ACCREDITATION MANUAL

FOR

ENGINEERING PROGRAMMES IN NIGERIAN UNIVERSITIES

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COUNCIL FOR THE REGULATION OF ENGINEERING IN NIGERIA
First Edition – 2019

FOREWORD

In many Engineering fora such as the annual Engineering Assembly of the Council for the Regulation of Engineering in Nigeria (COREN) and Conference of the Nigerian Society of Engineers (NSE), the need for improving the quality of the Engineering graduates has been well discussed. As a member of COREN Council (2013 – 2019) and now as the President of COREN, it has been my fervent desire to find ways to improve the quality of engineering graduates. The mandate of COREN is to regulate the practice of Engineering in all aspects and ramifications. At the education level, this is achievable through the regulation of academic curriculum standards and accreditation of programmes. As such, COREN's regulatory functions and its accreditation activities are important procedures of engaging other stakeholders towards improving the process of knowledge acquisition and value-addition in transforming students admitted into engineering programmes.

In the realization of the above, COREN is determined to be an active participant in the rapid pace of globalization and emerging technologies, and for all Nigerian engineering graduates to meet the local employers' and international job market requirements in the Engineering and Technology sectors. It was in light of this, that in November, 2015, COREN applied to become a member of the Federation of Engineering Institutions of Asia and the Pacific (FEIAP) and was accepted in 2016. In 2018, COREN began the process of the application for the Provisional Signatory Status of the Washington Accord (WA) under the International Engineering Alliance (IEA). Based on this, the Council set up a Committee to develop the framework for Outcome-Based Education (OBE) in Nigerian Engineering Programmes. The Committee developed this manual, which outlines the policy, processes and criteria of accreditation.

This manual gives definitions and very clear explanation of components of OBE such as (i) Programme Educational Objectives, PEOs, (ii) Programme Outcomes, POs, (iii) Course Learning Outcomes, CLOs, (iv) Curriculum and Learning Process, (v) Students, (vi) Continuous Quality Improvement (CQI), (vii) Staffing, (viii) Physical Facilities and Infrastructure, (ix) Industrial Linkages and Community Service and (x) Institutional Support and Funding. I am confident that engineering programmes in universities will find this manual useful.

COREN is ready to give necessary support and clarify any gray-area(s) to any engineering programme towards implementing the OBE system. Henceforth, during accreditation visits, COREN's trained and certified evaluators will be expected to identify evidences of the judicious implementation of OBE accreditation procedure. This manual makes it very easy to evaluate compliance with the criteria, policies and proceduresto assess the state of compliance as either Full accreditation, or flag the programme as Interim accreditation with deficiencies or Interim accreditation with weaknesses. As you must agree with me, COREN cannot ignore lapses in any of its accredited programmes.

As I read through this manual, I am convinced that it seeks to provide detailed guideline on accreditation based on OBE and the specific attributes such as knowledge, skills and attitudes, to be acquired by the graduates. It helps engineering programmes to meet the minimum standards

stipulated in the COREN BMAS for the accreditation of their existing or newly proposed programmes. Based on the forgoing, I strongly invite you to go through this manual, understand its contents and engage your colleagues towards analyses and syntheses that would eventually entrench the culture of high-quality teaching and learning processes in Nigerian engineering faculties. In such a culture, programmes would be looking forward to COREN Accreditation visits to affirm and commend their practices. Finally, COREN remains extremely grateful to her nominators – Board of Engineers Malaysia (BEM) and Pakistan Engineering Council (PEC) for their valuable feedback and useful guidance without which, this venture would have been much more difficult or impossible. We look forward to continuous mutually-beneficial interactions with all stakeholders.

Engr. Ali A. Rabiu
The President,
Council for the Regulation of Engineering in Nigeria
29 July, 2019

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PREAMBLE

The Council for the Regulation of Engineering in Nigeria (COREN) has a mandate to regulate the practice of Engineering in all aspects and ramifications. At the education level, on behalf of Federal Government of Nigeria, COREN determines the academic standards of courses and accredits programmes to be offered by institutions training Engineering Personnel. The objective has been to recognize and acknowledge the value added in transforming students admitted into engineering programmes into capable engineering professionals with sound knowledge of the fundamentals, an acceptable level of professional skills and personal competence for ready employability in the national economy. Such accreditation process has been in existence since 1972.

Today, after almost fifty years of existence, COREN is faced with some existential realities that make it necessary to change the paradigm of the Nigerian engineering education system. Firstly, there is expansion of engineering programmes in variety and number at various engineering faculties. This makes it necessary for COREN to strengthen its accreditation system. Secondly, the rapid pace of globalization and emerging technologies, make it necessary for engineering faculties to meet the requirements of local employers and international job markets in the Engineering and Technology sectors. COREN needs to mediate in regulating the processes that lead to local and international recognition of engineering qualifications from higher educational institutions in Nigeria. Such mutual recognition is expected to improve the quality, proficiency and mobility of COREN registered engineers.

In pursuit of the above, in November, 2015, COREN applied to become a member of the Federation of Engineering Institutions of Asia and the Pacific (FEIAP) and was accepted at its General Assembly in Perth 2016. Such membership required COREN programmes to implement the Outcome-Based Education curricula. COREN, in 2018, began the process of the application for the Provisional Signatory Status of the Washington Accord (WA) under the International Engineering Alliance (IEA). Based on the forgoing, the Council inaugurated a Committee to develop the framework for Outcome-Based Education (OBE) in Nigerian Engineering Programmes with the production of this Accreditation Manual as part of the terms of reference. This manual consists of four chapters and seventeen annexes to guide engineering programmes in planning, developing, implementing, reviewing the OBE system and its continuous quality improvements. Such practices make the COREN accreditation visit an accommodating experience rather than a stressful exercise as considered by some institutions. The four chapters are:

i. Accreditation Policy,
ii. Accreditation Process,
iii. Criteria for Accreditation and
iv. Template for COREN Self-Study Assessment Report.

There are also descriptions of the necessary accompanying documents in the annexes.

To meet the requirement of OBE, the accreditation procedures are now based on ten basic criteria: (i) Programme Educational Objectives, PEOs, (ii) Programme Outcomes, POs, (iii) Course Learning Outcomes, CLOs, (iv) Curriculum and Learning Process, (v) Students, (vi) Continuous

Quality Improvement (CQI), (vii) Staffing, (viii) Physical Facilities and Infrastructure, (ix) Industrial Linkages and Community Service and (x) Institutional Support and Funding. During the accreditation visits, COREN trained evaluators will be expected to identify evidences of substantial compliance with the enumerated criteria. COREN has the final decision on the status of the programme.

This Manual provides detailed guidelines on OBE based accreditation exercise. It highlights the specific attributes useful to meet the minimum standards stipulated in the COREN BMAS for the accreditation of existing or newly proposed engineering programmes. Based on guidance of the Council, this manual is a result of the cumulative efforts of an initial ad-hoc Committee on OBE accreditation guideline and was later expanded to Council Committee on Engineering Accreditation Board Implementation consisting of the following: Chairman: Engr. Prof. Sadiq Z. Abubakar, Members: Engr. Prof. Emmanuel Aluyor, Engr. Prof. Stephen J. Mallo, Engr. Prof. Joseph O. Odigure, Engr. Prof. Baba J. El-Yakubu, Engr. Dr. Eyitayo A. Afolabi, Engr. Oladipupo Mabogaje, Mrs. Dooshima Asa and Engr. Precious Onuoha.

I sincerely appreciate the concerted effort of all those who worked tirelessly to ensure the achievement of this goal within such a constrained time limit.

Engr. Prof. Joseph O. Odigure
Registrar,
Council for the Regulation of Engineering in Nigeria
29 July, 2019

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ACRONYMS

COREN	Council for the Regulation of Engineering in Nigeria
NUC	National Universities Commission
PEOs	Programme Educational Objectives
POs	Programme Outcomes
CLOs	Course Learning Outcomes
CPD	Continuing Professional Development
CQI	Continuous Quality Improvement
Cr Hrs	Credit Hours
E & T	Education and Training
GAs	Graduate Assistants
IEA	International Engineering Alliance
KPI	Key Performance Indicator
OBE	Outcome Based Education
OBA	Outcome-Based Assessment
SSR	Self-Study Report
SAR	Self-Assessment Report
RP	Resource Person
RA	Research Assistant
TA	Teaching Assistant
RV	Resource Verification
PA	Pre-Accreditation
A	Accreditation
WA	Washington Accord

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GLOSSARY

Academic staff	Staff responsible for teaching and learning activities in the Programme leading to the award of an engineering degree.
Accredited Programme	An engineering programme whose graduates are acceptable for registration with COREN. This is accorded to a programme that satisfies the minimum standards for accreditation set by COREN.
Concern	A criterion, policy, or procedure broadly in compliance but requiring improvement to avoid compromised quality of the programme or currently in compliance but the potential exists for the situation to change resulting in non-compliance in future. Progress on the corrective measures is required prior to the next review.
Course	Subject offered in the programme
Deficiency	A criterion, policy, or procedure either does not exist or is in the elementary stage. Compliance is required.
Degree	An engineering qualification in Nigeria recognized by COREN and NUC.
Faculty/School/College	The entity which includes departments responsible for designing and conducting the programme to be accredited.
Graduate	Anyone who has been conferred a degree
Opportunity For Improvement (OFI)	A criterion, policy, or procedure is in compliance and would be further strengthened by incorporating suggested measures/ improvements
Engineer	An engineering graduate registered with COREN under the provisions of the COREN Act
Programme	The sequence of structured educational experience undertaken by students leading to completion, on satisfactory assessment of performance
Programme Evaluators	A panel of evaluators appointed by COREN to verify programme compliance with accreditation criteria
Programme Not Accredited	This is the status of a programme that fails to meet the minimum standards for accreditation and has major shortcomings. In such a case, a further application is not normally considered within the next one year

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Stakeholders	Parties having an interest (direct or indirect) in the programme output, for example, employers, sponsors, faculty members and students.
Student	Anyone undertaking an undergraduate programme
Support staff	Staff responsible for supporting teaching, learning and administrative activities in programme implementation.
Weakness	A criterion, policy, or procedure lacks strength of compliance leading to the compromised quality of the programme. Corrective measure is required to strengthen compliance prior to the next review.
Withdrawal of Accreditation	COREN reserves the right to cease/terminate the accreditation if there is non-compliance or breach of accreditation requirements after accreditation has been given.
Assessment	Assessment is one or more processes that identify, collect, and prepare data to evaluate the attainment of student outcomes. Effective assessment uses relevant direct, indirect, quantitative and qualitative measures as appropriate to the outcome being measured. Appropriate sampling methods may be used as part of an assessment process
Evaluation	Evaluation is one or more processes for interpreting the data and evidence accumulated through assessment processes. Evaluation determines the extent to which student outcomes are being attained. Evaluation results in decisions and actions regarding program improvement program improvement
Feedback	Information about reactions to a product, a person's performance of a task, etc. which is used as a basis for improvement
Programme Outcomes	Programme Outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills, and behaviours that students acquire as they progress through the programme.

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CHAPTER 1

ACCREDITATION POLICY

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1. ACCREDITATION POLICY

1.1. INTRODUCTION

The Council for the Regulation of Engineering in Nigeria (COREN) is a statutory body set up by the Federal Government of Nigeria with the mandate to regulate the practice of Engineering in all aspects and ramifications. It was established by Decree 55 of 1970, amended by Decree 27 of 1992 and now, Engineers (Registration, etc.) Act CAP E 11, 2004 which was further amended by the Engineers (Registration, etc.) (Amendment)Act NO 3, 2018. COREN is empowered by its mandate to carry out the following:

- Accreditation of Engineering Programmes
- Registration of Engineering Personnel and firms
- Regulation and Control of Engineering Practice

1.2. COREN VISION AND MISSION

VISION:

To promote and ensure the highest standards of professionalism in engineering practice in Nigeria.

MISSION STATEMENT:

- To register and license Engineering Personnel and Firms and make provisions for the control of engineering practice.

- To determine the academic standards of courses and accredit programmes to be offered by institutions training Engineering Personnel.

- To foster speedy acquisition of relevant engineering and technological skills through Continuous Professional Development.

- To ensure that engineering is practiced to improve the quality of life and promote sustainable development.

- To promote and ensure stability and cooperation within the Engineering family.

Thus, this Manual provides the necessary information for the processes and procedures for conducting an accreditation exercise for engineering programmes in Nigeria. It also provides guidelines for the commencement of engineering programmes in institutions and for the re-accreditation of existing programmes.

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1.3. NEED FOR ACCREDITATION/RECOGNITION

The objective of the accreditation process is to recognize and acknowledge the value-added in transforming students admitted to engineering programmes into capable technical professionals, who have sound knowledge of the fundamentals, an acceptable level of professional skills and personal competence for ready employability in responsible technical assignments.

As indicated in Section 1.8, the accreditation process has been in existence in Nigeria since 1972. The current expansion in engineering programmes in variety and number at different higher institutions makes it necessary to strengthen the system. This is because it is not possible to meaningfully sustain the present growth rate without a parallel exercise in quality assessment of the programme(s). Such an exercise will ensure that the institution running the programme(s) has the necessary facilities, equipment and faculty resources for the programme(s), to deliver technically competent manpower that meets the local employers' requirements and global job market in the Engineering and Technology sectors. This process leads to local and international recognitions of engineering graduates from higher educational institutions in Nigeria.

1.4. OBJECTIVES OF ACCREDITATION

(a) To determine what standard of knowledge and skill are to be attained by persons seeking to become Registered Engineering Personnel and to review those standards from time to time as circumstances may permit;

(b) To consider reports of accreditation visits and make appropriate recommendations to Council;

(c) To draw up a list of accepted qualifications for the purpose of the Act;

(d) To arrange for periodic visits to engineering faculties and institutions in Nigeria by competent person or persons who must either be Registered Engineers or possess such qualification and experience as can facilitate thorough evaluation of engineering teaching programmes for the purpose of assessing the content and quality of training being given in these faculties and institutions and recommend approval or otherwise of the programmes, in accordance with Sections 9(1)-(7), of Engineers (Registration, etc.) Act, CAP E11, 2004; amended as E11, LFN, ACT No. 3, 2018.

(e) To undertake a study of the quality of training obtainable in engineering disciplines in institutions of learning and industries outside Nigeria as may from time to time be directed by Council and verify the quality of training in such institutions or industries and recommend approval or otherwise in accordance with Section 9(1)-(7), 9 of Engineers (Registration etc.) Act;

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(f) To arrange for periodic surveys of industrial training facilities available in Nigeria by competent persons who must be Registered Engineers or possess such qualifications and experience as can facilitate thorough evaluation of industrial training facilities and make recommendations to Council on how these may be increased and/or fully utilized; and

(g) To formulate and recommend to Council an industrial training policy which could form the basis of legislation by the Federal Government to ensure meaningful industrial training of graduate engineering personnel.

1.5. THE ACCREDITATION MANDATE OF COREN

The Act Section 1 (1) (b) (i) (as amended by Act No.3 2018) also states that COREN shall have the duty of:

"determining what standards of knowledge and skill are to be attained by persons seeking to become registered as engineering practitioners and to raise those standards from time to time as circumstances may permit".

Saddled with the responsibility to register engineering practitioners, the Act in Section 6 (1) (a) – (c), amongst others, stipulates that a person shall be registered by COREN if:

(a) He has attended a course of training approved by the Council under the following section;
(b) The course was conducted at an institution so approved, or partly at one such institution and partly at another or others;
(c) He holds a qualification so approved.

Section 9 provides conditions for the approval of courses, qualifications and institutions. Similarly, Section 9 (1) states that:

"…the Council may approve for the purposes of subsection (2) of section 6:

(a) any courses of training which is intended for persons who are seeking to become, or are already, members of the engineering profession, and which the Council considers is designed to confer on persons completing it sufficient knowledge and skill for the practice of that profession or for practice as members of a specialized branch of that profession;
(b) any institution either in Nigeria, or elsewhere, which the Council considers is properly organized and equipped for conducting the whole or any part of a course of training, approved by the Council under this section.

Worthy of note also is that the Act in Section 9 (3) (6) states that:

(3) The Council may, if it thinks fit, withdraw any approval given under this section in respect of any course, qualification or institution;

(6) An educational institution for the training of persons in the engineering profession shall submit a syllabus of its programme, content and minimum facilities to the Council for approval before a course approved by the National Universities Commission or the National Board for Technical Education, or any other engineering body, is commenced.

COREN, therefore, carries out this mandate through the Accreditation of engineering Programmes in Universities, Polytechnics and Technical Colleges. The exercise is geared towards quality assurance, hence accreditation ensures that products of Engineering Programmes in Universities, Polytechnics and Technical Colleges are sound, functional and efficient engineering practitioners that meet the challenges of our present and future society. This means that COREN ensures that the right quality of training is given for all cadres of engineering practitioners, (engineers, engineering technologists, engineering technicians and engineering craftsmen), and institutions produce industry-compliant graduates. COREN also registers and licenses all these categories of engineering personnel, as well as firms to practice in Nigeria.

It is therefore, mandatory for any engineering programme to be accredited by COREN, as only graduates of accredited engineering programmes will be registered and licensed by COREN to practise in Nigeria.

1.6. HISTORY OF ACCREDITATION OF ENGINEERING PROGRAMMES

Section 9 sub section 6 of the Act provides:
"an educational institution for the training of persons in the Engineering profession shall submit syllabus of its programme, content and minimum facilities to the Council for approval before a course approved by the National Universities Commission or the National Board for Technical Education is commenced".

Pursuant to the above, COREN started accreditation of engineering programmes in Nigerian Universities in 1972 shortly after the inauguration of the Council. Council Committees accredited four Universities offering twelve (12) engineering programmes. The universities were:

i. University of Ife (now Obafemi Awolowo University);
ii. Ahmadu Bello University Zaria;
iii. University of Lagos; and
iv. University of Nigeria, Nsukka.

The accreditation exercises were extended to some universities in the United Kingdom and Asia, particularly when graduates from these foreign countries applied for registration with COREN. In March 2018, COREN conducted accreditation visits to the twenty-three (23) engineering programmes of three (3) universities in Northern Cyprus. COREN has carried out countrywide awareness for the accreditation process including the requirement of approval before the commencement of engineering training in any Nigerian university.

COREN compiled and published the Benchmark Minimum Academic Standards and Accreditation Scoring Criteria for Undergraduate Engineering Programmes in Nigerian Universities in September, 2013. Concerned with the large disconnect between what is taught (engineering curricula and the limited skills and tools) in engineering programmes around the country and that which is expected of young engineers in the industries and society, it therefore became clear that engineering education needed to be changed (or even reinvented) to address the challenge. The need to change the training procedure from quantitative to qualitative assessment led to the revision in 2017 and re-naming of the document as Outcome Based Engineering Education Manual.

Today, after almost fifty years of existence, COREN is faced with some existential realities that make it necessary to change the paradigm of the Nigerian engineering education system. Thus, due to the expansion of engineering programmes in variety and number at different higher institutions as well as the rapid pace of globalization and emerging technologies, COREN seeks to strengthen its accreditation system in order to meet the requirement of local employers and international job market in the Engineering and Technology sectors. This may also lead to mutual recognition to improve the quality, proficiency and mobility of COREN registered engineers.

In pursuit of the above, in November, 2015, COREN applied to become a member economy of the Federation of Engineering Institutions of Asia and the Pacific (FEIAP) and was accepted by FEAIP at its General Assembly (GA) in Perth 2016. Institute of Engineers, Malaysia (IEM) was appointed by FEIAP to review the accreditation system of COREN to ascertain the substantial equivalence of COREN recognized degrees with those of other member economies of FEIAP. A visit was organized by COREN in collaboration with UNESCO, ISTIC (International Science, Technology and Innovation Center) and FEIAP from 17-22 July, 2016 tagged **"High Level Policy Forum on Engineering Accreditation and Mobility in Africa"** with Participants drawn from the relevant stakeholders from Nigeria, Cameroon, Ghana, Sudan, Tanzania and Kenya. The FEIAP Review Panel also undertook visits to two Nigerian universities whose degree programmes were accredited by COREN.

It therefore became important to introduce components of Outcome Based Engineering Education (OBEE) such as Programme Educational Objectives, Programme Outcomes, Course Learning Outcomes, Continuous Quality Improvement and Quality Management Concept, involvement of the stakeholders such as academic staff, student, industry player, alumni and authority in the education process. Training on outcome-based education in Nigeria commenced with the invitation of experts from other FEIAP economies who had fully implemented outcome-based engineering education to train COREN, university administration staff, professors and academic staff, as well as a panel of assessors (or evaluators) on the basics of outcome-based learning. The introductory workshop tagged "Outcome Based Engineering Education and Review of Benchmark Minimum Academic Standard (BMAS) and Accreditation Scoring Criteria for Undergraduate Programmes in Nigerian Universities", took place from 11th - 14th May, 2017 at the Renaissance Lagos Ikeja Hotel, 38/40 Isaac John Street, Ikeja GRA, Lagos.

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CHAPTER 2
ACCREDITATION PROCESS

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2 ACCREDITATION PROCESS

2.1 INTRODUCTION

This chapter highlights the process and procedures pertaining to the accreditation of engineering programmes by COREN. The accreditation process, whether for a Resource Verification, Pre-Accreditation or Accreditation visitations, involves a comprehensive assessment which starts with a review of the information submitted in SAR, followed by a detailed on-site accreditation visit by the COREN Accreditation Team appointed by COREN; and preparation of the accreditation report on findings and recommendations by the team.

2.2 PROCEDURE FOR INTRODUCTION OF NEW PROGRAMMES

An institution intending to begin a new programme shall seek approval from the relevant authorities as specified by the COREN Act.

Based on national manpower requirements, the National Universities Commission (NUC), approves an Engineering Programme to be run in Universities. COREN then carries out a Resource Verification visitation to the Engineering programme and based on the findings, approves or otherwise, its commencement. It is COREN that determines whether the Engineering programme has adequate facilities to commence teaching and learning of the programme. It is therefore illegal to commence an Engineering programme without initial approval by COREN.

2.3 TYPES OF ACCREDITATION VISITATIONS

COREN conducts the following types of Accreditation:

2.3.1 Resource Verification Visit

Institutions shall apply for Resource Verification Visit by providing detailed information to COREN based on the information provided for conformance evaluation of the essential requirements of starting a new engineering program. Resource Verification Visit is mandatory and the details/deadlines to submit the application are as specified in the Accreditation Manual which can be accessed on the COREN website.

The Resource Inspection visit is usually an opportunity for the institution to get professional advice from COREN on all aspects of the programme that need to be put in place. The Institution shall apply for Resource Verification at least **9months** before the first intake of students. If the engineering facilities and equipment are found to be below standard, the institution shall be given a grace period of six (6) months to put deficiencies in place and call back COREN for a Resource Inspection visitation.

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Two years after the initial approval, COREN shall visit again for Pre-Accreditation. An institution that scores more than 50% shall be granted "Passed Pre-Accreditation" by Council and normal accreditation visit shall be conducted just before the first set of students graduates and thereafter once every five (5) years except for programme on Interim accreditation status, where visitation shall be made after two (2) years.

2.3.2 Pre-Accreditation Visit

The programmes approved by COREN through the Resource verification visit, are required to apply for a pre-accreditation visit at the end of first year to ascertain its preparedness for the next phases. The institution shall provide detailed information for critical analysis along with the progress made based on the recommendations from the Resource verification. The details/deadlines to submit for the pre-accreditation can be accessed on the COREN website.

2.3.3 Accreditation Visit

An institution applying for accreditation visit is expected to fulfil all the requirements pertaining to faculty, curriculum, laboratories, library, infrastructure, finances and other allied facilities as per the accreditation guidelines. Any programme seeking accreditation for the first time is required to ensure submission of the necessary documents to COREN before the commencement of first semester for the accreditation visit towards the end of the fourth semester.

The programmes seeking renewal of accreditation status (Re-Accreditation) should apply within the last year, but not exceeding six months before the expiration from the accreditation period granted. All cases of non-compliance shall attract a penalty of 20% administration cost of the total cost of the accrediting the programme.

Note: More information on the requirements for the types of accreditation are in Annex M-1.

2.3.4 Post Accreditation Visit

To ensure that the Council maintains the standard in accreditation throughout the tenure of the license given to Universities, COREN shall conduct unannounced Post Accreditation visits to the institutions. The visit is to be conducted by selected Evaluators whose report goes directly to the Registrar for processing and appropriately recommended to Council for approval.

2.4 PROCEDURE FOR ACCREDITATION VISIT

COREN shall conduct the accreditation of engineering programmes based on the following steps:

a. Identify and Publish programmes that are in the last year of their accreditation statuses.
b. COREN notifies concerned institutions on accreditation expiration (at least 12 months).
c. Six (6) months before the expiration of the existing accreditation status of the programme, a completed SAR shall be sent from the institution informing COREN of

their readiness for the accreditation exercise. If the SAR submitted is found satisfactory, COREN schedules an accreditation visit. However, if the SAR submitted is considered to be inadequate, COREN shall inform the institution to provide further information before an accreditation visit is scheduled. If the required information is not provided within a period of 3months [non-compliance of (a-c)], the accreditation process shall attract a penalty of 20% of the total cost of accrediting the programme. At the expiration of the second warning, the graduates of the programmes shall not be eligible for COREN registration.

d. Selection/Notification of Evaluators by COREN (Section 2.11).
e. COREN sends the list of the Evaluators to the institution (30 days before Accreditation Visit) in order to resolve any conflict of interest.
f. Submission of SSR to COREN by the institution through the E & T department of COREN at least 1 month before the scheduled visit.
g. COREN sends the SSR and other necessary documents to the Evaluators at least 2 weeks before the scheduled visit.
h. The visitation team conducts the accreditation process and prepares a report on their findings using the accreditation manual and the Outcome Based Engineering Education: Benchmark Minimum Academic Standards (BMAS) and Accreditation Scoring Criteria for Undergraduate Engineering Programmes in Nigerian Universities.
i. Presentation of the report on accreditation visitation to COREN (through E & T department).
j. Deliberation on the accreditation reports and decision-making by E & T committee.
k. E&T's decision is forwarded to COREN Council for notification.
l. The Registrar communicates the decision on the status of accreditation to the concerned institutions.
m. COREN updates the institution's accreditation status on the COREN website.

2.5 THE ACCREDITATION PROCESS

The flow Chart of accreditation process and timeline from the process of application to the notification of accreditation result, are presented in Figure 1.

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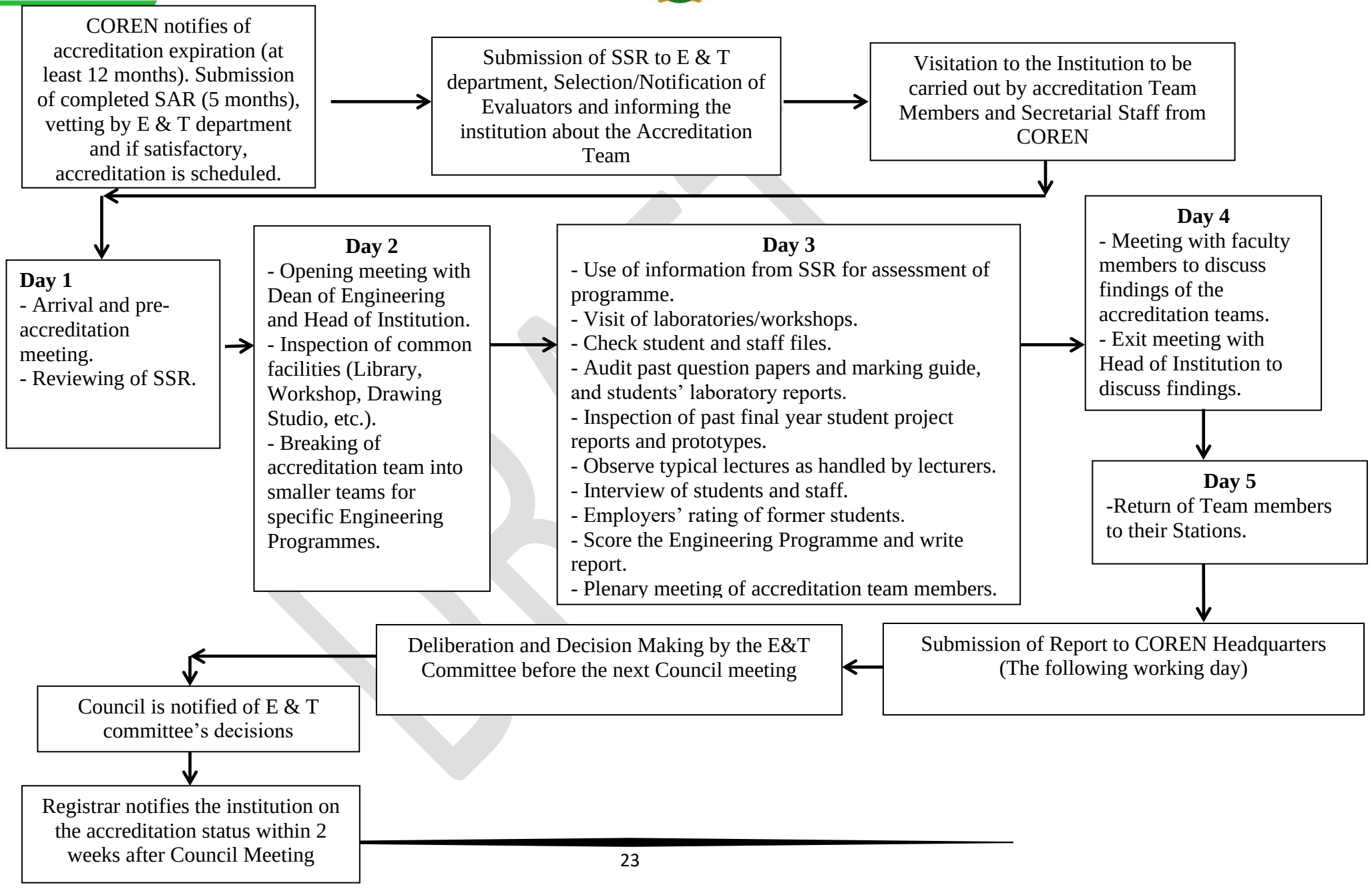

Figure 1: Flow Chart of Accreditation Process and Timeline

2.6 ACCREDITATION EVALUATION

An accreditation evaluation is conducted to verify that the programme under evaluation is in compliance with the appropriate accreditation criteria in this Manual. The evaluation exercise shall be conducted by a Team of Evaluators appointed by COREN.

2.7 CONFIDENTIALITY

All Documents or other information obtained during the process of accreditation exercise shall be treated as confidential.

2.8 CONFLICT OF INTEREST

Members of Council, E & T Committee and Department staff are expected to be constantly aware of any conflict of interest. Members shall declare their interest or withdraw from any situation or activity that may constitute a conflict of interest.

2.9 THE COREN ACCREDITATION TEAM

The COREN Accreditation Team for a visitation to an institution shall consist of three Evaluators per programme (one of whom shall lead the team), and members of staff from COREN to provide secretariat and other support. They shall be selected based on relevant qualification, professional experience, accreditation training and assessment.

Team Members shall consist of Engineers drawn from the Industry and Academia based on their expertise in a particular discipline. They are expected to contribute to the assessment of the programme from their perspective and experience. In addition, they are expected to maintain high professional standards and have no conflict of interest with the institution to be visited.

2.10 SELECTION OF PROGRAMME EVALUATORS

Evaluators shall be selected based on their high standing in the profession, ability to assess curricula, competence in appraisal based on overall objectives and performance towards the achievements of set goals.

Evaluators from academia shall be at the professorial level while the representative from industry must have a minimum qualification of a First degree and should be on an equivalent of Grade Level 15 of the Civil Service. COREN shall conduct periodic accreditation training workshops for all Accreditation team members and maintain an updated database of qualified Evaluators for all engineering disciplines. COREN through the E & T Department, shall select evaluators from the database. Evaluators are expected to have good understanding of COREN Accreditation policies as stipulated in the BMAS and COREN Accreditation Manual.

Evaluators shall be highly knowledgeable and experienced engineers with the following qualities:

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i. High level of integrity
ii. Firmness and fairness
iii. Minimum of 6 years registration with COREN.
iv. Maintain an up-to-date practicing licence.
v. Active participation in the activities of the Engineering profession.

Upon determination of an accreditation team, institution may request for certain designated Evaluators to be excluded from the team in case of any conflict of interest by submitting a justified reason in writing to COREN within a week after receiving the schedule of visiting team. In case of valid reason(s), COREN will replace the Evaluator(s).

2.10.1 The Team Leader

The Leader of an accreditation team shall oversee the accreditation visit. He shall assign duties to each team member keeping in view the overall perspective. He is expected to have good experience with the accreditation process and collate in advance, previous reports, if any. He has the responsibility for the preparation of the consolidated team report and its timely submission, for the consideration of the E&T Committee.

One of the senior members of the Visiting Team will be appointed to lead the Team, if the Leader is unable to undertake the visit for unforeseen circumstances. There shall be only one Team Leader whenever more than one programme is visited in an Institution.

2.10.2 Team Members

Two Evaluators, who are appointed by COREN, are responsible for the evaluation of an individual programme**.** An additional member from the industry or user organization can be included especially in the final visit during the 5th year of the programme. In case two programmes with substantial similarity in course contents are being offered within a Department, a single set of two / three Evaluators may be used for both programmes. For programmes in emerging or inter-disciplinary areas, more Evaluators can be included in the team depending on the need.

The duties of Evaluators shall include evaluation with reference to the criteria given earlier, through physical verification of infrastructure/ facilities, records, interviews with administrators, academic staff, alumni, students/stakeholders and other activities, which they find necessary for the accreditation exercise. The Evaluators are also required to mention the strengths, weaknesses, defects and concerns against each criterion in the Score Sheet. They may capture photographs of documents as evidence when necessary.

Evaluators must be informed ahead of time and their availability ascertained. The institution shall be informed about the composition of the visiting team. The institution may object to the assignment of an Evaluator provided it submits proof of any verifiable conflict of interest with the assigned Evaluators.

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In case an Evaluator is unable to undertake the visit due to circumstances beyond his control, the team leader should notify COREN who will nominate a replacement, keeping in view the guidelines for selection of Evaluators.

2.10.3 COREN Staff

COREN Staff shall be responsible for the provision of all secretarial and any other service that may be required for the success of the accreditation exercise. They shall coordinate between visiting team members and the institution, and ensure availability of relevant information. The COREN staff shall give detailed briefing about the visit, institutional data and previous accreditation visit report(s) to the Team Leader. They will also ensure the compilation of the visit report on the last day of the visitation for submission to COREN and provide necessary policy updates to the visitation team when and where required. COREN Staff participating in the accreditation of engineering programmes shall be expected to obtain the requisite certification**.**

2.11 ASSESSMENT CRITERIA FOR ACCREDITATION

The accreditation team shall examine the following areas of the programme for assessment:

a) PEOs,
b) POs and
c) CLOs,
d) Curriculum and Learning Process
e) Students
f) Continuous Quality Improvement (CQI)
g) Staffing
h) Physical facilities and Infrastructure,
i) Industrial Linkages and Community Service
j) Institutional Support and Funding

Specific scoring criteria for assessment are presented in Annex P.

2.12 ASSESSMENT GUIDELINES

Evaluation of programmes shall be evidence based in strict adherence to the criteria set in the BMAS and the Manual. The assessment shall include the auditing and confirmation of documents submitted by the Institution. In awarding marks, Evaluators shall strictly adhere to the grading guidelines provided in Annex P and the COREN BMAS.

2.13 DOCUMENTS FOR ACCREDITATION

The documents required for accreditation are specified in COREN publication titled: "Outcome Based Engineering Education: Benchmark Minimum Academic Standards and Accreditation Scoring Criteria for Undergraduate Engineering Programmes in Nigerian Universities", published in 2017 and this Accreditation Manual. These are useful tools for ensuring that every important aspect of a degree programme and its delivery are assessed and reported.

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Self-Study Report prepared by an engineering programme of the University to be visited is submitted 3 months before commencement of accreditation visit.

2.14 OUTCOME OF ACCREDITATION VISIT

Accreditation Outcomes - The decision on programme accreditation actions rests with COREN. The accreditation team takes decision based on evaluators' inputs. The following actions on the visited programme may be recommended to COREN by the accreditation team.

Full Accreditation (FA) – This action indicates that the programme substantially complied with the requirements in the BMAS and Chapters 3 and 4 of the Accreditation Manual in all areas of evaluation. Such a programme is then valid to run for five (5) years subject to maintaining and improving on the standards as may be verified through regular monitoring of the programme by COREN through post-accreditation visitation.

Programmes that do not meet substantially with the accreditation requirements stated above shall be given Interim accreditation.

a. Interim Accreditation, due to Weakness – This action indicates that the program has one or more Weaknesses. The accreditation team may decide that the Weaknesses are such that a report and on-site visit to the concerned program will be required to evaluate the remedial actions taken by the institution. This action has a typical duration of not more than one year.
b. Interim Accreditation, due to Deficiencies – This action indicates that a currently accredited program has one or more Deficiencies. The accreditation team may decide that the Deficiencies are such that a progress report and on-site visit will be required to evaluate the remedial actions taken by the institution. This action has a typical duration of not more than two years.

If the report submitted and site-visit conducted are adjudged satisfactory, COREN Council shall then extend the accreditation status to a typical duration of five years (inclusive of the interim period).

Otherwise, the programme gets a Failed Accreditation status and is asked to stop admitting new students, as graduates of such an unaccredited programme shall not be registered by COREN.

Deficiency is a serious issue. Therefore, the institution must provide, within 60 days of receipt of the Final Statement to the Institution, a summary to the students and staff of COREN's reasons for the interim accreditation and specific corrective actions the program intends to implement to maintain accreditation

COREN's decision upon notification by COREN Council shall be sent to the Institution. The hard and soft copies of the accreditation report shall be stored as appropriate. The accreditation shall be awarded to a specific programme, in a specific location and a specific mode of delivery.

2.15 PUBLICATION OF ACCREDITATION STATUS

COREN shall regularly update and publish the list of all accredited programmes.

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2.16 REVALIDATION OF AN ACCREDITED PROGRAMME

The Institution shall submit to COREN through the E&T Department, details of any changes made to an accredited programme under the following circumstances:

i. An increase in the student enrollment.
ii. A change in the scope of the program objective /curriculum/nomenclature.
iii. Addition of new stream/specialization in the program's scheme of study.
iv. Change of mode of delivery, etc.

Failure to do so may cause COREN to withdraw the accreditation. COREN may then direct the Institution to apply for re-accreditation of the revised programme. The application for this visit must be submitted at-least 6-months before the date of effective implementation of the proposed change.

2.17 SCHEDULING OF A VISIT

A visit shall be arranged and coordinated by COREN through the Education & Training Department. After an appropriate date suitable to both COREN and the Institution is decided, COREN shall appoint Evaluators. It is important that as far as possible, the agreed dates of visit are adhered to. The accreditation visit will normally be scheduled for a period of four (4) days.

2.17.1 Day 1 Activities:

The Evaluators should be punctual in order to attend the pre-accreditation meeting. This is to enable them discuss and identify shortcomings in the accreditation documents submitted, and plan on how to execute the accreditation exercise. Any further information required from the programme should be communicated to the HOD/Dean through the Team Leader.

2.17.2 Day 2-4 Activities:

The visit shall include but not limited to the following:

a. Opening meeting with the programme administrators.
b. Presentation by the Head of Department of the programme being evaluated and ensuing discussions.
c. Meeting with staff members.
d. Meeting with students.
e. Meeting with external stakeholders such as alumni, employers, and industry advisors.
f. Visitation and assessment of facilities.
g. Inspection of relevant supporting documents.
h. Exit meeting with programme administrators.

Meetings with all stakeholders are mandatory as they give indications of the staff involvement in the CQI process of the programme.

2.18 REPORT AND RECOMMENDATIONS

The report, prepared in accordance with Programme Evaluators' Guideline, by the Accreditation Team shall be submitted to E & T Department, COREN within 2 weeks after the visit.

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2.19 STRUCTURE OF ACCREDITATION FEEAND EXPENSES

The Institution shall bear all the costs incurred for carrying out activities related to the approval and accreditation of a programme. This should be paid to COREN before the commencement of the accreditation process. Additional cost shall be incurred for postponement of accreditation exercise.

Please note that the fee for various types of accreditation visit and other issues (i.e. Accreditation, Re-Accreditation, Pre-Accreditation, Resource Verification, Change of Scope, and Appeal cases) shall be as prescribed by COREN from time to time.

Note: Please refer to COREN Headquarters/website www.coren.gov.ng for the current fee structure/policy for the various types of assessment visit.

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CHAPTER 3

CRITERIA FOR ACCREDITATION

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3. CRITERIA FOR ACCREDITATION

3.1 INTRODUCTION

An engineering programme shall be assessed by COREN to enable graduates of the programme to register as graduate engineers with COREN. The assessment involves a review of qualifying requirements for the institution (See Section 1.10 in this manual) and an evaluation based on the following criteria:

Criterion 1 - Programme Educational Objectives (PEOs)
Criterion 2- Programme Outcomes (POs)
Criterion 3- Course Learning Outcomes (CLOs)
Criterion 4 - Curriculum and Learning Process
Criterion 5 - Students
Criterion 6 – Continuous Quality Improvement (CQI)
Criterion 7 - Staffing
Criterion 8 - Physical Facilities and Infrastructures
Criterion 9 - Institutional Linkage and Community Services
Criterion 10 - Institutional Support and Funding

3.2 ACCREDITATION CRITERIA

Each criterion serves to assess a principal feature of the institutional activities and overall programme's effectiveness. Hence, each of them is described in terms of quality attributes, amenable to a substantially objective and qualitative assessment.

3.2.1 Criterion 1- Programme Educational Objectives (PEOs)

Programme Educational Objectives (PEOs) for each engineering degree programme address the expectations of stakeholders. They should be consistent with the vision and mission of the university. The number of PEOs should be manageable (3 - 5), and they should be specific, measurable, realistic and achievable within reasonable time frame. Programme Educational Objectives (PEOs) are attributes expected of graduates of the engineering programme between 3 – 5 years after graduation. PEOs should be developed for each engineering programme by taking into consideration, as much as possible, inputs from external and internal stakeholders such as Federal, State and Local Governments, some relevant industries, alumni, employers, students, parents, lecturers and university administration.

The aim of running any engineering programme is to produce graduates with high academic and ethical standards, adequate soft skills and practical exposure thereby making them suitable candidates for self-employment, and employment in public service or in the organized private sector.

The programme seeking accreditation must demonstrate that, the following are in place:

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(a) Well-defined and published Programme Educational Objectives
(b) PEOs consistent with the institution mission
(c) PEOs based on the stakeholders' needs
(d) A process in place to evaluate the attainment of PEOs
(e) Evaluation results used for continual improvement of the programme.

Note: Since the graduates of a programme, which is being accredited for the first time, or the one which is in the initial phases of its accreditation (e.g. whose only one/two batches have graduated so far) the data related to the level of attainment of the PEOs are not required.

3.2.2 Criterion 2– Programme Outcomes (POs)

Programme Outcomes are the narrower statements that describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills and attitude that the students acquire while progressing through the programme specifically, the programme should demonstrate that the students have acquired the following Graduate Attributes associated with the corresponding POs as indicated in Annex A.

A graduate of an engineering programme to be accredited by COREN is expected to have ability to:

i. **Engineering Knowledge:** apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of developmental and complex engineering problems;
ii. **Problem Analysis:** identify, formulate, research literature and analyze developmental and complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences;
iii. **Design/Development of Solutions:** proffer solutions for developmental or complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations;
iv. **Investigation:** conduct investigation into developmental or complex problems using research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions;
v. **Modern Tool Usage:** create, select and apply appropriate techniques, resources and modern engineering and ICT tools, including prediction, modelling and optimization to developmental and complex engineering activities, with an understanding of the limitations;
vi. **The Engineer and Society:** apply reasoning informed by contextual knowledge including Humanities and Social Sciences to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice;
vii. **Environment and Sustainability:** understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development;

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viii. **Ethics:** apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice, including adherence to the COREN Engineers' Codes of Conduct;

ix. **Individual and Team Work:** function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings;

x. **Communication:** communicate effectively on developmental or complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions;

xi. **Project Management:** demonstrate knowledge and understanding of engineering, management and financial principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments;

xii. **Lifelong Learning:** recognize the need for, and have the preparations and ability to engage in independent and lifelong learning in the broadest context of technological and social changes.

An Engineering programme which targets to develop the above-mentioned attributes in its graduates must ensure that its curriculum encompasses all the desired elements of ***Knowledge Profile*** as given in Table A-1. The range of ***Complex Problem Solving*** and ***Complex Engineering Activities*** are given in the Tables A-2 and A-3.

In particular, the programme must demonstrate the following:

(a) Well-defined and published POs
(b) Mapping of POs to PEOs
(c) Teaching-learning and assessment methods appropriate and supportive to the attainment of POs.
(d) Quality of assessment mechanism to evaluate achievement levels for all the Programme Outcomes by each student.
(e) Process in place by which assessment results are applied to further refine the assessment mechanism and/or redefine the programme outcomes, thus leading to continuous improvement of the programme.

3.2.3 Criterion 3 – Course Learning Outcomes (CLOs)

The programme must ensure that each student has achieved all POs to acceptable level through assessment of CLOs. The appropriateness of the assessment methods along with the level of achievement against the targeted outcomes must be evaluated. Mapping of Programme Outcomes to individual courses, nature of assessment tools (direct/indirect/rubrics) and the process of evaluation to determine the attainment of POs should be demonstrated through reasonably convincing evidences.

In particular, the programme must demonstrate the following:

(a) Well-defined and published CLOs

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(b) Mapping of CLOs to POs
(c) Teaching-learning and assessment methods appropriate and supportive to the attainment of CLOs.
(d) Quality of assessment mechanism to evaluate achievement levels for all the CLOs by each student.
(e) Process in place by which assessment results are applied to further refine the assessment mechanism and/or redefine the CLOs, thus leading to continuous improvement of the programme.

3.2.4 Criterion 4 – Curriculum and Learning Process

The academic curriculum and curricular design shall strongly reflect the philosophy and approach adopted in the programme structure, and the choice of the teaching- learning (delivery) and assessment methods. The curricular approach, the educational content and the teaching-learning and assessment methods shall be appropriate to, consistent with, and support the attainment or achievement of the Programme Outcomes. The theory content of the curriculum has to be supplemented with appropriate experimentation in laboratories.

The institution should ensure incorporating the inputs from all stakeholders especially from the industry, in developing curriculum contents so as to keep the curriculum aligned with the PEOs and POs. The programme structure should cover the essential fundamental principles at the initial stages, leading to integrated studies in the final year of the programme, in consonance with the approach and levels defined in Bloom's taxonomy.

The programme should be offered as a 5-year, 10-semester programme. Minimum Fifteen (15) weeks of teaching, excluding time of examination(s), in a regular First and Second semester is mandatory.

The curriculum requirements specify subject areas appropriate to engineering and non-engineering courses. The programme curriculum must provide adequate content for each area, consistent with the Programme Outcomes and Programme Educational Objectives, to ensure that students are prepared to enter the practice of engineering. The curriculum must include:

(a) A minimum of 30 semester credit hours (or equivalent) of a combination of college-level mathematics and basic sciences with experimental experience appropriate to the programme.
(b) A minimum of 85 semester credit hours (or equivalent) of engineering topics appropriate to the programme, consisting of engineering and computer sciences and engineering design, and utilizing modern engineering tools.
(c) A broad education component that complements the technical content of the curriculum and is consistent with the Programme Educational Objectives.
(d) A culminating major engineering design experience that:

i. incorporates appropriate engineering standards and multiple constraints, and
ii. is based on the knowledge and skills acquired in earlier course work.

Comprehensive pursuance of a curriculum necessitates that all of its related activities should be allocated time intervals as per a well-defined reference. In semester system of education, this reference is "Credit-Hour". One credit hour is defined as:

1) One contact hour per week for theory classes (it does not take into account any independent study time).
2) Three contiguous contact hours per week of supervised lab work.
3) Three hours per week related to final year project, including meeting with the supervisor.

Evidence shall be present to show that the curriculum contents are being updated to keep up with the scientific, technological and knowledge development in the field, and to meet the needs of society.

In addition, an Engineering Programme should demonstrate the following essentials:

- **Internship Programme**

The programme should facilitate and promote cooperative learning through supervised internship programme of continuous 4-6 months duration in an engineering practice environment/organization. The training programme should have been planned and agreed to between the institution and the host organization and recorded in log books/report. The institution should receive report about each trainee indicating the training details, interest shown by the student; his/her work habits and punctuality.

- **Lab Work**

The teaching/learning in each core engineering subject must be supported with sufficient practical work in the labs. For this purpose, lab manual containing all experiments for each course must be maintained. The labs should be well-equipped with the requisite equipment/machines such as basic components, modules, measuring instruments, etc. The students should be encouraged to develop practical skills. In addition, they should be motivated to come up with their own design ideas and demonstrate the ability to investigate, analyze and solve complex engineering problems. In this regard the concept of open–ended l a b s and problem-based learning may be introduced.

- **Design Project(s)**

In order to enhance the practical skills and giving spark to their imagination, the students of an engineering programme must be encouraged to undertake design projects as an integral part of every core subject. Such design projects should inculcate intuitiveness, resourcefulness and the spirit to compete. The students should also be motivated to participate in competitions which assign a theme and require the participants to use their ingenuity, creativity and innovation.

- **Final Year Project**

A final year project is the convergence of an engineering programme. Undertaking a final year project is a compulsory requirement. It should mainly comprise literature search, individual analysis, design and putting together various hardware, software and firmware modules to demonstrate a functional concept.

Design projects shall include complex engineering problems and design systems, components or processes integrating core areas and meeting specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. A project of this nature should invariably lead to an integration of the knowledge and practical skills as mandated in the program outcomes. In this context, project of interdisciplinary nature should be encouraged. The final-year design project should span over two consecutive semesters, i.e. semester 9 & 10, totalling at least 6-credit hours.

3.2.5 Criterion 5 - Students

The quality of students admitted and their academic progression are important considerations in evaluating the success of a programme in achieving its set objectives and outcomes. Students must be advised regarding curriculum and career matters. The programme must have and enforce policies for accepting both new and transfer students, awarding appropriate academic credit for courses taken at other institutions.

Students should not be over burdened with workload that may be beyond their ability to cope with. Therefore, policies should be made and implemented to maintain a manageable teaching load in all semesters. The programme must have and enforce procedures to ensure and document that students who graduate meet all graduation requirements. Adequate opportunities, such as involvement in co-curricular activities in student clubs, sports and campus activities, shall be provided for students to develop their character apart from academic development.

The programme should comply fully with guidelines on admission criteria, annual intake, transfer of students, class sizes for theory and practical courses and semester academics load as stated in the COREN BMAS document. **The Programme should provide evidence for the implementation of these guidelines in the Self Study Report to be submitted for accreditation exercises.**

3.2.5.1 Academic Counseling

This aspect pertains to the guidance available to students from academics staff through dedicated office-hours beyond scheduled time-table. The office hours must be publicized by the instructors by posting them on the office doors/notice-boards. Tutorials, problem-solving and/or help sessions, when planned, should be scheduled and made a part of the time-table. RAs and TAs/GAs engaged to provide extra coaching and/or subject assistance, especially when assisting the main instructor with a larger class-size, should also maintain specific designated hours for off-class assistance/counselling. Individual student's academic progress should be monitored and corrective measures taken on regular basis through well-defined mechanism.

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3.2.5.2 Career and Student Guidance & Counseling

In addition to the course specific guidance, the Faculty/School/College should have designated student counsellors who would advise and counsel students regarding academic as well as career matters. A formal orientation session for the newly admitted students to apprise them about the salient requirements and policies/procedures of the programme is highly desired. The student wellness counsellor(s) should also provide assistance to students in managing their health, financial, stress, emotional and spiritual problems.

3.2.5.3 Completion of Courses and Student Feedback

This aspect pertains to the completion of subject contents as published in the official programme catalog and/or website. All the subject topics as well as the practical experiments meant to be covered for the particular course must be completed during the prescribed time. The information should be gathered from the official record, e.g. course-file as well as through feedback and interaction with students.

The course-file is an important instrument to monitor and evaluate the effectiveness of the delivery of the course. All engineering programs in Nigeria are required to maintain course- files for each course taught in the curriculum. A course file must include all relevant data (such as given below) which could become the basis of evaluation.

- Course Description including course contents, recommended text books, lecture breakdown, office hours for students, CLOs with taxonomy levels and their mapping to POs, Assessment tools and their weightage, grading policy etc.
- Schedule of sessional/mid-term tests and final examination.
- Samples of best, worst and average answer sheets, along with the question paper and model solutions of each sessional(s)/midterm/quizzes/assignments and final examination.
- Record of make-up classes for any un-scheduled holiday.
- Breakdown of laboratory experiments pertaining to the course and record of successful conduct.
- Record of CLOs assessment and attainment
- Instructor course feedback form
- Recommendation and suggestions related to the course for the next session. (Course Report)

3.2.5.4 Participation in Competitions

Students' participation in national/international engineering exhibitions and/or competitions not only provides an opportunity to display their projects, exchange ideas and compete with teams from other institutions. It helps to broaden their horizon and provides a platform to the programme academic staff and administrators to benchmark their programme. Winning positions/prizes in such competitions serves to highlight the strong area of the programme and builds confidence in the students. Thus, the programme should encourage and facilitate participation in such competitions/exhibitions.

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3.2.5.5 Student Performance Evaluation

This aspect pertains to the various mechanisms being used for evaluating students' performance in the programme courses, and their suitability and affectivity for assessment of the level of achievement of Course Learning Outcomes. This may include a review of various class assignments, quizzes, research reports, examinations as well as lab projects and viva- voce (oral). The number and variety of such assessment tools and their coverage of subject topics in a manner which ensures a reasonably accurate assessment of students' level of achievement against various learning outcomes is the key to monitor students' progress in a direct manner. It is expected that the programme should demonstrate a minimum number of such class assignments, quizzes and examinations for assessment of POs.

3.2.6 Criterion 6–Continuous Quality Improvement

The programme must regularly use appropriate, documented processes for assessing and evaluating the extent to which the Programme Outcomes are being attained. The results of these evaluations, as well as that of the PEOs and CLOs must be systematically utilized as input for the continuous improvement of the programme. Other available information may also be used to assist in the continuous improvement of the programme.

In addition, various steps taken for improvement of programme quality and the particular steps taken in the light of the observations of last accreditation visit must be clearly stated and documented.

The institution should also provide details of the procedure of internal assessment which is part of the internal quality assessment of the programme. The institution should demonstrate and provide information and reports that are prepared for continuous quality improvement related to different accreditation criteria described in this manual. The institution should also provide the following documents:

i. Self-assessment reports based on Surveys and feedback from the stakeholders
ii. Report of implementation plan based on the observations of last accreditation visit and the remedial actions taken by the programme.

The Programme is expected to identify employers of their graduates and asked them to evaluate their performance in terms of achieving the needs of the industry. The industry is expected to carry out an independent review of the overall academic standard of the programme in relationship with the industrial outcomes. The employers' rating of graduate report and feedback from the industry shall be used for continuous quality improvement of the Programme.

3.2.7 Criterion 7– Staffing

The programme must demonstrate that the staff members are of sufficient number and they have the competencies to cover all of the curricular areas of the programme. A viable engineering programme is expected to comply with COREN's criteria for the minimum number of dedicated programme staff members (Section 10 of the Revised BMAS, 2017). Sufficient staff for the Programme helps to accommodate adequate levels of student-staff interaction, student advising and counselling, university service activities, professional

development, and interactions with industrial and professional practitioners, as well as employers of students.

The programme staff must have appropriate qualifications and demonstrate sufficient ability to ensure the proper guidance of the programme and to develop and implement processes for the evaluation, assessment, and continuing improvement of the programme. The overall competence of the academic staff may be judged by such factors as: education, diversity of backgrounds, engineering experience, teaching effectiveness and experience, ability to communicate, enthusiasm for developing more effective Programmes, level of scholarship, participation in professional societies, and licensure as an Engineer.

The staff is expected to act not only as instructors and researchers but also as student advisors, staff mentors, academic planners, curriculum developers, internal auditors; and also occasionally assist in institutional administration. The academic staff must demonstrate complete familiarity with Outcome-Based Educational (OBE) approach. They are expected to have the ability/authority required to ensure proper conduct of the programme, and to develop/implement processes for evaluation, assessment and Continuous Quality Improvement (CQI) of the programme. Their familiarity with the PEOs and POs, understanding of the outcome-based assessment cycle, and enthusiasm for developing more effective Programmes are the key elements to ensure attainment of PEOs.

Employment and retention of qualified faculty and supporting staff is an indication of managements' commitment and seriousness towards institution's mission and PEOs. Adequate employment security coupled with salaries and benefits commensurate with position, and periodic evaluation for vertical mobility should be ensured and made known. The institution should implement an effective mechanism for mentoring and academic/professional development of the faculty to ensure their continuity and retention. In addition, some sort of performance appraisal mechanism should also be in place to monitor the continued effectiveness of the staff and their adherence to PEOs and POs.

An Engineering programme in Nigeria is expected to comply with COREN's criteria for Staff Strength, Full time/Shared/Visiting dedicated academic staff, Staff qualification and Student/Staff ratio (Sections 10 -14 of BMAS, 2017 Revised).

3.2.7.1 Faculty Training and Mentoring

This aspect pertains to the training and mentoring of the faculty members for making them more effective in their role as instructors, student advisors, academic planners, and curriculum developers. Senior academics staff is expected to undertake the responsibility to guide and help in providing mentoring support on regular basis. Not only there should be a systematic plan of activities for the training of newly inducted/young academic members, the institution/program should also devise a strategy to conduct workshops/seminars as a refresher for the existing programme staff.

The staff must be trained with Outcome-Based Education (OBE) system. Their familiarity with the PEOs and POs, understanding of the Outcome-Based Assessment (OBA) cycle, enthusiasm for developing more effective program, and the ability to become an active player in this regard are the keys to ensure the attainment of PEOs. They are expected to have the ability to ensure proper implementation of the programme, and to develop processes for assessment, evaluation and CQI.

Following are some of the key points that should be covered during various phases of training:

- Teacher's training programme
- PEOs and POs
- Outcome-based assessment cycle and its implementation
- General aspects of lectures delivery
- Modes and means of effective student-teacher interaction
- Using quizzes/assignments/exams/projects/viva voce as effective assessment tools
- Evaluation of assessment results to gauge level of attainment of POs/CLOs
- Preparing and maintaining course files

3.2.7.2 Staff Retention, Development and Career Planning

Employment and retention of qualified faculty is an indication of managements' commitment and seriousness towards institution's mission and PEOs. Staff strength and qualifications, level of competencies, commitment and attitude play a vital role in the accomplishment of PEOs and POs.

To inculcate a sense of professional satisfaction and commitment to the programme among staff members, adequate employment security coupled with salaries and benefits commensurate with position, and periodic evaluation for vertical mobility should be ensured and made known to the staff.

The institution should implement an effective planning for academic/professional development of the staff to ensure their continuity and retention; in addition, some sort of performance appraisal mechanism should also be in place to monitor the continued effectiveness of the faculty and their adherence to PEOs and POs. Institution should have adequate provisions for scholarships leading to PhD, training and sabbatical leave for Post-Doc research to promote professional growth and development. Workload for young staff enrolled in postgraduate Programmes should be reduced to compensate their pursuits in their research programme.

3.2.7.3 Faculty Research & Publications

The institution should foster research activities among its staff members, by supporting participation in national/international conferences, workshops, etc. staff members, especially those holding PhDs degrees, should contribute actively in research, and are expected to publish at least 1 research paper each year in reputed national and international ISI indexed journals.

The institution should make provisions in the budget for allocations to participate and organize workshops, conferences, colloquia, etc. Policies for sabbatical leaves and short/summer leaves for the staff to take-up post-doctoral research assignments at other national/international institutions /organizations should also be made available.

The institution should encourage staff members for establishing linkages with industry to provide consultancy, design services and to provide solutions to their developmental issues. Interaction with industry and sponsoring national/international agencies to attract R&D funding is one of the important factors indicating the dynamism of the programme as well as its staff members. The efforts of staff members, who secure R&D funds from

industry/donors, should be acknowledged in the form of reduced workload and/or financial incentives.

3.2.8 Criterion 8 – Physical Facilities and Infrastructures

The quality of the environment in which the programme is delivered is considered as paramount to providing the educational experience necessary to accomplish the Programme Outcomes. Classrooms, offices, laboratories, and associated equipment must be adequate to support attainment of the Programme Outcomes and to provide an atmosphere conducive to learning. Modern tools, equipment, computing resources, and laboratories appropriate to the programme must be available, accessible, and systematically maintained and upgraded to enable students to attain the Programme Outcomes and to support programmes' needs. Students must be provided appropriate guidance regarding the use of the tools, equipment, computing resources, and laboratories available to the programme.

The library services and the computing and information infrastructure must be adequate to support the scholarly and professional activities of the students and staff. Support facilities such as hostels, sport and recreational centres, health centres, student centres, and transport must be adequate to facilitate students' life on campus and to enhance character building.

The following documentary evidences should be furnished with clear description in self-assessment report by Institution/Programme for the accreditation/re-accreditation of engineering programme(s).

(a.) The adequacy of teaching and learning facilities such as classrooms, learning-support facilities, study areas, information resources (library), computing and information-technology systems, laboratories, workshops, and associated equipment to cater for multi-delivery modes.

(b.) Describe the adequacy of support facilities such as hostels, sports and recreational centers, health care centers, student centers, and transport in facilitating students' life on campus and enhancing character building.

The information required in items (a) and (b) should be provided in the supporting documents but is not limited to the following:

- Master plan of physical facilities.
- A summary, in tabulated form, of the lecture hall facilities (give number, capacity, and audio video facilities available).
- Details of the Programme laboratories.
- A summary of recreational, and sports facilities, and other amenities.
- A summary of information on recent/continuous improvements and planned improvements in these facilities.

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3.2.9 Criterion 9 - Institutional Linkage and Community Service

This aspect relates to industrial collaboration and linkages programme of the institution in order to provide opportunity to students for training, consultancy, R&D and exposure to professional practices. Students are expected to undertake assignments from industry to provide solutions to complex engineering problems. Students and academic staff should be encouraged to establish collaboration for R&D and product development related projects, with due regard to environmental and societal impact. Feedback from the industry and employers is crucial and an essential part of curriculum review process used to evaluate attainment of the PEOs.

Members of Staff are expected to have contributed to the development of their immediate community and the nation through community service, projects within and outside the University environment, public lectures, etc.

3.2.10 Criterion 10 - Institutional Support and Funding

This criterion deals with the financial resources and their commitment to support an engineering programme. The main objective is to garner and assess the adequacy of these resources in sustaining the programme, with a view to its up-gradation and future enhancements. Institutional support and Funding must be adequate to ensure the quality and continuity of the programme. Resources including institutional services, financial support, and staff (academics, administrative and technical) provided to the programme must be adequate to meet programme needs. The resources available to the programme must be sufficient to attract, retain, and provide for the continuing professional development of a qualified staff. The resources available to the programme must be sufficient to acquire, maintain, and operate infrastructures, facilities, and equipment appropriate for the programme, and to provide an environment in which POs can be attained.

The required information comprises income and expenditure details which can be extracted from the approved budgets for the current as well as two previous, but consecutive, financial years. In case of new Programmes, only one or two budgetary figures will suffice. Institution is required to provide copies of the approved budgets and last-year audited accounts.

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CHAPTER 4

TEMPLATE FOR COREN SELF-STUDY ASSESSMENT REPORT

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4. TEMPLATE FOR COREN SELF-STUDY ASSESSMENT REPORT

4.1. Introduction

The institution applying for accreditation must submit documents that provide accurate information and sufficient evidence for the purpose of evaluation. For each program to be accredited, unless otherwise stated, the institution shall submit the following documents:

i. Self-Study Report (as per the format described below) in Hardcopy
ii. Duly filled annexes provided in this Manual, in Hardcopy.
iii. Supporting Material/Documents, either in Hardcopy or in Digital form.

4.2. Format of Self-Study Report

A Self Study Report must be comprehensive, easily readable, free standing, and provide a coherent overview with the text addressing each major point in a definitive manner. It is an account of the institution's plan, implementation, assessment and evaluation of the program conducted. In addition, it should be a clear reflection of the processes with results obtained, used in continual quality improvement at all levels of the program's activities. This bound document with all pages numbered and a table of contents shall provide the information and description about the program to enable the Evaluation Panel to objectively assess the program for the purpose of accreditation. The emphasis shall be on qualitative description of each aspect and criterion, and how these meet the standards and expectation as set out in this Manual. In other words, this summary document is a form of Self-Study of the institution's Programme and expected to provide accurate information as required by the Accreditation Standard (as detailed in Chapter 3 of this manual).

4.3. General

(a) Provide general information on the institution, specific programme and attach the institution academic calendar.
(b) Provide detailed information on program history of accreditation (year of accreditation, conditions imposed and actions taken).
(c) Describe any self-initiated improvements made in the program and the year the changes were introduced.

4.4. Programme Educational Objectives

(a) State the vision and mission of the institution and/or faculty (School).
(b) Describe the PEOs and state where they are published.
(c) Describe how the PEOs are consistent with the vision and mission of the institution and/or faculty/School and stakeholders' requirements.
(d) Describe the processes used to evaluate the achievement of PEOs.
(e) Describe how the results obtained from evaluation are being used to improve the effectiveness of the programme.
(f) Describe the processes used to evaluate the level of achievement of the PEOs. This includes describing graduates/alumni database, tools (survey, meetings, interviews, etc.) and frequency of activities and timelines.
(g) Discuss the PEOs achievement results by the graduates/alumni.

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(h) Describe how the feedback and results obtained from the above processes are being used for the CQI of the programme.
(i) Describe the extent to which the programme's various stakeholders are involved in these processes.
(j) Describe CQI strategies to be implemented in relation to PEOs.

4.5. Programme Outcomes (POs)

a) List the POs and state where they are published.
b) Describe how the POs relate to PEOs (in addition to the template given in **Annex B-1).**
c) Describe how the POs encompass and are consistent with the 12 POs of Section 3.2.2 of this Manual.
d) Describe the PO definition or elements/performance indicators.
e) Describe the processes used to establish and review the POs, and the extent to which the program's various stakeholders are involved in these processes (where applicable). This includes describing the tools used in the processes (survey, meetings, interviews, etc.) and frequency of activities and timelines.
f) Describe the mapping of courses with POs (as per template given in **Annex-D**).
g) Explain how the assessment results are applied to further develop and improve the POs.
h) Describe the materials, including student work and other evidence, that demonstrate achievement of the POs.
i) Describe the extent to which the programme's various stakeholders are involved in the processes.
j) Describe CQI strategies to be implemented in relation to POs.

4.6. Course Learning Outcomes (CLOs)

a) List the CLOs and state where they are published.
b) Mapping of CLOs to related POs (as per template given in **Annex B2).**
c) Describe the relationship between the CLOs and the POs.

4.7. Curriculum and Learning Process

(a) Discuss the program structure and course contents to show how they are appropriate to, consistent with, and support the development of the range of intellectual and practical skills and attainment or achievement of the PLOs.
(b) Discuss the program delivery and assessment methods and how these are appropriate to, consistent with, and support the development of the range of intellectual and practical skills and attainment or achievement of the PLOs.
(c) Provide evidence of the use of tutorials and non-conventional delivery methods such as Problem Based Learning (PBL) techniques alongside traditional lectures.
(d) Describe how the requirements of Complex Problem Solving (CPS) and Complex Engineering Activities (CEA) have been addressed.

The information required in **(a) and (b)** should include but is not limited to the following:

- A matrix linking courses to PLOs to identify and track the contribution of each course to the PLOs (as per template given in **Annex-D**).

- Distribution of the engineering courses according to areas specific to each program (as per template given in **Annex-E**).
- Distribution of the related non-engineering (general education) courses.
- Distribution of the courses offered according to semester (as per template given in **Annex-F**).
- Details of Laboratory equipment/workstations and experiments conducted (as per template given in **Annex-G**).

4.8. Students

The information required in this section should include relevant templates given in Annexes, where applicable.

(a) Discuss the requirement and process for admission of students to the program, response and annual intake (as per template given in **Annex-H**).
(b) Discuss the policies and processes for students' transfer and credit transfer/exemption.
(c) Discuss mechanism for providing guidance to students on academic, career and aspects pertaining to wellness.
(d) Discuss students' workload, class sizes for theory as well as laboratory sessions and completion of courses.
(e) Describe formal or informal feedback platform/channel to obtain students feedback and suggestions for further programme improvement, and how have the feedback resulted in programme improvement.
(f) Summarize the graduation requirements for the program, the process for ensuring and documenting that each graduate completes all graduation requirements for the program (as per template given in Annex M).
(g) Describe CQI strategies to be implemented in relation to Students.

4.9. Continuous Quality Improvement

(a) Discuss the mechanism for: program planning; curriculum development; curriculum and content review; responding to feedback and inputs from stakeholders including industry advisors, students and alumni; tracking the contribution of individual courses to POs; tracking outcomes of performance through assessment, including rubrics; reviewing of PEOs and POs; and continuous quality improvement. For a new programme, the institution also needs to discuss the processes for the decision to introduce the programme.
(b) Discuss the implementation plan based on the observations of the last accreditation visit and the remedial actions taken.

The information required in **(a) and (b)** should include but is not limited to the following:

- Evidence on the participation of faculty members and support staff as well as students in the continuous quality improvement process.
- Evidence on the development of academic staff through opportunities in further education, industrial exposure, as well as research and development.
- Policies, internal processes and practices that are in place at all levels within the institution relating to the accreditation criteria as stated in Chapter 3 of this Manual.

(a) Summarize responses to the external examiner's report.

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(b) Discuss how the quality management system of the institution provides quality assurance and benchmarking.
(c) Evidence of the on-going participation of industry advisors in discussions and forums, professional practice exposure, and collaborative projects.
(d) Provide at least ten (10) employers' feedback report on the performance of students who graduated within the last five (5) years.

4.10. Staffing

The information required in this section should include relevant templates given in annexes, where applicable.

(a) Discuss the strength and competencies of the academic staff in covering all areas of the program, and in implementing the outcome- based approach to education (as per template given in **Annexes-I ~ K**).
(b) Discuss how the overall staff workload enables effective teaching (including student-teacher ratio), student-staff interaction, student advising and counselling, institutional service and research activities, professional development and interaction with industry.
(c) Discuss processes for faculty development, training and retention.
(d) Describe the role played by the faculty with respect to course creation, modification, and evaluation, their role in the definition and revision of Programme Educational Objectives and Programme Outcomes, and their role in the attainment of the Programme Outcomes. Describe the roles of others on campus, e.g., dean or provost, with respect to these areas.
(e) Discuss the sufficiency and competency of technical and administrative staff in providing adequate support to the educational programme. These include:

- A breakdown in terms of numbers of teaching staff (full- time, part-time and inter-programme) by year for the past five years
- A summary of the academic qualifications of teaching staff.
- A summary of the professional qualifications and membership in professional bodies/societies of teaching staff.
- A summary of the posts held by full time teaching staff.
- A summary of teaching workload of teaching staff for the current semester.
- An analysis of all support staff and post held in the Department.
- The staff: student ratio by year for all academic years for the past five years.
- A listing of lecturers/invited speakers from industry/public bodies and their level of involvement.

Outline the organizational structure of the institution as well as the structure within the faculty/department/programme. Discuss the level and adequacy of institutional support, operating environment, financial resources, constructive leadership, policies and mechanisms for attracting, appointing, retaining and rewarding well qualified staff and provision of professional development, and provision of infrastructure and support services to achieve Programme Educational Objectives and assure continuity of the programme. All relevant policies are to be made available during the visit.

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4.11. Physical Facilities and Infrastructure

(a) Discuss the adequacy of teaching and learning facilities such as classrooms, learning-support facilities, study areas, information resources (library), computing and information-technology systems, laboratories and workshops, and associated equipment to cater for multi-delivery modes.

(b) Describe the adequacy of support facilities such as hostels, sport and recreational centers, health centers, student centers, and transport in facilitating students' life on campus and enhancing character building.

The information required in **(a) and (b)** should include but is not limited to the following:

- A summary, in tabulated form, of the lecture facilities (give number, capacity, and audio/video facilities available).
- A summary, in tabulated form, of the laboratories (list down the details of workstation available in each laboratory).
- A summary, in tabulated form, of the workshops/drawing studio (list down the equipment/machinery available in each workshop/drawing studio).
- A summary, in tabulated form, of the computer laboratories (list down the hardware and software available).
- A summary, in tabulated form, of recreational facilities.
- A summary, in tabulated form, of information on recent improvements and planned improvements in these facilities.

4.12. Industrial Linkages and Community Services

Discuss the involvement of industry in discussions and fora, professional practice exposure, and collaborative projects / research for the solutions to engineering problems. Discuss students' activities and involvement in student organizations that provide experience in management and governance, representation in education and related matters and social activities.

4.13. Institutional Support and Funding

Discuss the strategies used for the employment and retention of staff for the programme. Discuss institution's financial commitment and support to sustain and enhance the quality of programme. Also summarize the salient features in a tabular form (as per the template given in Annex-L).

4.14. Institutional Documents to be Made Available

The institution should make available the following items as evidences to support the information provided in the Self-Study Report during the visit:

(a) The Handbook, Calendar supplement, or other official publication relating to the faculty/school/department, and containing the statement of programme details; Institution prospectus.

(b) All relevant documents and evidences related to Programme Educational Objectives and Programme Outcomes (one copy) as follows:-

- Course files – for every course offered by the programme, provide the course information to include the targeted course learning outcomes, a matrix linking

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course outcomes to programme outcomes, course synopsis/syllabus, and a list of references (texts used).

- Examination questions, Booklets and Marking Schemes. Any information with regard to other learning activities and assessment measures such as projects, quizzes, tutorial questions, assignments, class projects, copies of the course notes (optional), and any other materials used for the course are also to be included. For laboratory courses, provide a copy of the syllabi, experiment instruction sheets, as well as supporting information.
- Documents related to training workshops on OBE and Curriculum development.
- Objectives and outcomes assessment instruments – supporting documents for objectives and outcomes assessment including sample questionnaires, portfolios, survey forms, video recordings, etc.
- Copies of the final year project report, instruction sheets, and grade sheets or other evaluations for the project. A listing of final project titles for the past 2 years.
- Copies of the training reports, guidelines for the training, and reviews of PEOs by the industry as well as the staff mentors.
- Copies of the laboratory instruction sheets and reports, grade sheets or other evaluations for the project laboratory report.
- Evidence of students' evaluation of staff.
- A bound copy of the overall students' results for each semester and overall graduating students' spreadsheet.
- Minutes and records of action and improvement of meetings of the programme teaching team, Industry Advisory Committee, staff-student consultation fora.
- Documents related to students' participation in design competition, public speaking activities, etc.
- Documents related to academic staff attending trainings, conferences and workshops.
- Facilities and equipment maintenance records with Equipment calibration records.
- Evidence of activities relevant to industry exposure with a summary of the industrial training schemes, and the list of companies involved.
- Documents related to health, safety, and environment.
- Institution/programme annual report.
- External examiners' reports.
- A **Three-page CV** for each staff member in Annex.

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ANNEXES (A–Q)

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ANNEX A: ENGINEERING GRADUATE ATTRIBUTES

Annex A-1: Examples of Engineering Content of some Programmes

A. Engineering Applications

Emphasis on engineering applications in degree Programmes aims to ensure that all engineering graduates have a sound understanding of up-to-date industrial practice, in particular, here are four examples for specific disciplines:

Civil Engineering:

i. To appreciate the characteristics and structural behaviour of materials in a variety of user environments.
ii. To be able to analyze and design structural components from these materials.
iii. To appreciate the range of construction technology currently available and the skills which they require in people for their use.
iv. To appreciate the cost aspects of material selection, construction methods, operation and maintenance in their interaction with design and the delivery of civil engineering facilities and services.
v. To understand the whole process of industrial decision-making in design, manufacturing and use and how it is influenced not only by technical ideas but also by the practical constraints of financial and human resources as well as the business and social environment of engineering.

Mechanical Engineering:

i. To appreciate the characteristic behaviour of materials in a variety of user environments.
ii. To appreciate the range of manufacturing systems and industry energy currently available and the skills which they require in people for their use.
iii. To appreciate the cost aspects of material selection, manufacturing methods, operation and maintenance in their interaction with design and product
iv. To understand the whole process of industrial decision-making in design, manufacturing and use and how it is influenced not only by technical ideas but also by the practical constraints of financial and human resources as well as the business and social environment of engineering.

Electrical and Electronic Engineering:

i. To appreciate the characteristic behaviour of materials in electrical and electronic systems.
ii. To be able to analyse and design electrical and electronic systems from devices/components made of various materials.
iii. To understand the concepts of generation, transmission and distribution of low and high voltage power.
iv. To appreciate cost effectiveness and energy consumption of component/device equipment selection, manufacturing process and integration process.

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v. To appreciate the range of manufacturing methods currently available and the skills which they require in people for their use.
vi. To understand the whole process of industrial decision making in design, manufacturing and use and how it is influenced not only by technical ideas but also by the practical constraints of financial and human resources and by the business and social environment of engineering.

Chemical Engineering

i. To appreciate the physical/chemical characteristics and properties of materials.
ii. To be able to adopt these materials in process design and analysis.
iii. To calculate and analyze the material and energy flows for a given chemical process.
iv. To understand the general sequence of processing steps for any given type of chemical process.
v. To understand the selection or estimation of process operating conditions, selection of process equipment, maintenance and process troubleshooting.
vi. To analyze the various types of unit operations and processing steps and to decide their relative advantages or disadvantages on the basis of environment, economics, safety and operability.
vii. To understand the various process control schemes for the purpose of maintaining production quality, ensuring process safety and preventing waste.

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Annex A-2: Knowledge Attribute Profile

The curriculum shall encompass the knowledge profile as summarised in the table below:

Table A-2: Knowledge Attribute Profile

S/No.	Attribute
K1	A systematic, theory-based understanding of the **natural Sciences** applicable to the discipline.
K2	Conceptually-based **mathematics**, numerical analysis, statistics and formal aspects of computer and information science to support analysis and modelling applicable to the discipline.
K3	A systematic, theory-based formulation of **engineering fundamentals** required in the engineering discipline.
K4	Engineering **specialist knowledge** that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline.
K5	Knowledge that supports **engineering design** in a practice area.
K6	Knowledge of **engineering practice** (technology) in the practice areas in the engineering discipline.
K7	**Comprehension** of the role of engineering in society and identified issues in engineering practice in the discipline: ethics and the professional responsibility of an engineer to public safety; the impacts of engineering activity: economic, social, cultural, environmental and sustainability.
K8	Engagement with selected knowledge in the **research literature** of the discipline.

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Annex A-3: Definition of Complex Problem Solving

The range of complex problem solving is defined as follows:

Table A-3: Range of Complex Problem Solving

	Attribute	**Complex Problems**
1	Preamble	Engineering problems which cannot be resolved without in-depth engineering knowledge, and have some or all of the characteristics listed below:
2	Range of conflicting requirements	Involve wide-ranging or conflicting technical, engineering and other issues.
3	Depth of analysis required	Have no obvious solution and require abstract thinking, originality in analysis to formulate suitable models.
4	Depth of knowledge required	Requires research-based knowledge much of which is at, or informed by, the forefront of the professional discipline and which allows a fundamentals-based, first principles analytical approach.
5	Familiarity of issues	Involve infrequently encountered issues
6	Extent of applicable codes	Are outside problems encompassed by standards and codes of practice for professional engineering.
7	Extent of stakeholder involvement and level of conflicting requirements	Involve diverse groups of stakeholders with widely varying needs.
8	Consequences	Have significant consequences in a range of contexts.
9	Interdependence	Are high level problems including many component parts or sub-problems.

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Annex A-4: Definition of Complex Engineering Activities

The range of complex engineering activities is defined as follows:

Table A-4: Range of Complex Engineering Activities

	Attribute	**Complex Activities**
1	Preamble	Complex activities means (engineering) activities or projects that have some or all of the following characteristics listed below:
2	Range of resources	Involve the use of diverse resources (and for this purpose, resources include people, money, equipment, materials, information and technologies).
3	Level of interaction	Require resolution of significant problems arising from interactions between wide- ranging or conflicting technical, engineering or other issues.
4	Innovation	Involve creative use of engineering principles and research-based knowledge in novel ways.
5	Consequences to society and the environment	Have significant consequences in a range of contexts, characterized by difficulty of prediction and mitigation.
6	Familiarity	Can extend beyond previous experiences by applying principles-based approaches.

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ANNEX B: MAPPING OF PEOs TO POs/GRADUATE ATTRIBUTES

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Annex B-1: Mapping of POs to PEOs (Sec 3.2.2)

COREN Programme Outcomes (as defined in Sec 3.2.2)	PEO1	PEO2	PEO3	PEO4	PEO5	PEO6	PEO7	PEO8	PEO9	PEO10	PEO11
	PEOs as defined by the Programme										

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Annex B-2: Mapping of CLOs to POs (Sec 3.2.2)

Course Learning Outcomes (as defined by the Programme)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
	POs as defined by COREN (more may be added by the Programme)											

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Annex B-3: Course Evaluation Form

Indirect Evaluation of CLOs in the Course Evaluation File

Institutions' Logo

$< Name\ of\ Institution >$

$< Name\ of\ Faculty/School >$

$< Name\ of\ Department >$

Students' Course Evaluation Questionnaire

Course Code: CHE 412 **Course Name:** Transport Phenomena III

Session- Semester: 2017/2018 - First

The questionnaire should be filled by each student at the time of course completion.

Please give us your views so that the quality of this course can be improved. You are encouraged to be candid in your answers. Any information you share here will be kept confidential.

Course Learning Outcomes

For each Learning Outcome listed below, please choose the one response that most accurately represents your view, where:

1 = Strongly Disagree

2 = Disagree

3 = Not Sure

4 = Agree

5 = Strongly Agree

I was able to attain the following learning outcomes for this course:

LO1 understand the basic principle of conduction convection and radiation processes	
LO2 apply equations for solving conduction problems with constant and varying heat transfer areas	
LO3 discuss dimensional analysis and heat transfer by convection.	
LO4 calculate heat transfer coefficient of a typical heat exchanger	

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ANNEX C: SYSTEM OF INSTRUCTIONS AND EXAMINATION

Session/Semester: _____

Duration of a Session (in weeks) **Total:** _____ **Teaching:**_____
Total No. of courses in the _____
No. of courses in a session: **Min.** _____ **Max.** _____
Total contact-hours for a Theory course per session: _____
Total contact-hours for a Practical course per session: _____
Weekly contact-hours for a Theory class: _____
Weekly contact-hours for a Practical class: _____

Attach Academic Calendars (for Current & the previous years):

Attach Grade-Sheets for LAST ONE-year (All Batches) as per the following format:

Grade-Sheet

		No. of Students Securing Grades (or %age Ranges, i.e.<40, 40-44, 45-49, 50-60, 60-						
Course Code	**Course Name**	**Total**	**A**	**B**	**C**	**D**	**E**	**F**

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ANNEX D: MAPPING OF COURSES TO POs

Semester No.	Course Code	Course Title	Level of Emphasis of PO (1: High; 2= Medium; 3=Low)										
			1	2	3	4	5	6	7	8	9	10	..
			POs as defined by COREN (more may be added by the Programme)										
1	MT10001	Calculus											
	HU1021	English Grammar				1							
		Subject 3					2						
		Subject 4											
		Subject 5											
		Subject 6		3									
2	CE1052	OOPS											
		Subject 2											
		Subject 3											
		Subject 4		3									
		Subject 5											
:													
			1										
:													
						2							
:													
					2		2		2				
10		Subject 1											
		Subject 2					2		2				
		Subject 3	2										
		Subject 4							2			2	
		Subject 5								1			

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ANNEX E: DESIGN OF ENGINEERING CURRICULUM

Domain	Knowledge Area	COREN/NUC Recommended		Institute's Program Breakup	
		Total Credits	Overall %	Total Credits	Overall %
Non-Engineering	Humanities	As per discipline specific COREN BMAS guidelines	25% – 40%		
	Management Sciences				
	Natural Sciences				
Engineering	Computing	As per discipline specific COREN BMAS guidelines	60% – 75%		
	Engineering Foundation				
	Major Based Core (Breadth)				
	Major Based Core (Depth)				
	Inter-Disciplinary Engineering Breadth (Electives)				
	Final Year Design Project	6			
	Industrial Training (SIWES)	2			
	Total	130 – 138	100%	0	0

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ANNEX F: CURRICULUM

Annex F-1: Course Offerings

NOTE: The programme is required to attach the list of Contents for ALL Courses

Semester No.	No.	Course Code	Course Title	Credit - Hours	Knowledge Area	Pre-requisite Courses (if any)
1	1	MAT111	Algebra and Number Theory	3-3	Basic Science	
	2	MAT112	Geometry and Trigonometry	3-3	Basic Science	
	3	PHY 113	General Physics I	3-3	Basic Science	
	4	CHM111	Physical Chemistry I	3-3	Basic Science	
	5	GST110	Use of English I & Library	3-3	General Studies	
	6	GST 104	Introduction to Principles of Economics	2-2		
			Total Credit Hours	**17-17**		
2	1	PHY123	General Physics II	3-3	Basic Science	
	2	PHY126	General Physics III	2-2	Basic Science	
		STA127	Probability II	2-2	Basic Science	

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	4	CHM121	Organic Chemistry I	3-3	Basic Science	
	5	CHM191	Practical Laboratory Chemistry I	2-2	Basic Science	
	6	PHY100	Practical Laboratory Physics I	2-2	Basic Science	
			Total Credit Hours	**14-14**		
Semester No.	**No.**	**Course Code**	**Course Title**	**Credit - Hours**	**Knowledge Area**	**Pre-requisite Courses (if any)**
3	1	EET211		3-3	Major Eng. course	
	2	EET212		3-3	Major Eng. course	
			Total Credit Hours			
4	1	EET221		3-3	Major Eng. course	
	2	EET222		3-3	Major Eng. course	
	3	EET223		2-2	Major Eng. course	
			Total Credit Hours	**17-17**		
.	1					
.	2					

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.			**Total Credit Hours**			
	1					
			Total Credit Hours			
10	1	ENG521				
	2	ENG522				
	3	ENG523				
	4	ENG524				
			Total Credit Hours	**14-16**		

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Annex F-2: List of Electives

Area of Specialization/ Options	Sr. No.	Course Code	Course Title	Credit Hours	Knowledge Area	Pre-requisite Courses (if any)
Semiconductors	1					
	2					
	3					
	4					
Power Systems	1					
	2					
	3					
	4					
	5					
Digital Design	1					
	2					
	3					

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Annex G: LABORATORIES & LABORATORY WORKS

Number of Total Engineering + Computing Courses: _____

Number of Lab Courses: _____

Number of Laboratories: _____

Attach Lab Commitment Charts for each Lab (for current & the previous semester):

Attach List of Experiments and name of Instructor(s) for each Lab course (for current & the previous semester):

Sr. No.	Name of Laboratory (Staff Names & Qualifications)	Titles of Laboratory Course(s) Conducted in the Lab.	Type(s) of Workstations (No. of each type)	Nature of Experiments	No. of Students per Workstation
1	Communication Systems Lab 1:Mr. Lab Engr. -- BE (Elect) 2:Mr. Lab. Asst -- DAE (PWR) 3:Mr. Lab Attend. -- FA	1- Communication Theory 2- Wave Propagation & Antennas 3- Microwave Engineering	1-Analog Communication Trainers (6)	Demonstration	4 to 5
			2-Digital Communication Trainers (8)	Demonstration	3 to 4
			3- Antenna Trainers (6)	Demonstration	4 to 5
			4- Microwave Trainers (4)	Demonstration	6 to 7
2	Electronics Circuits Lab 1:Mr. Lab Engr. -- BE (Elect) 2:Mr. Lab. Asst -- DAE (PWR) 3:Mr. Lab Attend. -- FA	1- Circuit Analysis I 2- Circuit Analysis II 3- Electronic Devices & Circuits 4- Integrated Electronics	Workbenches, each with Power-supply, Signal Generator, Oscilloscope, Multimeter, Breadboard, Components (14)	Hands-on	2

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ANNEX H: STUDENTS

Annex H-1: Student Admissions & Enrollments

Session	Applicants			Total Number of Students Admitted		
	UTME	Direct Entry	Total	UTME	Direct Entry	Total
2014/2015	326	77	403	145	17	162
2015/2016	942	102	1044	160	19	179
2016/2017	875	87	962	139	14	153
2017/2018	491	85	576	151	14	165
2018/2019						

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Annex H-2: List of Registered Students in Department of ---------- for the past 5 Sessions

Level	Number of Registered Students				
	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
100	151				
200	128				
300	143				
400	121				
500	97				
Total	**640**				

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Table H-3: Staff/Student Ratio for the past 5 sessions

SESSION	5	4	3	2	1 (current session)
RATIO					

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ANNEX I: STAFFING

Annex I-1: List of Full-Time Departmental Academic Staff

Sr. No.	Name	COREN #	Rank	Date of first appointment	Details of Qualifications			Specialization	Experience Teaching (Total) Years	Dedicated / Shared	Credit Hours taught in the Current & Last *Semesters*	
					Degree	Year	Institution				First	Second
1			Professor & Head of Department		Ph.D. MEng B.Eng.				10 (15)	Dedicated	6+3	3+0
2			Professor		Ph.D. MEng BEng				08 (10)	Dedicated	6+6	9+0
3			Associate Professor		Ph.D. MEng B.Eng.				06 (10)	Dedicated	3+3	12+0
4			Senior Lecturer		Ph.D. MEng B.Eng.				02 (03)	**Shared**	3+9	0+12 **(06)***
5			Lecturer I		Ph.D. MEng B.Eng.				0.5 (01)	Dedicated	0+0	0+6
6			Lecturer II		MEng B.Eng.				03 (03)	**Shared**	0+0	6+9 **(09)***
7			Assistant Lecturer		MEng B.Eng.					Dedicated	0+0	12+0

NB: Sort by Rank *** Taught to other Departments/Degrees**

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Annex I-2: List of Shared/Visiting Staff from other Departments/Organizations

Sr. No.	Name	COREN #	Rank	Details of Qualifications			Specialization	Department / Organization	Credit Hours taught in the Current & Last Semesters	
				Degree	Year	Institution			M S	BS
1			Professor	Ph.D.				Dept. of Mech. Engg	3+0	3+3
				M.Eng						
				B.Eng						
2			Associate	Ph.D.					0+3	3+6
				M.Eng						
				B.Eng						
3			Senior Lecturer	Ph.D.					0+0	3+3
				M. Eng						
				B.Eng						

NB: Names to be sorted by Rank

Annex I-3: List of Full-Time Laboratory Technologists

Sr. No.	Name	COREN #	Rank	Details of Qualifications			Specialization	Date of first appointment	Laboratory Works Conducted (Contact Hours)	
				Degree	Year	Institution			Current Semester	Last Semester
1			Lab. Tech.	B.Eng					9	12
				HND						
				ND						
2			Lab. Tech.	B.Eng						
				HND						
				ND						

Annex I-4: Summary of Academic Staff

Current Academic Session

Number of New Staff members employed in the programme since last Accreditation Visit

BEng	
MEng	
PhD	

	Staff Teaching Engineering Subjects				Staff Teaching Non-Engineering Subjects			
	B.Eng	M.Eng	PhD	TOTAL	BEng	M. Eng	PhD	TOTAL
Programme Staff (Dedicated)								
Programme Staff (shared with other programs)								
Shared Staff (from other programmes)								
Visiting Eng. Staff								
GA / RA								

Annex I-5: Scenario at the time of Last Accreditation Visit

Number of Staff members who left the programme since last Accreditation Visit

BEng	
MEng	
PhD	

	Staff teaching Engineering Subjects				Staff teaching Non-Engineering Subjects			
	BEng	M Eng	PhD	TOTAL	B.Eng	M Eng	PhD	TOTAL
Program Staff (Dedicated)								
Program Staff (shared with other programs)								
Shared Staff (from other programs)								
Visiting Engg. Staff								
GA / RA								

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ANNEX J: TEMPLATE FOR SELF-STUDY REPORT (SSR)

COREN < with COREN Logo>

Self-Study Report

for the

<Programme Name>

<Faculty/School Name>

at

<University Name> < with Institution Logo>

<Location>

<Date>

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ANNEX K: STAFF WORKLOAD

List the staff members in the same sequence as listed in ***Staff Strength*** sheet

S/No.	Name	Degree	Current Semester Loading			Last Semester Loading		
			Credit Hours		Course Titles	Credit Hours		Course Titles
			Theory	Practical		Theory	Practical	
		B Eng						
		MEng/PhD						
		B Eng						
		MEng/PhD						
		BEng						
		MEng/PhD						
		B Eng						
		MEng/PhD						
		B Eng						
		MEng/PhD						
		BEng						
		MEng/PhD						
		B Eng						
		MEng/PhD						
		B Eng						
		MEng/PhD						

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ANNEX L: INSTITUTIONAL SUPPORT AND FUNDING

Annex L-1: Details of the University Income

S/No.	Source of Income	Current Fiscal-Year	1st Previous Fiscal-Year		2nd Previous Fiscal-Year	
			Budgeted	Actual (as per Audit Report)	Budgeted	Actual (as per Audit Report)
A	Grants from Government/Founder					
B	IGR					
C	Tuition-Fee					
D	.					
E	.					

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Annex L-2: Details of the University Expenditure

S/No.	Expenditure Head	Current Fiscal-Year	1st Previous Fiscal-Year		2nd Previous Fiscal-Year	
			Budgeted	Actual (as per Audit Report)	Budgeted	Actual (as per Audit Report)
A	Maintenance of Existing Facilities					
B						
C	.					
D	.					
E	.					

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ANNEX M: QUALIFYING REQUIREMENTS FOR RESOURCE VERIFICATION, PRE-ACCREDITATION & ACCREDITATION VISITATION

<Institution Logo>

<Name of Institution >

SELF ASSESSMENT REPORT

<Complete Name of the Engineering Programme>

<Name of the School / Faculty / Department>

Submitted to

EDUCATION & TRAINING DEPARTMENT

COUNCIL FOR THE REGULATION OF ENGINEERING IN NIGERIA

<Month, Year>

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This Page should be on University Letterhead

Please tick:

Accreditation

Approval of New Programme

Subject: **SAR for the Programme of <as per the degree nomenclature>**

1. The requirements as per the Check List below to qualify for the process of accreditation under the COREN OBE Manual of Accreditation-2019 have been addressed / verified:

Check List:

S. No.	Qualifying Requirement	Institution Check	COREN Check Remarks
i.	A minimum of 160 credit units of which 85 credit units must be core engineering courses offered over a period of five years (10 semesters).		
ii.	Final year project (minimum 6 credit hours)		
iii	Industrial training /SWEP		
iv	Full-time engineering faculty (minimum of 6)		
v	Teaching Staff: student ratio of 1:15 minimum		
vi	External examiner's report		
vii	Programme Educational Objectives		
viii	Programme Outcomes		

2. The Self-Assessment Report (SAR) is hereby submitted for consideration of E & T Department, COREN to process for accreditation of the programme of – (name of the programme)

Signature : _____

(Head of the Department)

Date:

Signature: _____

(Dean/ Head of the Institution)

Date:

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Note:
Give a summary of the adopted initiatives through appropriate and diverse assessment methods to demonstrate that the programme complies with the Outcome Based Assessment (Programme Educational Objectives and Programme Outcomes reflecting Knowledge profiles, Complex problem solving and Complex Engineering activities as indicated in Tables 1, 2 and 3 Annex A of the manual) as a Self-Assessment Report (SAR) to be submitted to COREN.

Failure to meet any one of the qualifying requirements will mean that the programme shall not be assessed for accreditation, and the process shall stop here and no submission to COREN can be made by the institution. Institutions are advised to ensure all requirements are fulfilled by the programme before re-applying for accreditation.

For a programme going for Pre accreditation and Accreditation visitations, the SAR shall include:

- Self-assessment of the concerns listed in the previous accreditation, substantiated with evidences of actions taken to close these concerns, and results achieved from the actions. Give a summary of the concerns and action taken closing these concerns in a tabular form.
- Updates on the fulfillment of the eight (8) Qualifying Requirements.
- Report of how the programme is addressing (closing the gap) newly introduced/revised accreditation requirements by COREN (if any).
- Updates on any changes in information, data, statistics, status, policies, etc., and report on Continuous Quality Improvement (CQI) activities related to the seven (8) accreditation criteria. These may involve for example change of programme name, PEO or PO statements, OBE model, academic curriculum (structure or content), students' entry requirements, number of academic or support staff, number of academic staff with professional qualifications, staff student ratio, facilities.
- Any other related matters to be highlighted in any section/criteria.

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ANNEX N: CHECKLIST OF DOCUMENTS FOR RESOURCE VERIFICATION, PRE-ACCREDITATION AND ACCREDITATION VISITATION

INTRODUCTION

This Appendix contains checklist of Documents for Accreditation/Approval of New Programme and Relevant Information as follows:

1. Chapter 4 : Self-Study Report (SSR) to be submitted in hard and soft copies.

Annex N-1: General Information

No.	Refer to Section 4.2	To be filled out by the institution	Checked by Evaluator
1	Name of the institution.		
2	Address of institution.		
3	Name of Faculty/School/Department.		
4	Name and phone number of Staff to be contacted.		
5	Programme for Accreditation.		
6	COREN Reference Number.		
7	Degree to be Awarded and Abbreviation.		
8	Duration of Programme (in years).		
9	Institution Academic Session.		
10	URL Address; institution website.		

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Annex N-2: History of Programme Accreditation

No.	Refer to Section 4.2	To be filled out by the institution	Checked by Evaluator
1	Introduction Year of Programme.		
2	Year of Last Accreditation for this Programme.		
3	Decision (if any) from Previous Accreditation.		
4	Action taken on the decision Above		
5	Major Changes (Self-Initiated) Reasons and Year of Changes.		

Annex N-3: Criterion 1 - Programme Educational Objectives (PEOs)

No.	Refer to Sections 3.2.1 and 4.3	Indicate the location of these items in the submitted SSR	Checked by Evaluator
1	State the vision and mission of the institution and/or faculty/Programme.		
2	List the PEOs and state where they are published and publicized.		
3	Describe how the PEOs are consistent with the vision and mission of the institution and/or faculty and stakeholders' requirements.		
4	Describe the processes used to evaluate the level of achievement of the PEOs. This includes describing graduates/alumni database, tools (survey, meetings, interviews, etc.) and frequency of activities and timelines.		
5	Discuss the PEOs achievement results by the graduates/alumni.		
6	Describe how the feedback and results obtained from the above processes are being used for the CQI of the programme.		
7	Describe the extent to which the programme's various stakeholders are involved in these processes.		

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8	Describe CQI strategies to be implemented in relation to PEOs.		
9	Self-assessment on programme performance related to PEOs based on the following scale (with justifications): *Poor/Satisfactory/Good		

Annex N-4: Criterion 2 - Programme Outcomes (POs)

No.	Refer to Sections 3.2. 2 and 4.4	Indicate the location of these items in the submitted SSR	Checked by Evaluator
1	List the POs and state where they are published.		
2	Describe how the POs relate to the PEOs.		
3	Describe how the POs listed encompass and consistent with the 12 COREN POs.		
4	Describe the PO definition or elements/performance indicators.		
5	Describe the processes used to establish and review the POs, and the extent to which the program's various stakeholders are involved in these processes (where applicable). This includes describing the tools used in the processes (survey, meetings, interviews, etc.) and frequency of activities and timelines.		
6	Describe the mapping of courses with POs		
7	Explain how the assessment results are applied to further develop and improve the POs.		
8	Describe the materials, including student work and other evidence, that demonstrate achievement of the POs.		

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9	Describe the extent to which the programme's various stakeholders are involved in the processes.		
10	Describe CQI strategies to be implemented in relation to POs		
11.	Self-assessment on programme performance related to POs based on the following scale (with justifications): *Poor/Satisfactory/Good		

Annex N-5: Criterion 3 - Course Learning Outcomes (CLOs)

No.	Refer to Sections 3.2.3 and 4.5	Indicate the location of these items in the submitted SSR	Checked by Evaluator
1	List the CLOs and state where they are published.		
2	Mapping of CLOs to related POs (as per template given in **Annex B-2).**		
3	Describe the relationship between the CLOs and the POs		
4	Self-assess on programme performance related to CLOs based on the following scale (with justifications): *Poor/Satisfactory/Good		

Annex N-6: Criterion 4 - Curriculum and Learning Process

No.	Refer to Sections 3.2.4 and 4.6	Indicate the location of these items in the submitted SSR	Checked by Evaluator
1.	Discuss the programme structure and course contents to show how they are appropriate to, consistent with, and support the development of the range of intellectual and practical skills and attainment or achievement of the PLOs.		

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2.	Discuss the programme delivery and assessment methods and how these are appropriate to, consistent with, and support the development of the range of intellectual and practical skills and attainment or achievement of the PLOs.		
3.	Provide evidence of the use of tutorials and non-conventional delivery methods such as Problem Based Learning (PBL) techniques alongside traditional lectures.		
4.	Provide evidence that students performed at least 10 laboratory practicals per semester (for at least 5 semesters from 300 level).		
5.	Provide evidence that students performed at least 10 engineering drawing assignments per semester in 200 level.		
6.	Describe how the requirements of Complex Problem Solving (CPS) and Complex Engineering Activities (CEA) have been addressed.		
7.	A matrix linking courses to PLOs to identify and track the contribution of each course to the PLOs (as per template given in **Annex-D**).		
8.	Distribution of the engineering courses according to areas specific to each programme (as per template given in **Annex-E**).		
9.	Distribution of the related non-engineering (general education) courses.		
10.	Distribution of the courses offered according to semester (as per template given in **Annex-F**).		

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11.	Details of Laboratory equipment / workstations and experiments conducted (as per template given in **Annex-G**).		
12.	Self-assess on programme performance related to Curriculum Learning Process based on the following scale (with justifications): *Poor/Satisfactory/Good		

Annex N-7: Criterion 5 - Students

No.	Refer to Sections 3.2.5 and 4.7	Indicate the location of these items in the submitted SSR	Checked by Evaluator
1.	Discuss the requirement and process for admission of students to the program, response and annual intake (in addition to template given in **Annex-H**).		
2.	Discuss the policies and processes for students' transfer and credit transfer/exemption		
3.	Discuss mechanism for providing guidance to students on academic, career and aspects pertaining to wellness.		
4.	Discuss students' workload, class sizes for theory as well as laboratory sessions and completion of courses.		
5.	Describe formal or informal feedback platform/channel to obtain students feedback and suggestions for further programme improvement, and how have the feedback resulted in programme improvement.		

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6.	Summarize the graduation requirements for the program, the process for ensuring and documenting that each graduate completes all graduation requirements for the program (as per template given in Annex M).		
7.	Describe CQI strategies to be implemented in relation to Students		
8.	Self-assess on programme performance related to Students based on the following scale (with justifications): *Poor/Satisfactory/Good		

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Annex N-8: Criterion 6 - Continuous Quality Improvement (CQI)

No.	Refer to Sections 3.2.6 and 4.8	Indicate the location of these items in the submitted SSR	Checked by Evaluator
1.	Discuss the mechanism for: programme planning; curriculum development; curriculum and content review; responding to feedback and inputs from stakeholders including industry advisors, students and alumni; tracking the contribution of individual courses to POs; tracking outcomes of performance through assessment, including rubrics; reviewing of PEOs and POs; and continuous quality improvement.		
2.	Discuss the implementation plan based on the observations of the last accreditation visit and the remedial actions taken		
3.	Evidence on the participation of faculty members and support staff as well as students in the continuous quality improvement process.		
4.	Evidence on the development of academic staff through opportunities in further education, industrial exposure, as well as research and development.		
5.	Policies, internal processes and practices that are in place at all levels within the institution relating to the accreditation criteria as stated in Chapter 3 of this Manual.		
6.	Summarize responses to the external examiner's report.		
7.	Discuss how the quality management system of the institution provides quality assurance and benchmarking with renowned national/international universities offering similar programme.		
8.	Evidence of the on-going participation of industry advisors in discussions and forums, professional practice exposure, and collaborative projects.		
9.	Provide at least ten (10) employers' feedback report on the performance of students who graduated within the last five (5) years.		

10.	Self-assessment on programme performance related to CQI based on the following scale (with justifications): *Poor/Satisfactory/Good		

Annex N-9: Criterion 7 - Staffing

No.	Refer to Sections 3.2.7 and 4.9	Indicate the location of these items in the submitted SSR	Checked by Evaluator
1.	Discuss the strength and competencies of the academic staff in covering all areas of the programme, and in implementing the outcome-based approach to education (as per template given in **Annexes-I - K**).		
2.	Discuss how the overall staff workload enables effective teaching (including student-teacher ratio), student-staff interaction, student advising and counselling, institutional service and research activities, professional development and interaction with industry.		
3.	Discuss processes for faculty development, training and retention. Produce retention index of staff of the programme.		
4.	Describe the role played by the faculty with respect to course creation, modification, and evaluation, their role in the definition and revision of Programme Educational Objectives and Programme Outcomes, and their role in the attainment of the Programme Outcomes. Describe the roles of others on campus, e.g., dean or provost, with respect to these areas.		
5.	Discuss the sufficiency and competency of technical and administrative staff in providing adequate support to the educational programme.		
6.	Produce evidence of how many staff has at least 3 publications in ISI-indexed journals in 5 years.		

7.	Self-assess on programme performance related to Staffing based on the following scale (with justifications): *Poor/Satisfactory/Good		

Annex N-10: Criterion 8 - Physical Facilities and Infrastructures

No.	Refer to Sections 3.2.8 and 4.10	Indicate the location of these items in the submitted SSR	Checked by Evaluator
1.	Discuss the adequacy of teaching and learning facilities such as classrooms, learning-support facilities, study areas, information resources (library), computing and information-technology systems, laboratories and workshops, and associated equipment to cater for multi-delivery modes.		
2.	Describe the adequacy of support facilities such as hostels, sport and recreational centers, health centers, student centers, power and internet services, fire/security services, and transport in facilitating students' life on campus and enhancing character building.		
3.	A summary, in tabulated form, of the lecture facilities (give number, capacity, and audio/video facilities available).		
4.	A summary, in tabulated form, of the laboratories (list down the details of workstation available in each laboratory).		
5.	A summary, in tabulated form, of the workshops/drawing studio (list down the equipment/machinery available in each workshop/drawing studio).		
6.	A summary, in tabulated form, of the computer laboratories (list down the hardware and software available).		
7.	A summary, in tabulated form, of recreational facilities.		

8.	A summary, in tabulated form, of information on recent improvements and planned improvements in facilities		
9.	Self-assess on programme performance related to Physical Facilities and Infrastructures based on the following scale (with justifications): *Poor/Satisfactory/Good		

Table N-11: Criterion 9 - Institutional Linkage and Community Services

No.	Refer to Sections 3.2.9 and 4.11	Indicate the location of these items in the submitted SSR	Checked by Evaluator
1	Discuss the involvement of industry in discussions and fora, professional practice exposure, and collaborative projects/research for the solutions to engineering problems.		
2	Discuss students' activities and involvement in student organizations that provide experience in management and governance, representation in education and related matters and social activities.		
3	Self-assess on programme performance related to Institutional Linkages and Community Services based on the following scale (with justifications): *Poor/Satisfactory/Good		

Table N-12: Criterion 10 - Institutional Support and Funding

No.	Refer to Sections 3.2.10 and 4.12	Indicate the location of these items in the submitted SSR	Checked by Evaluator
1	Discuss institution's financial commitment and support to sustain and enhance the quality of programme. Also summarize the salient features in a tabular form (as per the template given in **Annex-L**)		

2	Self-assess on programme performance related to Institutional Support and Funding based on the following scale (with justifications): *Poor/Satisfactory/Good		

ANNEX O: EXTERNAL EXAMINER'S REPORT

The external examiner's report shall contain but is not limited to the following:

i. Assessment of programme curriculum
ii. Assessment of OBE implementation and achievement of the POs by the students.
iii. Assessment of staff quality including qualifications and industry exposure. This is to include assessment of loading of each staff in teaching, research, consultancy and supervision of student projects.
iv. Assessment of staff-student ratio and student workload. If found to be not sufficient, corrective action to be taken by the institution.
v. Assessment of preparation process of examination papers i.e. procedures for setting and vetting, quality assurance, confidentiality and security.
vi. Assessment of examination papers and marking schemes set for the standard of questions, coverage of syllabus, adequate balance between theory and application, setting of questions of equal level, adequate choice of questions, and appropriateness of marking scheme.
vii. Assessment of the marked answer scripts based on a sample of good, average and weak candidates. Fairness/disparity of marking, follow-through method adopted if answer to one section is wrong, response of candidates to the question, and distribution of marks.
viii. Assessment of coursework, laboratory work, assignments, design projects, final year projects.
ix. Assessment of examination procedures and regulations.
x. Management commitment towards the programme.
xi. Assessment of assessments moderation process.