regardless of their engineering specialisation, acquire essential skills in both mechanical and electrical engineering.
- Consider extending the mandatory internship duration beyond one month, as requested by both industrial partners and students. A longer duration, perhaps up to six months, would provide a more comprehensive experience, align better with industry expectations, and improve learning outcomes. Alternatively, combine the Master's project with the industrial internship to extend the duration of industrial experience.

- Integrate real-world projects, case studies, and guest lectures from industry experts into the curriculum to provide students with practical insights and prepare them for the job market or entrepreneurship.
- Develop and implement a policy for work-linked training programmes and continuing education. Leverage existing partnerships with industry to create opportunities for students, especially those from modest social backgrounds or with limited financial means, to gain practical experience and enhance their employability.
- Facilitate students' involvement in decision-making processes by appointing students' representatives to relevant boards or committees. This inclusion would ensure that students have a role in programme development and provide valuable perspectives on improvements.

**Article 4**

This decision will be published on the Hcéres website.

Paris, 27<sup>th</sup> June 2024.

The acting President  
signed  
Stéphane Le Bouler



2 rue Albert Einstein  
75013 Paris, France  
T. 33 (0)1 55 55 60 10

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