Procedures for Curriculum Development and Review
EXECUTIVE SUMMARY

ES1. This document, “Procedures for Curriculum Development and Review provides effective modalities for the actual development of marketable curriculum, framework for assessment of cost implications in implementing a new curriculum, and procedures for curriculum review. Specifically, the document provides guiding framework for developing curriculum contents in terms of enabling learning outcomes and strategies for their realization, including modularization of training programmes to ensure flexibility.

ES2. The procedures are intended to ensure that developed curricula realize (enable) all the principal learning outcomes specified in respective Qualification Standard by NACTE and represents performance required of learners in their personal or professional lives after graduation. This has been emphasized with clear guidelines that ensure all curricula that have been developed in line with the given provisions clearly describe what students will be able to do with what they have learned and represent integrations of student’s knowledge, skills and understanding in a complex role. This includes incorporation of generic curriculum needs to facilitate life-long learning within and across fields. For that the curriculum should adequately formulate teaching and learning strategies that can realize all the learning outcomes, which should be properly reconciled with course modules, and hence allowed modular delivery of curriculum under a semesterized learning timeframe.

ES3. Once curriculum contents have been identified, assessment methods should be specified in line with the assessment criteria and supported with respective instruments. The assessment criteria are statements that clearly indicate what learners are expected to do in order to demonstrate that they have successfully realized a learning outcome. They are required mainly to assist the examiners and moderators to check that the assessment is compliant with the standards set in the qualification.

ES4. In order to ensure smooth implementation of curriculum it is necessary to confirm relevance and adequacy of the teaching staff, teaching and learning space, facilities and equipment for teaching and learning as well materials and consumables for teaching and learning. It is also necessary for the Technical Institutions to have adequate relations with external institutions. All these
Procedures for Curriculum Development and Review

Factors may in one way or another result to additional investments in the budget. The respective technical institution should carefully examine related requirements, identify corresponding financial implications, and facilitate their adequate availability in good time for introduction of a new curriculum. Otherwise, the institution may need to postpone the introduction of the curriculum or scale it down in line with the available resources. Target enrolment should be reached after a few years so as to give room for progressive preparations and adjustments. Procedures for projection of students’ enrolments are provided in the document.

ES5. Continuous monitoring is crucial during the curriculum implementation at training institutions to ensure that curriculum remains relevant in terms of the market needs and NACTE norms. If the latter is not the case it gives a clear sign of the need to review the curriculum. Once the need for curriculum review is clear, which shall be demonstrated by the gap between what the performance indicators are showing and the targeted values, one will need to clearly identify the required intervention. Normally, such interventions include improvement of competencies, in order to either be in line with revised occupational standards or other NACTE norms, or attain competitive edge over other institutions, or ensure flexibility of curriculum in response to modern socio-economical trends, or rationalize efficiency in curriculum implementation; or combination thereof.

ES6. All modalities contained in the present NACTE document have been operationalised. A total of 15 operational instruments have been prepared for the purpose and are included as appendices.
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## LIST OF ABBREVIATIONS AND ACRONYMS

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<thead>
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<th>Description</th>
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<tr>
<td>CDTT</td>
<td>Curriculum Development Task Team</td>
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<tr>
<td>CQFW</td>
<td>Credit and Qualifications Framework for Wales</td>
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<td>ICT</td>
<td>Information and Communication Technology</td>
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<td>NACTE</td>
<td>National Council for Technical Education</td>
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<td>NTA</td>
<td>National Technical Award</td>
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<td>QCA</td>
<td>Qualifications and Curriculum Authority</td>
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<td>NICAT</td>
<td>Northern Ireland Credit Accumulation and Transfer System</td>
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<td>NUCCAT</td>
<td>Northern Universities Consortium for Credit Accumulation and Transfer</td>
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<td>SERTEC</td>
<td>“Technikon Quality Assurance Body”</td>
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1.0 INTRODUCTION

1.1 Background

The National Council for Technical Education (NACTE) has been established to regulate and coordinate all matters pertaining to technical education and training in Tanzania [1]. In the view of that fact, curricula of technical institutions play a strategic role in realising the Mission of the Council. The strategic importance of curriculum lies in the fact that it is the one that realises the purpose and values of learning in an institution. It is through curriculum where learners are analysed versus competence required for the respective work context and level. The subjects and their contents are also identified within the curriculum to support achieving the desired competencies. Subsequently, curriculum decides on the activities, methods and media for teaching and learning, and gives provision on how assessment will be done and overall effectiveness of the delivery will be evaluated.

A properly prepared curriculum refers to all the teaching and learning activities and experiences that are provided by a technical institution with adequate reflection of the needs and interests of learners, the technical institution, the employers, the profession, the society, the Government, and the economy. It is through the implementation of such curriculum that learners will be able to meet the respective Qualification Standards set for the various levels of the National Technical Awards (NTA).

In the light of the facts highlighted above, it is clear that effective regulation and coordination of technical education and training in the country mandated to NACTE may not be achieved if curriculum development and review in the technical education institutions is left to continue to be done in adhoc manners, without any modalities that provide a guiding framework for that purpose. The present document provides the required framework.

1.2 Objectives and Scope of the Document

This document, “Procedures for Curriculum Development and Review” is intended to provide the required framework to guide the actual process of developing or reviewing a curriculum based on market demand, as clarified from the situation analysis covered in another document prepared by NACTE for the purpose [2]. After developing or reviewing a curriculum in line with the provisions in the present document, the same has to be approved and validated in accordance with the modalities described in the NACTE document: “Procedures for Curriculum Approval and Validation” [3].
2.0 FRAMEWORK FOR CURRICULUM DEVELOPMENT PROCESS

2.1 The Actual Curriculum Development Process

Curriculum development implies, amongst other things, familiarization with the relevant NACTE Qualification Standards and subsequent identification of curriculum contents and strategies. NACTE Qualification Standards prescribe purpose(s) of particular qualification, principal learning outcomes for realisation of the purpose(s) and associated credit guidelines and assessment criteria. On the other hand, identification of appropriate curriculum contents, i.e. learning outcomes and strategies that will enable realization of the principal outcomes and purposes of qualification is done following specific steps as shown in Fig. 1 and elaborated in subsequent sub-sections.

Figure 1: Key Steps constituting Actual Curriculum Development Process
2.2 Modalities for the Identification of Enabling Learning Outcomes

2.2.1 General Framework

Learning outcomes are grouped into two categories namely the principal learning outcomes (or simply principal outcomes) and the enabling learning outcomes (or simply enabling outcomes).

Principal outcomes are broad Standards of achievement at a particular level of study and context specified by NACTE to facilitate realisation of purpose of a particular NTA qualification. They are mainly intended to describe qualifications through broad competencies (skills, knowledge and understanding) at a particular level of study specifying requirements for a particular context in terms of: working under supervision versus working independently; working with routine versus unfamiliar and complex situations; solving concrete, closed problems with few variables versus abstract open ended problems with many variables; using given principles versus constructing/adapting principles; and using given techniques versus selecting and adapting techniques.

On the other hand, enabling outcomes are outcomes that enable the achievement of higher-level principal outcomes. While principal outcomes are fixed by NACTE as it is described in another document [4], enabling outcomes are formulated by curriculum developers. These are more focused statements that describe the knowledge, skills and understanding that learners will develop after following a curriculum of a training institution, making curriculum goals clear and transparent to all stakeholders.

As it is seen in Fig. 1 above, having clarified the principal outcomes as required by the NACTE Standards for a particular qualification, the first step in the actual curriculum development process is to identify the enabling outcomes. Specifically, enabling outcomes shall have the following key features:

- Represent integration of student’s knowledge, skills and understanding in a complex role;
- Represent performance required of learners in their personal or professional lives after graduation;
- Clearly describe what a student will be able to do with what they have learned in a course module, or in the whole training programme;
Are verifiable, assessable and public; and

Are not listings of discrete skills or pieces of knowledge and understanding that students are expected to master.

Hence, enabling outcomes, whether at the training programme level or at the level of course module should facilitate effective teaching and learning in a number of ways:

(a) The learner should be clear as to what is expected in terms of learning and assessment of learning; this can facilitate the learner becoming an active player in the learning process;

(b) The process of writing statements on enabling outcomes should encourage reflection on the question: “What do I want learners to be able to do at the end with what they have learned in meeting the Qualification Standard?” This can result to re-thinking of the amount and type of “content coverage” within a training programme or a course module;

(c) From the technical institution’s perspective, having enabling outcomes reconciled with course modules is a critical issue. It facilitates clear awareness to the students, teaching staff and other interested parties of what outcomes (competencies) should be pre-requisites for taking a module, what should/could be taught in concurrent course modules, and what should be learnt in future;

(d) Writing outcomes statements that focus on how students will use what they have learned can provide clues as to integrative student assessment strategies;

(e) Articulating enabling outcomes as indicated in (a) to (d) above facilitate rational curriculum development/review with the end in mind, minimizing unnecessary overlaps and duplication, and avoiding gaps. It is only this way one can ensure an efficient curriculum and that which comply with the standards.

The above attributes can be more effectively realized if the enabling outcomes are identified using a top down approach as shown in Fig. 2.
Guidelines for Preparation of Quality Management Plan for Institutions Accredited to NACTE

The top down approach implies that learning outcomes are formulated beginning with the principal outcomes which are large, complex, and workplace-oriented outcomes and ending up with the enabling outcomes which are more specific and simpler outcomes supporting the complex ones. Normally, in a Technical Institution enabling outcomes are formulated by the Curriculum Development Task Teams (CDTT) or Course Committee of the relevant NACTE Subject Board for curriculum developed by NACTE [2]. Specifically, these organs shall adopt the following four initial steps in doing so:

(i) Take one principal outcome at a time from one of the exit level outcomes of a qualification;

(ii) Identify at least three abilities that a learner needs in order to accomplish the principal outcome in (i) above. These abilities are in the actual fact the enabling outcomes. They are called enabling because they enable the attainment of

Figure 2: Major Components of Actual Curriculum Development Process

![Diagram showing the components of curriculum development process](image-url)
higher-level principal outcomes specified by NACTE to describe a particular NTA;

(iii) Disaggregate each of the enabling outcomes identified in (ii) above further to get the second level initial enabling outcomes (sub-enabling outcomes) which are more specific than the ones in (ii);

(iv) Present the enabling outcomes information on a grid, the format of which is shown in Appendix I, and a typical example in Appendix II of the present document;

(v) Repeat steps (ii) to (iv) for all principal outcomes describing a qualification. At the end of this exercise you should have several grids depending on the number of principal outcomes describing the qualification.

It is crucial to ensure that all enabling outcomes are clearly formulated to enable the respective principal outcome. In doing so it is necessary to ensure that specific curriculum issues, generic curriculum needs and attributes to guarantee competitiveness have been incorporated in the enabling outcomes.

2.2.2 Putting in Specific Curriculum Needs

Specific curriculum needs refer to the abilities to do a set of tasks, to understand the theory underpinning the tasks and the ability to pass reasoned judgment on different ways to do the tasks. It is clear from above that a specific curriculum need has three sub-competencies: Practical competence, Foundational competence and reflexive competence. While practical competence refers to the ability to do a set of tasks, foundation competence is described by the demonstrated understanding of what one is doing and why. On the other hand, reflexive competence refers to the ability to learn from one’s actions and to adapt to changes and unforeseen circumstances. In enabling outcomes, the attributes of the three sub-competencies are described as follows:

- **Doing** a set of tasks is used to indicate a skill and is described with action verbs such as: perform, demonstrate, etc. a set of tasks. In this case the learner is not required to understand the processes by which one does a task;

- **Understanding** is represented by verbs that refer to grasping of concepts and being able to use them creatively. Such verbs include: find, analyse and synthesize, etc; and

- **Passing judgment** is represented by phrases such as: pass judgment on, make reasoned changes, evaluate, critique, suggest a way forward, etc.
Apart from stating specific competencies as may directly be obtained through desegregation of principal outcomes, additional specific curriculum needs are established from opinions of employers and professional bodies on related required competencies as obtained from situational analysis, if they differ from the former.

### 2.2.3 Incorporating Generic Curriculum Needs

Generic curriculum needs are technical education and training qualities that must be developed in all learners regardless of the specific area or content of learning, in order to facilitate life-long learning within and across fields. These cross cutting issues also cover many of the desired workplace attitudes and life skills characterized by cognitive, affective and psychomotor domains necessary for success in one’s life within the modern global economies. Enabling outcomes should therefore also include some or all of generic curriculum needs which include ability to do the following:

- Identify and solve problems in which responses display that responsible decisions using creative and critical thinking have been made;
- Demonstrate an understanding of the world as a set of related systems by recognizing that problem solving contexts do not exist in isolation;
- Being culturally and aesthetically sensitive across a range of social contexts;
- Develop successful entrepreneurial opportunities;
- Collect, analyse, organize and critically evaluate information;
- Communicate effectively using visual, mathematical and/or language skills in the modes of oral and/or written presentation;
- Work effectively with others as a member of a team, organization, and community;
- Organize and manage oneself and one’s activities responsibly and effectively;
- Show responsibility towards the environment and health of others;
- Demonstrate cultural sensitivity across a range of social contexts;
- Explore education and career opportunities and reflect on and explore a variety of strategies to learn more effectively.
The situational analysis results (employer, professional and society needs) shall provide basis for any emphasis on particular qualities.

2.2.4 Putting in Competitive Advantage

Competitive advantage must be incorporated in the enabling environment to ensure that students who qualify at a technical institution are better equipped for their carrier than students who graduated from another institutions. The technical institution should strive to remain competitive and relevant as well as being a respected institution nationally and regionally. To a greater extent this is going to be influenced by the vision and mission of a technical institution as clarified during the situational analysis stage. However, the following are recommended for consideration:

- Curriculum and hence enabling outcomes should address the needs of respective professional bodies. This will ensure that the learners can be admitted to such bodies, upon graduation, or simply be successful in respective careers for cases when a professional body is not a registering organ;

- Cutting edge technologies/processes/methods, as the case may be, and future trends are identified and clearly reflected in the enabling outcomes; and

- Institutional teaching and research focus, where applicable, are identified and evident in the curriculum.

Formats for presentation of enabling outcomes and examples for a particular level are shown in Appendices I to IV of the present document.

2.2.5 Embedding Level Descriptors in Enabling Outcomes

Having ensured that specific and generic curriculum needs have been incorporated in the enabling outcome and the curriculum is competitive enough, it is necessary to ensure that the same is indeed pegged to a particular NTA, adopting appropriate level descriptors. Level descriptors are broad, generic (cross-fields) standards of achievement prescribed by NACTE. These should be adopted and accordingly be embedded in the enabling outcomes. Specifically, level descriptors are represented in the enabling outcomes with phrases such as the following, depending on the level of study:

- Working under supervision versus working independently;

- Working with routine versus unfamiliar and complex situations;
Solving concrete, closed problems with few variables versus abstract open ended problems with many variables;

Using given principles versus constructing/adapting principles; and

Using given techniques versus selecting and adapting techniques.

Enabling outcomes incorporating such statements should therefore be proportioned for the different NTA levels taking into account the growing complexity of competence requirements. Typically this shall be realized as shown in Appendix V.

2.2.6 Developing Tasks to Realize Enabling Outcomes

The curriculum development process described so far has been involved mainly with the formulation of enabling outcomes, which enable learners to achieve the qualification outcomes. The outcomes will not, however, state what learners would be doing in order to show that they could achieve these outcomes. The ‘what’ part is constituted primarily by the integrated tasks learners are set to do in their assignments, while the ‘show’ part is gauged by criteria for assessment. It is therefore clear that the sub-enabling outcomes should be translated into concrete tasks that will facilitate realization of respective outcomes.

For technical education and training, tasks to be developed to translate the enabling outcomes should:

- As much as possible relate to the situation expected at relevant workplace after graduation. This is achieved through simulation of complex occupational roles in the tasks and reflection therein of the specific and generic curriculum needs as well as attributes demonstrating competitive advantage of the curriculum;

- Include assessment criteria that also relate to the workplace roles;

- Promote reasonable multi-disciplinarity, in order to facilitate life-long learning within and across fields, which is necessary for success in modern global economy; and

- Provide the context for learners to achieve the enabling outcome of the curriculum.
2.2.7  Formulation of Teaching and Learning Strategies

After establishing enabling outcomes and respective tasks, curriculum developers should indicate how these could be realized. Realization of enabling outcomes can be through lectures, independent work, tutorial sessions, seminars, laboratory work, studio work, training workshop activities, field-work (real work practice), or combination thereof. Appropriate learning aids including ICT learning aids, textbooks and other references, as well as any other special facilities should also be identified for each enabling outcome and clearly specified.

2.3  Modularization of Curriculum and Assignment of Credits

2.3.1  Identification of Course Modules

Modern outcome based technical education and training focuses on teaching and learning towards complex workplace competencies, which can be grouped around competence modules rather than subjects. In the present context, learning outcomes in curricula shall be clustered into modules to allow assessment procedures to be based on smaller units of work that can be credited towards an NTA at any given level. Modular curricula also make it easier to ensure that courses are kept up to date since either a single or several modules can be changed as needed, leaving other modules unchanged. Client and market needs are more easily met with modular curriculum. It is therefore necessary to reconcile the learning outcomes and course modules and hence allow modular delivery of training programmes. However, for practical reasons, some of the modules may simply comprise foundation units or may not strictly represent a specific competence or group of integrated competencies. In any case, course modules should as much as possible be targeted to achieve a specific competence or a group of integrated competencies.

Generally, a module is package of learning consisting of four key components, namely:

(i)  A unit of assessment. This is an explicit and coherent set of enabling outcomes against which the attainment of a learner will be measured through accomplishment of related tasks as explained in 2.2.6, above;

(ii)  Method of Assessment for measuring that attainment;

(iii)  Learning materials to be used in the module (ICT learning aids, textbooks, manuals, journals, handouts, other references, as indicated in 2.2.7, above); and
(iv) Appropriate learning context [whether the module will taught through lectures, or guided independent work, or tutorial sessions, or seminars, or laboratory work, or studio work, or training workshop activities, or field-work (real work practice), or combination thereof].

The procedure to identify course modules is as follows:

- By now a CDTT or Course Committee of the relevant NACTE Subject Board shall have a grid of enabling outcomes for all the principal outcomes (e.g. what is shown in Appendix IV). For each principal outcome, all sub-enabling outcomes that can conveniently be grouped together towards achieving related competencies shall be identified;

- CDTT or Course Committee of the relevant NACTE Subject Board shall group the related sub-enabling outcomes by clustering them together in terms of level and nature of competencies, that is, whether sub-enabling outcome represents:

  a. Foundation skills, knowledge and understanding, or
  b. Intermediate core skills, knowledge and understanding, or
  c. Intermediate optional skills, knowledge and understanding, or
  d. Advanced core skills, knowledge and understanding, or
  e. Advanced optional skills, knowledge and understanding.

- CDTT or Course Committee shall refine the relatively larger groups above when necessary to obtain smaller groups of related outcomes that can be enabled within a specific period as may be determined by the technical institution. These should form modules;

- Based on the contents of the enabling outcomes, CDTT or Course Committee of the relevant NACTE Subject Board shall formulate name of each module. Format for presentation of course modules is given in Appendix VI.
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2.3.2 Assignment of Credits

An academic credit is fundamentally a tool for measuring and expressing learning equivalence. A credit plays an important role in rewarding the incremental progress of learners, facilitating student transfer, recognizing prior learning and contributing to the definition of academic standards. The fundamental principle behind credit frameworks is that credit is awarded only for evidence of learning achievement and is derived through estimation of notional learning time at a particular level. Specifically, a notional time is a period spent by an average student in learning about something towards realizing a learning outcome. This could include formal learning in classroom, out of class formal learning, e.g. in doing projects, and learning gained through on the job experience. In England, Wales, Northern Ireland [5], and in South Africa [6], amongst other countries, a ratio of 1 credit = 10 hours is employed. NACTE shall adopt the same. The number of credits awarded for successful completion of a module is called credit value of the module for that particular study level. In order to earn module credits at a particular level, the learner must satisfy the assessment criteria for all (or the majority) of the designated learning outcomes of the module.

Modalities given in the present document require CDTT or Committee of the NACTE Subject Board, as the case may be, to assign credits to modules based on each outcome to be achieved by a learner in a module. This however, shall be constrained by the minimum number of credits necessary to qualify for a particular NTA, which is set by the NACTE and specified in respective Qualification Standards [4]. Hence, referring to the NACTE document [4] and using simple arithmetic logic, module credits are derived from the minimum NTA credits downwards using an expression,

\[
MC = EOC_1 + EOC_2 + EOC_3 + \ldots \ldots + EOC_k
\]

(2.1)

\[
QC = MC_1 + MC_2 + MC_3 + \ldots \ldots + MC_n
\]

(2.2)

Where,

\[
MC \quad \text{Credit value of a module}
\]

\[
EOC_i \quad \text{Credits assigned to an enabling outcome 1}
\]

\[
EOC_2 \quad \text{Credits assigned to an enabling outcome 2}
\]

\[
EOC_3 \quad \text{Credits assigned to an enabling outcome 3}
\]

\[
EOC_k \quad \text{Credits assigned to an enabling outcome “k”}
\]

\[
QC \quad \text{Minimum Credits assigned by NACTE to the qualification}
\]

[4]

\[
MC_i \quad \text{Credit value of a module 1}
\]
$MC_2$ – Credit value of a module 2

$MC_n$ – Credit value of a module “n”

The application of Equations (2.1) and (2.2) above is illustrated by an example provided hereunder:

**Example on the Application of Equations (2.1) and (2.2)**

Consider a situation whereby it takes approximately 1200 notional hours (QC=120 credits) for an average learner to realize specified qualification outcomes at a particular study level, starting from scratch. Such qualification outcomes are achieved through 100 sub-enabling outcomes that have been assigned credits as typically indicated in Table 2.1 hereunder. Specify course modules and corresponding credit values.

**Table 2.1: Arbitrary Assignment of Credits to Enabling Outcomes**

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<td>70</td>
<td>71</td>
<td>72</td>
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<td>92</td>
<td>93</td>
<td>94</td>
<td>95</td>
<td>96</td>
<td>97</td>
<td>98</td>
</tr>
</tbody>
</table>
Solution:

Related sub-enabling outcomes are clustered together to arbitrarily form a total of 25 modules. This is typically done as indicated in Table 2.2, where credit values are also assigned for each module as per Eq. (2.1)

Table 2.2: Clustering of Related Sub-Enabling Outcomes into Modules

<table>
<thead>
<tr>
<th>Sub-Enabling Outcomes (Numbering from Table 4.1, above)</th>
<th>Module Number</th>
<th>Credit Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>5, 6, 9</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>1, 47, 48</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2, 3, 7</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>8, 10, 17</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>20, 21, 32, 64, 65, 100</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>66, 67</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>4, 11, 12, 15</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>16, 19, 22</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>23, 27, 30</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>14, 24, 31, 33, 34</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>49, 50, 51, 52, 53, 54</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>18, 63</td>
<td>12</td>
<td>3</td>
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<tr>
<td>25, 37</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>45, 46</td>
<td>14</td>
<td>2</td>
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<tr>
<td>39, 41</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td>76, 77</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td>83, 84, 85, 86, 87, 88</td>
<td>17</td>
<td>6</td>
</tr>
<tr>
<td>26, 28, 29</td>
<td>18</td>
<td>6</td>
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<tr>
<td>35, 36, 38, 78</td>
<td>19</td>
<td>4</td>
</tr>
<tr>
<td>55, 56, 57, 58</td>
<td>20</td>
<td>5</td>
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<tr>
<td>59, 60, 61, 62</td>
<td>21</td>
<td>4</td>
</tr>
<tr>
<td>40, 42, 43, 44</td>
<td>22</td>
<td>4</td>
</tr>
<tr>
<td>97, 98, 99</td>
<td>23</td>
<td>3</td>
</tr>
<tr>
<td>13, 68, 69, 70, 71, 72, 73, 74, 75, 76, 82</td>
<td>24</td>
<td>12</td>
</tr>
<tr>
<td>79, 80, 81, 89, 90, 91, 92, 93, 94, 95, 96</td>
<td>25</td>
<td>16</td>
</tr>
</tbody>
</table>
As it is seen in Table 2.2, the total number of credits from all modules is 120 which is equal to the number credits specified for the learner to qualify for an award [as governed by Eq. (2.2)]. It is important to note that the data given in Tables 2.1 and 2.2 are just examples. Several combinations could emerge from clustering the sub-enabling outcomes to meet the minimum credit requirements of the qualification. These may include the few arbitrary cases indicated in Table 2.3, where the combination assumed in Table 2.2 above is also included as Scenario No.2.

**Table 2.3: Arbitrary Example of Distribution of Qualification Credits in Modules**

[As given by Eq. (2.2)]

<table>
<thead>
<tr>
<th>Total Credits (QC)</th>
<th>Module Credits (MCi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>Scenario 1</td>
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<tr>
<td></td>
<td>4</td>
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<td>12</td>
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<td>12</td>
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</tbody>
</table>
Flexibility to students can be significantly promoted by introducing a credit banking system. Under this arrangement, it is important to adopt an open-ended approach whereby the number of credits in a particular qualification (NTA level) reflects planned progression and credit attainment through all NTA levels (currently Levels 4 to 8 for NACTE). The same approach is adopted by QAA and SAQA, among other bodies.

For example, in order for one to qualify for the Honours Degree award in the UK (Level H) in line with the provisions by QAA, he or she has to achieve 360 minimum overall credits (cumulated) including 120 credits at Certificate of Higher Education level (Level C), 120 credits at Diploma of Higher Education level (Level I), 60 credits at Ordinary Degree level (Level I), and 60 credits at Honours Degree level (Level H). This arrangement also applies to postgraduate qualifications (Levels M and D).

In South Africa, one needs to achieve 480 credits to qualify for a B. Tech/Professional Degree (SAQA Level 6). For that, credits are assigned as follows, starting with a certificate: For a one year certificate, 120 credits are assigned; for a two-year diploma, total 240 credits with 120 credits at this level; for a two-year diploma, total 240 credits with 120 credits at this level, for a three-year diploma, total 360 credits with 120 credits at this level; and for B.Tech/Professional, total 480 credits with 120 credits at this level. The system continues up to Doctorate qualification (SAQA Level 8) in the same manner, i.e., all qualification levels have to consist of a minimum of 120 credits.

Most important feature of this system in terms of flexibility to students is the fact that both QAA (through CQFW, NICATS, NUCCAT and SEEC) [5] and SAQA [6] do not require that all credits assigned to a particular level of qualification to come from the learning outcomes achieved in that level of the qualification. This is the whole essence of credit banking. Some credits obtained at Diploma level, for example, may count for the B.Tech. programme, provided that the same were not counted towards the Diploma and also a certain specified minimum number of credits have been realized at the B.Tech. level.

SAQA has specified a maximum of 48 credits that can come from the lower level course modules, out of the 120 credits prescribed for each level [6]. Similarly, QAA (through CQFW, NICATS, NUCCAT and SEEC) [5] has specified a maximum number of credits from lower levels for the same purpose. However, only 30 credits from the lowest level can contribute to any higher qualification. This helps to ensure that the standard is not compromised by the inclusion of excessive numbers of lower level credits.

A similar framework for credits has been set by NACTE for the NTAs [4] (see Appendix IV therein).
2.4 Semesterisation of Curriculum

Generally, various education and training institutions organize the structure of their academic year using different systems. The most common systems divide the academic year in a number of temporal units of more or less equal lengths, usually three or four for term, three for trimester, and two for semester systems. Regardless of the way the academic year is sub-divided, there are only three ways of organizing teaching and examination process. In the non-modularized system, individual courses are designed to run throughout the length of the academic year at the end of which outcomes that have been enabled throughout the academic year are assessed. In another version of the non-modularized system, the achievement of the learner is formally assessed at the end of the training programme. In the modularized system, course modules are designed such that each can be taught and examined in the duration of a term, trimester or semester.

As it has already been mentioned, the non-modularized system is rather rigid. It does not easily allow tailoring of courses to accommodate student’s career needs or needs of occasional students who for various reasons, may wish to attend courses for only part of the academic year. That may not meet the requirements of the present Tanzania, which promotes liberalized labour market, privatization of the economy, and private sponsorship of students. All these trends favour enhanced flexibility in the delivery of courses. Moreover, since teaching of courses extends over a longer duration, chances are higher that some learning outcomes, which are necessary for complying with the Standards, may not be realized and/or assessed.

As it has already been emphasized in 2.3 above, curricula of technical institutions should be modularized. However, doing that within a term system, and to some extent within a trimester system is not effective as time may not be sufficient to cover self-contained modules. It is therefore preferable for the modules established as in 2.3 above to be semesterized, i.e. spread over semesters. All modules offered during a semester should be examined at the end of that semester and credited. The length of a semester however need not be standardized.

Semesterization of curriculum as indicated above shall be effected by CDC [2] or Course Committee of the relevant NACTE Subject Board, depending on respective logistics preferences.
2.5 Procedure for Specification of Criteria and Methods of Assessment

The criteria of assessment are statements that clearly indicate what learners are expected to do in order to demonstrate that they have successfully realized a learning outcome (completed a curriculum task). They are required mainly to assist the examiners and moderators to check that the assessment is compliant with the standards set in the qualification. CDTT and Course Committee of NACTE Subject Board shall therefore formulate assessment criteria for each enabling outcome to reflect that, as a result, learners can perform (do) something, can understand what they are doing and why they are doing it, and can connect these two as application of knowledge and, furthermore, can pass judgment on performance. A typical example on how to formulate assessment criteria is as shown in Table 2.4.

**Table 2.4: Example of formulating criteria of assessment**

<table>
<thead>
<tr>
<th>Sub Enabling Outcome</th>
<th>Some of Related Tasks</th>
<th>Criteria of Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop manual farm implements suitable for use in the coastal areas of Tanzania</td>
<td>Analyze different soils found along the coast of Tanzania</td>
<td>1. The learner should show knowledge and understanding of soil parameters and their effect on operation of farm implement 2. ………………………………………………………… 3. …………………………………………………………</td>
</tr>
<tr>
<td>Design farm implements for specific use in the coastal areas of Tanzania</td>
<td>1. The learner should show knowledge and understanding of general design principles 2. ………………………………………………………… 3. …………………………………………………………</td>
<td></td>
</tr>
</tbody>
</table>

CDTT and Course Committee of NACTE Subject Board should subsequently benchmark the criteria of assessment to indicate how different grades could be awarded, as shown in Table 2.5, as a typical example.

**Table 2.5: Example of Benchmarking Criteria of Assessment**

<table>
<thead>
<tr>
<th>Criteria of Assessment</th>
<th>Satisfactory</th>
<th>Good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>The learner should show knowledge</td>
<td>Has knowledge of essential</td>
<td>Has knowledge and understanding of essential</td>
<td>Has wide knowledge and understanding of essential</td>
</tr>
</tbody>
</table>
and understanding of general design principles

| elements of design process | elements of design process and can apply the techniques of the process in familiar situations | elements of design process and can apply the techniques of the process in unfamiliar situations |

Format for presentation of criteria of assessment and their benchmarking is given in Appendix VII.

The benchmarked assessment criteria shall then be applied through various assessment methods and instruments as appropriate to include Questioning, Observation, and Evaluation of Product.

(a) **Questioning**

By questioning it means asking the candidate questions either orally or in writing and which can be answered orally and in writing. The questions could relate to the activities described in the outcome tasks to check if the learner understands why the tasks were carried out or they could test the learner's ability to work within contexts given in the range statements or in the contingencies suggested by the assessment criteria. Questioning is mainly an important means of establishing evidence of a learner's underpinning knowledge and understanding.

(b) **Observation**

This method involves observing the learner while he/she is performing a curriculum task, whether real or simulated, or defined in an outcome or outcomes statement. It is one of the most effective methods for assessing skills.

(c) **Evaluation of Product**

This is another method that is effective for assessing skills and involves looking at something the learner has made or done within the provision of a curriculum after the activity has been completed.

All the three key assessment methods are operationalised through selection of appropriate assessment instruments. An assessment instrument refers to the nature of the assessment task or activity given to the learner to do. Typical example of assessment instruments include, amongst others, assignments, tests and their variations (multi-choice, open book, closed book, descriptions, essays, and so on), examinations and their variations (multi-choice, open book, closed book, descriptions, essays, and so on), projects, case studies, real world exercises. Listed hereunder are some key points that should be borne in mind while developing criteria for assessment of curricula.

(i) **Assessment should be an integrated undertaking**
It is important that tasks from both cross cutting curriculum issues, applied competence and those reflecting competitive edge should be assessed, and a variety of assessment methods and instruments are used. In doing so, one should ensure that the chosen method(s) and instrument(s) are fair, reliable, valid, and practical.

(ii) **Assessment should recognize achievements**
Assess what the learner knows and can do against approved criteria and benchmark. In line with the assessment benchmark, ensure that a learner has achieved all (or the majority) of the designated learning outcomes of the module before he or she gets a credit for the module.

(iii) **Assessment should allow progression and portability**
Allow the building up of credits, and enable the transference of credits from one learning situation to another but similar situation (similar in the sense that both situation should be outcome based). For example, in order to be awarded an NTA, a learner must have accumulated number of credits from all prescribed compulsory modules plus a specified minimum number of credits from optional modules such that total number of credits is not less than the minimum number of credits approved by NACTE for a particular NTA.

(iv) **Assessment should recognize prior learning**
Allow for accelerated access to further learning and give credit to evidence of learning outcomes that have already been acquired in different ways.

(v) **Legitimacy, transparency and clarity**
Assessment should emphasize legitimacy and transparency and clarity on what the learner is expected to achieve, what assessment method and instrument will be used to assess achievement, what the learner will have to do to show achievement, how it will be assessed, the conditions under which or the situation in which the assessment will take place, the underpinning knowledge that will have a bearing, the amount, complexity and type of evidence that will be required, and when the assessment will take place. As assessment is central to recognition of achievement, therefore, the quality of that assessment is important in order to provide credible certification. Credibility in assessment is assured through assessment procedures and practices being governed by fairness, validity, reliability and practicability. These principles help to allay the concerns and anxieties that the users of assessment results (learners, parents, employers, technical institutions and the general public) have about assessment, as assessment results often affect personal, social and economic progression and mobility in society. They
assure users of the credibility of the assessment process and provide accurate information about the individual that has been assessed.

The outcome of the actual curriculum development process is a *Curriculum Information Report*, which follows the format as indicated in Appendix VIII.

### 3.0 IMPLICATIONS AND PROCEDURES FOR IMPLEMENTING A NEW CURRICULUM

The implementation of a new curriculum has to take into consideration many factors, which may be directly or indirectly implied. It is obvious that there will be financial implication in addressing such factors with a view to ensuring smooth implementation of curriculum. It is therefore necessary that all implications are carefully thought of and taken aboard and particularly when making decision to implement a new curriculum.

#### 3.1 Implications for Implementing a Curriculum

In order to ensure smooth implementation of curriculum it is necessary to assess the situation with respect to staff situation, teaching and learning space, facilities and equipment for teaching and learning, availability of materials and consumables for teaching and learning, existence of relations with external institutions. These will facilitate making the right decision on students’ enrolment and identification of corresponding financial implications.

##### 3.1.1 Staff Situation

Staffing is a critical factor which must be addressed before implementing any new curriculum or when a curriculum has been reviewed. The key issues to be addressed in the assessment of staff situation is the number of staff in relation to the number of students enrolled/to be enrolled in line with acceptable students to staff ratio; qualification and profile of staff in relation to the expertise required to implement the curriculum.

The student staff ratio may vary from one institution, country or field of specialization to another. There is therefore a need to be familiar with acceptable students to staff ratio of comparable institutions and subject area and ensure that the ratio at the technical institution does not deviate significantly from such figures. As a result of assessment of staff situation in terms of number, provision for recruiting new staff may be apparent to be in line with acceptable students to staff ratio, and hence requirement for additional investments in the budget.
The qualification and profile of expertise of staff members are another critical issue. The introduction of a new curriculum for example, may have implication on the need to re-train the staff or recruitment of additional staff with specific desired expertise. This again has financial implication. The respective technical institution must do required preparations to ensure smooth implementation of the curriculum.

### 3.1.2 Teaching and Learning Space

Students’ enrolment targets has implication on space requirements. In this context, teaching and learning space includes space required in the various types of classrooms, laboratories when applicable, workshops when applicable space, and library. The criteria for assessing space is to consider the ratio of total space area to the total students enrolled. Space to students ratio of similar local institutions or in the region may be used as a guide.

As a result of assessment of space versus students enrolment targets, requirements for additional space may be apparent to be in line with acceptable space to students ratio, and hence requirement for additional investments in the budget.

### 3.1.3 Facilities and Equipment for Teaching and Learning

The implementation of a new curriculum may involve the implementation of new laboratory practicals that require facilities and equipment that do not exist, or of different specifications. Therefore, this may require upgrading of laboratory facilities and equipment relevant to the desired learning outcomes from the curriculum. All facilities and equipment required should therefore be identified, their financial implication worked out and acquisition planned for prior to the implementation of the curriculum.

In addition, the mode of delivery of some course modules introduced with the new curriculum may require special teaching aids for maximum effectiveness and higher students’ retention rates. The current trends promote the use of ICT facilities for teaching and learning. As a result, the adequacy of ICT facilities to support newly introduced curriculum must be clarified prior to the implementation of the curriculum, and appropriate planning measures taken. Furthermore, because libraries normally stock reference-reading materials mainly to support existing courses, a new curriculum may imply new additional library collections.

All these may result to additional investments in the budget. The respective technical institution should carefully examine such requirements, identify corresponding financial implications, and facilitate their availability in good time for introduction of the curriculum. Otherwise, the institution may need to postpone the introduction of the new curriculum or scale it down in line with the available facilities and equipment.
3.1.4 Materials and Consumables for Teaching and Learning

The introduction of new curriculum has direct implication on teaching and learning materials and consumables, as a result of new students’ enrolment targets. It is therefore important that technical institutions intending to implement new curriculum to clarify the additional requirements on materials and consumables to support newly introduced curriculum prior to the implementation of the curriculum, and appropriate planning measures taken.

3.1.5 National and International Relations

The implementation of a new curriculum may result in graduates failing to get absorbed in the job market simply because the employers and society in general are not well informed on the competencies that are enabled in the curriculum. Therefore, measures must be taken to address public awareness of the new curriculum and its potential. This may have financial implication.

In addition, as it is obvious, technical education advocates field training. Training places are exclusively solicited from private and public organizations. The implementation of a new curriculum may require the respective technical institution to strengthen its relation with such organizations through visits, staff attachments, joint ventures in undertakings within the terms of reference of respective technical institution and exchange of information, among other strategies. Some of these strategies may have implication on financial resources. Furthermore, additional implications may result necessity to strengthen the placement office due to increased activities.

Apart from national relations, it is also important for a technical institution intending to implement a new curriculum to strengthen its relations with international academic institutions. This is important to provide opportunities for staff and student exchanges. Under this arrangement, qualified and experience teaching staff from external institution may support introduction of new courses while own staff members are under training or gaining experience. Matters related to external examination/assessment will also be easier to realize. It is obvious that all these strategies may result to additional investments in the budget.
3.2 Procedures for Implementing a New Curriculum

It is clear that most of the factors highlighted in 3.1, above require time for their realization. Some may require less time than the others. For a smooth take-off, it is recommended that the introduction of a new curriculum should be done gradually starting with the first small batch of students. Target enrolment should be reached after a few years so as to give room for progressive preparations and adjustments. It is recommended that full enrolment be reached at least after the first batch of students has graduated. Specifically, implementation of a new curriculum should follow the following procedures:

3.2.1 CDC or the NACTE Subject Board on behalf of technical institution shall assess all the factors indicated in 3.1, above. At this juncture, CDC or the NACTE Subject Board should have already be in possession of data on staff; teaching and learning space; facilities and equipment for teaching and learning; and materials and consumables for teaching and learning (refer Section 5.8 in *Situational Analysis towards Curriculum Development/Review* [2]). Format for assessing national and international relations is given in Appendix IX of the present document.

3.2.2 CDC or NACTE Subject Board shall project student enrolment based on respective humanpower requirements and employment growth rates. Guidelines for doing this are given in Appendix X for both existing and new curricula. The Format for projecting student enrolment into existing and new training programmes are given in Appendices XI and XIII, respectively. In order to elaborate the procedure, corresponding examples are given in Appendices XII and XIV, respectively.

3.2.3 CDC or NACTE Subject Board shall work out financial implications of introducing the new curriculum using the format given in Appendix XV.

3.2.4 CDC shall identify resources that are available or realistically expected to be made available in time for implementing the new curriculum and accordingly recommend the number of first batch students as per Appendix XIV.

3.2.5 If there are shortfalls in resources to meet the humanpower requirements from the analysis in 3.2.4 above, CDC shall plan to bridge such shortfalls by clearly indicating the target, planned milestones each year until the full enrolment target is realized, and strategies for realization. In all cases, CDC shall report the findings and recommendations to the owners of the Institution for further consideration.
4.0 MODALITIES FOR REVIEW OF CURRICULA

Based on the evaluation of the performance indicators as a result of continuous monitoring of curriculum implementation as described in the NACTE document on “Performance Indicators for Assessment of Institutions” [7] and evaluation of feedback from stakeholders via situation analysis [2], curriculum need to be updated to satisfy current demands.

4.1 Interrelation of Curriculum Review and Evaluation Tasks

Key features of a system for routine and periodic review and evaluation of curriculum are demonstrated in Fig. 3, which also indicates the major tasks and their interrelations. The line activities include assessment of curriculum implementation leading to identification of needs for curriculum review, qualification of the necessary interventions, and curriculum renew.

4.1.1 Assessment of Curriculum Implementation

As it seen in Fig. 3, a technical institution should be able to evaluate implementation of its curriculum. NACTE too should be able to assess implementation of curricula by institutions under its umbrella. Only this way it will be possible to identify the need for review of curriculum. The performance indicators should be of help in that respect, but one should be able to reliably measure the performance and translate the result over a realistic period of time into useful information.

4.1.2 Qualification of Needs for Curriculum Review

Once the need for curriculum review is clear, which shall be demonstrated by the gap between what the performance indicators are showing and the targeted values, one will need to clearly identify the required intervention. There are many good reasons why NACTE or a technical institution should routinely and regularly review and evaluate curriculum, but all are aiming to renew the same by sustaining and/or improving its quality in response to the market requirements. Curriculum review could therefore be either for the purpose of:

- Improvement of competencies, in order to be in line with revised competence standards or other NACTE norms;
- Improvement of competencies, in order to attain competitive edge;
- Ensuring flexibility of curriculum in response to modern socio-economical trends;
- Rationalizing efficiency in curriculum implementation; or
- Any combination thereof.

Figure 3:  A System for Curriculum Review
As it clearly seen in Fig. 3, curriculum review and evaluation essentially involve ascertaining the quality of a given curriculum. That is, the value or worth of a curriculum, in terms of curriculum inputs, processes, outputs and outcomes in line with current needs of employers, the profession, the graduates and society at large, as well as current NACTE norms. The ultimate goal is to renew the curriculum.

4.1.3 Curriculum Renew

While during curriculum review required interventions in the curriculum are qualified for meeting the market demand, curriculum renew involves realization of the qualified interventions. Curriculum renew could therefore entail updating of goals and objectives of curriculum, or relevance of course contents, teaching and learning strategies, or assessment criteria, etc., or combination thereof. Situation analysis will therefore be necessary to obtain feedback from graduates, employers, professional bodies and other stakeholders. This will assist NACTE or a technical institution, as the case may be, to qualify and realize the necessary interventions. In most cases, the necessary intervention shall require enabling outcomes and tasks to be improved in the curriculum. These in turn may require regular updates of competence-based standards by NACTE. In order for NACTE to regularly update its competence-based standards it is required to have a dynamic understanding of occupation trends within various sectors covered by the Council to include knowledge of skills required, employment patterns and possible career routes. On the other hand, NACTE and/or technical institution need also to assess present and future training needs in terms of context, inputs, processes and outputs. This requires, amongst other things, a good understanding of market needs, learners ability and expectations.

It is evident from above that most of the tasks are interrelated making the process of comprehensive curriculum review more or less as complex as curriculum development, depending on the age of curriculum since last review. In order to optimize utilization of both time and financial resources, it is crucial to continuously monitor the performance of curriculum implementation. This will enable technical institutions or NACTE, as the case may be, to update some minor components of the curriculum through a routine review, before a major comprehensive periodic review exercise. In this way, there will be much less implications on resources when conducting comprehensive review.
4.2 Procedure for Review and Evaluation of Curriculum

4.2.1 Routine Review of Curriculum

Curriculum should continuously be reviewed and evaluated throughout the period of implementation. Specifically this should be done as follows:

(a) Assessment of Performance in Curriculum Implementation

(i) Except for standardized performance indicators or those with targets that are widely acceptable (e.g. student/staff ratio, library floor space per student, etc), it is the responsibility of CDC or NACTE Subject Board, as the case may be, to quantify target values for all other relevant performance indicators described in the NACTE document on *Performance Indicators for Assessment of Institutions* [7]. In that endeavour, it is necessary to ensure that the target values are achievable and time bound, i.e. realistic. This can better be realized through a consultative approach involving those who are implementing the curriculum, other specialists in the subject of the curriculum, educationist and the owners of the institution. Some of the key indicators are presented in the Compendium of the NACTE Academic Quality Standards [8].

(ii) Coordinator for Curriculum Development in a technical institution or NACTE Chief Coordinator for Information and Documentation, as the case may be, shall maintain reliable records of actual performance in curriculum implementation, using same indicators as described in the NACTE documents on *Performance Indicators for Assessment of Institutions* [7] and “NACTE Academic Quality Standards” [8].

(iii) CDC or NACTE Subject Board, as the case may be, shall assess performance in curriculum implementation by comparing the actual and target figures of similar performance indicators.

(iv) If significant deviations are observed between the actual indicators with targets for a reasonable period of time showing a clear trend it is a sign of needs for curriculum review. CDC or NACTE Subject Board, as the case may be, shall confirm and qualify such needs.

(b) Qualification of Needs for Routine Curriculum Review
In qualification of needs for routine curriculum review CDC or NACTE Subject Board, as the case may be, shall confirm:

(i) Nature of the needs, that is whether the required improvement is on mandatory or optional competencies, or on teaching and learning strategies, or on rationalizing efficiency in curriculum implementation;

(ii) Scope of the needs whether the required improvement affects the whole curriculum or only a number of modules, whether the required improvements can be effected without extensive research undertaking, i.e. graduate and/or employer surveys, study of employment patterns, and other components of Situation Analysis;

(iii) In case there would be a need to conduct research work to confirm certain trends, the CDC or NACTE Subject Board, as the case may be, shall arrange to facilitate that. NACTE Modalities require the Subject Board to refer such requirement to the NACTE Information, Research and Development Committee, which shall invite appropriate Call for Research Proposals. For this purpose, it is emphasized that relevant chapters of the document: “NACTE Modalities for Conducting Research and Consultancy” [9], should be referred to.

The first confirmation is necessary to know the direction of curriculum renew, while the second and third shall determine whether the improvements can be immediately implemented or should await the outcome of periodic review. It is the duty of CDC or NACTE Subject Board, as the case may be, to make this decision.

(c) Curriculum Renew

(i) If CDC or NACTE Subject Board, as the case may be, has deliberated to implement the improvements, either in the whole curriculum or part thereof (i.e. in a module only) the curriculum renew process should be planned as already provided in the NACTE document on “Situational Analysis towards Curriculum Development/Review” [2].
(ii) Situation Analysis, if necessary, shall be conducted also in accordance with the relevant NACTE modalities [2]. In case the situational analysis is conducted by the NACTE Subject Board, or if the relevant technical institution opts to request NACTE to do the task on its behalf, \textit{NACTE Modalities for Conducting Research and Consultancy} should be closely followed [9].

(iii) Actual renew of curriculum, i.e. improvement in either learning outcomes, or learning strategies, or assessment criteria and methods, covering the whole curriculum or part thereof (i.e. a module or a couple of modules) shall be done in accordance with the relevant provisions in Chapter 2.0, above.

(iv) Approval of renewed curriculum shall follow the relevant provisions in the NACTE document on “\textit{Procedures for Curriculum Approval and Validation}” [3]. However, for curriculum that has been reviewed by technical institutions, the same should also be validated by NACTE. Procedures for that are also provided in the \textit{NACTE document on “Procedures for Curriculum Approval and Validation”} [3].

\textbf{4.2.2 Periodic Review of Curriculum}

Apart from the regular reviews indicated in 4.2.1 above, it is necessary to conduct more comprehensive review after a certain period has elapsed. This type of review will provide more realistic trends of the deficiencies, if any, and which could be addressed in a more detailed way.

For this purpose, all curricula, irrespective of the routine reviews, should be evaluated after every 5 years. This duration is considered long enough to provide realistic trends, and short enough not to allow unbearable deviations. Specifically the periodic review should be done as follows:

\textit{(a) Qualification of Needs of Periodic Curriculum Review}

In qualification of needs for periodic curriculum review CDC or NACTE Subject Board, as the case may be, shall conduct situation analysis to confirm current and future needs of employers, the profession, graduates, society and other stakeholders.
(b) Curriculum Renew

(i) CDC or NACTE Subject Board, as the case may be, shall plan the curriculum renew process as already provided in the NACTE document on “Situational Analysis towards Curriculum Development/Review” [2].

(ii) Situation Analysis should be conducted in accordance with the relevant provisions in the NACTE document on “Situational Analysis towards Curriculum Development/Review” [2]. In case situation analysis is conducted by the NACTE Subject Board, or if the relevant technical institution opts to request NACTE to do the task on its behalf, NACTE Modalities for Conducting Research and Consultancy should be closely followed [9].

(iii) Actual renew of curriculum, i.e. improvement in either learning outcomes, or learning strategies, or assessment criteria and methods shall be done in accordance with the relevant provisions in Chapter 2.0, above.

(iv) Approval of renewed curriculum shall follow the relevant provisions in the NACTE document on “Procedures for Curriculum Approval and Validation” [3]. However, for curriculum that has been reviewed by technical institutions, the same should also be validated by NACTE. This is also provided in [3].
GLOSSARY OF TERMS USED IN THE DOCUMENT

The following, arranged in alphabetical order, are the definitions of the terms used in this document, unless the context required otherwise:

G1. Capability
Capability is in essence a combination of knowledge understanding and skills, usually in a particular field of activity.

G2. Competence
Competence is associated with clear ability to successfully carry out some occupational activity and it is described in terms of ‘skills’, ‘knowledge’, and ‘aptitude or understanding’ as well as typical ‘context’ and ‘level’ that person who possesses such competence could work in.

G3. The Council

G4. Competitive Advantage (of a curriculum)
In this context, competitive advantage implies existence of the enabling environment to ensure that students who qualify at a technical institution are better equipped for their carrier than students who graduated from another institutions.

G5. Course
Means a course as approved by the Council and leading to award of the Council. It is essentially synonymous to a learning programme.

G6. Course Module
A course module (or simply a module) is a set of learning outcomes (professional competencies) that has been pedagogically structured to respond to a meaningful stage of the work process, to represent a meaningful phase of the learning process, and to constitute the basic units for evaluation.

G7. Credit
A Credit is an instrument for measuring and expressing learning equivalence. A credit plays an important role in rewarding the incremental progress of learners, facilitating student transfer, recognizing prior learning and contributing to the definition of academic standards.

G8. Credit Value
Credit Value is the number of credits awarded for successful completion of a module at particular study level. A credit value is achieved when the learner has satisfied the assessment criteria for all (or the majority) of the designated learning outcomes of the module.

G8. Credit Transfer
Implies transferring of credit value(s) from one programme to another, both programmes belonging to the same institution, or from one learning environment to another, i.e. involving programmes of two different institutions.

G10. Cross Crediting
In the context of the present procedures it implies transferring of credit value(s) from one study level to another, both levels being offered by the same institution, i.e. same learning environment.

G11. Curriculum
Curriculum is a teaching and learning experiences taking place in learning institution and includes the aims and objectives of learning, what is taught, provided in terms of learning outcomes for realization of target qualification requirements, teaching and learning strategies for realization of outcomes, and form of assessment and evaluation. Curriculum is not syllabus documentation.

G12. Curriculum Renew
Curriculum Renew is a process of making an old curriculum anew. It involves realization of the interventions qualified during curriculum review. Curriculum renew could therefore entail updating of goals and objectives of curriculum and either relevance of enabling learning outcomes (course contents), or teaching and learning strategies, or assessment criteria, etc., or combination thereof.

G13. Curriculum Review
Curriculum Review is a process of assessing implementation of an old curriculum to confirm its present and future validity. It involves qualifying required interventions in the curriculum for meeting the present and future market demands. It is a basis for curriculum renew. Curricula are first reviewed before they can be renewed. However, not all curriculum review may lead to curriculum renew.

G14. Cutting Edge (technology/process/method)
Cutting edge technology/process/method is a technology/process/method that is very appreciable in one way or another, e.g. very efficient, precise, accurate, safe, etc. Cutting edge technologies/processes/methods, as the case may be, and future trends are normally identified and incorporated in curriculum to achieve
Guidelines for Preparation of Quality Management Plan for Institutions Accredited to NACTE

competitive advantage (For definition of “Competitive Advantage” please refer G4).

G15. Enabling Learning Outcomes (Enabling Outcomes)
Enabling Outcomes are outcomes that enable the achievement of higher-level Principal Outcomes. While Principal Outcomes are fixed by NACTE, enabling outcomes are formulated by curriculum developers. They are non-standards. These are statements that describe the knowledge, skills and understanding that learners will develop after following a curriculum, making curriculum goals clear and transparent to all stakeholders. Enabling Outcomes describe more clearly what a student will be able to do with what they have learned in course modules and are verifiable and assessable.

Generic curriculum needs are technical education and training qualities that must be developed in all learners regardless of the specific area or content of learning, in order to facilitate life-long learning within and across fields.

G17. Knowledge
Knowledge is regarded as information that has been gathered and recorded in one’s memory and that which can be recalled in answer to a question.

G18. Learning Outcomes
Learning outcomes are statements on competencies expected to be imparted to a learner during the learning experience. Learning outcomes may be standard and non-standard.

G19. Level Descriptors (Competence Level Descriptors or Competence Descriptors)
Level Descriptors are broad, cross-fields standards of achievement. One main difference between level descriptors and qualification outcomes (G12) is that the latter is field-specific and hence relatively more detailed than the level descriptors.

G20. NACTE Norms
These include NACTE Standards as described in G17 below, and all other relevant procedures for realizing such Standards as stipulated in the various NACTE Documents.

G21. NACTE Standards
Statements of learning outcomes from technical education and training and their associated assessment criteria as registered/specifed by NACTE

G22. Notional Time
Notional time is a period spent by an average student in learning about something towards realizing a learning outcome. This could include formal learning in classroom, out of class formal learning, and learning gained through on the job experience.

G23. Principal Learning Outcomes (Principal Outcomes)
These are broad Standards of achievement at a particular level of study and context specified by NACTE to facilitate realisation of the purpose(s) of a particular NTA or qualification.

G24. Qualification
A planned combination of broad learning outcomes which has a defined purpose or purposes, and which is intended to provide qualifying students with applied competence and a basis for further learning. In other words, qualification means the formal recognition of the achievement of the required number and range of credits and such other requirements at specific levels of the National Technical Awards as determined by the Council.

G25. Qualification Outcomes
These are exit level outcomes at a high level of abstraction specified by NACTE. They are standards and are used to indicate the main objectives of the qualification, i.e. what the learner should be able to demonstrate following completion of a particular training programme at the designated level.

G26. Technical Education
Education and training undertaken by students to equip them to play roles requiring higher levels of skill, knowledge and understanding and in which they take responsibility for their area of specialization.

G27. Technical Institution
An institution registered by the Council and accredited to deliver courses leading to the awards of the Council.

G28. Training Programme or Learning Programme
A sequential learning activities, associated with curriculum implementation.

G30. Skill
Skill is defined by the ability to do specific things without necessarily understanding the processes by which one does them.

G31. Specific Curriculum Needs
Specific curriculum needs refer to the abilities to do a set of tasks, to understand the theory underpinning the tasks and the ability to pass reasoned judgment on different ways to do the tasks.

G22. Syllabus

Syllabus is a documentation of module or subject contents, what is taught, provided in terms of learning outcomes for realization of target qualification requirements.

G33. Understanding

Understanding involves grasping concepts and being able to use them creatively.
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Guidelines for Preparation of Quality Management Plan for Institutions Accredited by NACTE
FOREWORD

NACTE was established to oversee and coordinate technical education and training in Tanzania. In accomplishing this task, NACTE require institutions to have a quality system in place. To assist institutions in implementing this requirement, NACTE has established procedures and guidelines to be used as guiding tools. The guidelines for preparation of a Quality Management Plan for institutions accredited by NACTE are among the tools.

A Quality Management Plan (QMP) is formulated to provide how an institution structures its quality system and describes its quality policies and corresponding operational procedures including criteria for and areas of application of the policies, as well as specific roles and responsibilities of the relevant authorities in implementing the operational policies and procedures. QMP also describes institution’s policies and procedures for assessing the effectiveness of the quality system.

This document discusses the contents and elements of a QMP that must reflect the institution’s commitment to quality management principles and practices. The booklet aims at guiding institutions on how to prepare an institutional Quality Management Plan. The document also recommends the institutional quality management structures to coordinate quality aspects of both teaching and non-teaching elements.

We hope that technical institutions will find this booklet helpful during the preparation of their respective Quality Management Plans.

J. M. Maggila
EXECUTIVE SECRETARY
EXECUTIVE SUMMARY

ES1: All technical institutions accredited by NACTE are required to establish and implement a quality system. Such quality system is operationalised through establishment of a Quality Management Plan (QMP) and corresponding Institutional Quality Control and Quality Assurance Policies and Procedures.

ES2: QMP is formulated to provide how an institution structures its quality system and describes the quality policies of the institution, corresponding operational procedures to include criteria for and areas of application of the policies, as well as specific roles and responsibilities of the relevant authorities in implementing the operational policies and procedures. It also describes institution’s policies and procedures for assessing the effectiveness of the quality system.

ES3: This document describes ten key elements of a quality system for technical institutions accredited by NACTE that must be documented in a QMP to comply with NACTE requirements. Each QMP Element is described by its purpose and specifications of respective key issues that need to be provided under the element.

ES4: The identified key elements that have to be considered include the Management and institution, Components of Applicable Quality System, Qualification and Training of Personnel, Procurement of Items and Services, Documents and Records, Computer Hardware and Software, Planning, Implementation of Teaching and Research, Assessment and Response, and Quality Improvement.

ES5: The document has also prescribed the procedures for preparation of QMP, its approval and implementation, as well as conditions for review of plan and modalities for the actual review of QMP.
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### LIST OF ABBREVIATIONS AND ACRONYMS

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<tr>
<td>NACTE</td>
<td>National Council for Technical Education</td>
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<td>NACTE-QCAC</td>
<td>NACTE Quality Control and Assurance Committee</td>
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<td>NTA</td>
<td>National Technical Award</td>
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<td>QA</td>
<td>Quality Assurance</td>
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<td>SB-QCAC</td>
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1.0 INTRODUCTION

All technical institutions accredited by NACTE are required to establish and implement a quality system. Such system is necessary to guarantee quality of respective outputs and win confidence of stakeholders in the quality of technical education provided. This is quite in line with the prescriptions of the NACTE Academic Quality Standards [1]. Essentially, the required quality system is a structured system that describes the policies and procedures followed by the institution for ensuring that all inputs, work processes, and products or services of the respective technical institution are in line with the vision and mission of the institution and satisfying the expectations of the employers of relevant graduates, the profession concerned, the society, and the NACTE norms.

The quality system at a technical institution is operationalised through establishment of a Quality Management Plan (QMP) and corresponding Institutional Quality Control and Quality Assurance Policies and Procedures. The latter is described in another NACTE document [2]. On the other hand, QMP is formulated to provide how an institution structures its quality system and describes the quality policies of the institution, corresponding operational procedures to include criteria for and areas of application of the policies, as well as specific roles and responsibilities of the relevant authorities in implementing the operational policies and procedures. It also describes an institution’s policies and procedures for assessing the effectiveness of the quality system.

This document describes the elements of a quality system for technical institutions accredited by NACTE that must be documented in a QMP to comply with NACTE requirements. Specifically, the document presents specifications and instructions for the information that must be contained in a QMP and discusses the procedures for review, approval, implementation, and revision of QMPs. It is important for readers to note that all elements described in this documents are required in a QMP unless otherwise directed by NACTE.

2.0 REQUIREMENTS ON A QUALITY MANAGEMENT PLAN

2.1 Purpose

The major purpose of a QMP is to provide a management tool for operationalisation of a quality system of an institution. It prescribes the policies and procedures for planning, implementing, documenting, and assessing the effectiveness of activities supporting educational operations of a technical institution.

2.2 General Contents of QMP
As it has already been highlighted, QMP is intended to describe the policies and procedures for management practices and all key operational matters in a technical institution with a view to ensuring quality outputs in line with the market expectations. The contents of QMP therefore satisfy this requirement and as such, the document should include the following major descriptions:

a) The mission and quality policy of the institution;

b) The specific roles, authorities, and responsibilities of management and staff of the institution with respect to QC and QA activities;

c) The means by which effective communications with personnel actually performing the work are assured;

d) The processes used to plan, implement, and assess the work performed;

e) The process by which measures of effectiveness for QC and QA activities will be established and how frequently effectiveness will be measured; and

f) The continual improvement based on lessons learned from previous experience.

Specific elements of a quality system are addressed within the major contents of QMP outlined above. The key such elements include those reflecting the institution, its management and the components of applicable quality system, as well as the frameworks for qualifications and training of personnel, procurement of items and services, documentation and records, usage of computer hardware and software, planning, implementation of work processes, assessment and response, and quality improvement.

Each technical institution shall evaluate these elements for applicability to their quality system. Where a particular element is not relevant, an explanation of why it is not relevant must be provided in the QMP. Also, if it is determined that an additional quality management element is useful or necessary for an adequate quality system, such element shall be included in the QMP. However, in all cases, QMP shall reflect the institution’s commitment to quality management principles and practices, tailored, when appropriate, by senior management to meet the institution’s needs. Specific requirements for each of these elements are described in Chapter 3 of the present document.

3.0 ELEMENTS OF A QUALITY MANAGEMENT PLAN

Each QMP Element is described by its purpose and specifications of respective key issues that need to be provided under the element. In order to ensure uniformity and consistency
in presentation and review of QMP, it is preferable, but not necessary, that QMP addresses the specifications in the same order as presented under this Chapter.

However, if an existing and approved QMP adequately addresses each of the required issues under the specifications but the same are presented in a different order, such QMP shall not be rewritten simply to conform to the outline provided in the present modalities.

3.1 Management and Institution

3.1.1 Purpose

To document the overall policy, scope, applicability, and management responsibilities of the institution’s quality system.

3.1.2 Specifications

The institution shall provide the following:

(a) An approval page for the signatures of the institution’s management and QC & QA manager. The approval page may be part of a title page or a separate sheet following the title page.

(b) A statement of the institution’s policy on QC and QA, including:

   (i) The importance of QC and QA activities to the institution and why,
   (ii) The general objectives and goals of the quality system, and
   (iii) The policy for resource allocation for the quality system (QMPs must discuss personnel, intramural and extramural funding, and other teaching resources).

(c) An institution organisation chart that identifies all of the components of the institution and, in particular, the institutional position and lines of reporting for the QC & QA Manager (or similar position such as a Quality Manager) and any other QC & QA staff;

(d) A description of the authorities of the QC & QA Manager and any other staff that also:
Guidelines for Establishing Institutional Policies and Procedures on Quality Control and Quality Assurance

(i) Documents the institutional independence of the QC & QA Manager from groups generating, compiling, and evaluating teaching data, and

(ii) Indicates how the institution will ensure that QC & QA personnel will have access to the appropriate levels of management in order to plan, assess, and improve the institution’s quality system;

(e) A description of the technical activities or programmes that are supported by the quality system including:

(i) The specific programmes that require quality management control;

(ii) Where oversight of delegated, contracted, or other extramural programmes is needed to assure data quality; and

(iii) Where and how internal coordination of QC and QA activities among the different units of an institution needs to occur;

(f) A description of how management will assure that applicable elements of the quality system are understood and implemented in all educational programmes; and

(g) A discussion of the institution’s process for resolving disputes regarding quality system requirements, QC and QA procedures, assessments, or corrective actions.

3.2 Components of Applicable Quality System

3.2.1 Purpose

To document how an institution manages its quality system and defines the primary responsibilities for managing and implementing each component of the system.

3.2.2 Specifications

The institution shall provide the following:
(a) A description of the institution’s quality system that includes the principal components of the system and the roles and implementation responsibilities of management and staff with regards to these components. These components include, but are not limited to:

(i) Quality system documentation;

(ii) Annual reviews and planning;

(iii) Management assessments;

(iv) Training;

(v) Systematic planning of projects;

(vi) Project-specific quality documentation; and

(vii) Project and data assessments.

(b) A list of the tools for implementing each component of the quality system. These tools include, but are not limited to:

(i) QMPs (quality system documentation);

(ii) Quality Systems Audits (management assessments);

(iii) Training Plans (training);

(iv) QA Project Plan (project-specific quality documentation); and

(v) Data Verification and Validation (data assessments).

(c) A list of any components of the institution that develop QMPs (or equivalent document) in support of the institution’s Quality System and the review and approval procedures for such documentation; and

(d) A description of how roles and responsibilities for the principal components of the Quality System are incorporated into performance standards.

3.3 Qualification and Training of Personnel

3.3.1 Purpose
To document the procedures for assuring that all personnel performing work for an institution have the necessary skills to effectively accomplish their work.

3.3.2 Specifications

The institution shall provide the following:

(a) A statement of the policy regarding training for management and staff;

(b) A description of the process(es), including the roles, responsibilities, and authorities of management and staff, for:

(i) Identifying, ensuring, and documenting that personnel have and maintain the appropriate knowledge, skill, and statutory, regulatory, professional or other certifications, accreditations, licenses, or other formal qualification necessary; and

(ii) Identifying the need for retraining based on changing requirements.

3.4 Procurement of Items and Services

3.4.1 Purpose

To document the procedures for purchased items and services that directly affect the quality of educational programmes.

3.4.2 Specifications

The institution shall provide a description of, or reference to the document describing the procurement process(es). The description should include the roles, responsibilities, and authorities of management and staff, pertaining to all appropriate procurement documents or extramural agreements, including grants, cooperative agreements, and contracted and subcontracted activities, involving or affecting educational programmes, for:

(a) Reviewing and approving procurement documents (and any changes to these documents) to ensure:
(i) That the procurement documents are accurate, complete, and clearly describe the item(s) or service needed, the associated technical and quality requirements, and the quality system elements for which the supplier is responsible; and

(ii) The supplier’s conformance to the customer’s requirements will be verified.

(b) Reviewing and approving all applicable responses to solicitations to ensure that these documents:

(i) The documents satisfy all technical and quality requirements, and provide evidence of the supplier’s capability to satisfy institutional quality system requirements; and

(ii) The procured items and services are of acceptable quality, including the review of objective evidence of quality for applicable items and services furnished by suppliers and subcontractors, source selection, source inspections, supplier audits, and examination of deliverables.

3.5 Documents and Records

3.5.1 Purpose

To document appropriate controls for quality-related documents and records determined to be important to the mission of the institution.

3.5.2 Specifications

The institution shall provide a description of, or reference to the document describing the procurement process(es). The description should include the roles, responsibilities, and authorities of management and staff, for:

(a) Identifying quality-related documents and records (both printed and electronic) requiring control;

(b) Preparing, reviewing for conformance to technical and quality system requirements, approving, issuing, using, authenticating, and revising documents and records;
(c) Ensuring that records and documents accurately reflect completed work;

(d) Maintaining documents and records including transmittal, distribution, retention (including retention times), access, preservation (including protection from damage, loss, and deterioration), traceability, retrieval, removal of obsolete documentation, and disposition;

(e) Ensuring compliance with all applicable statutory, regulatory, and NACTE requirements for documents and records; and

(f) Establishing and implementing appropriate chain of custody and confidentiality procedures for evidentiary records.

3.6 Computer Hardware and Software

3.6.1 Purpose

To document how the institution will ensure that computer hardware and software satisfies the institution’s requirements.

3.6.2 Specifications

The institution shall provide a description of, or reference to the document describing the procurement process(es). The description should include the roles, responsibilities, and authorities of management and staff, for:

(a) Developing, installing, testing (including verification and validation), using, maintaining, controlling, and documenting computer hardware and software used in educational programmes to ensure it meets technical and quality requirements and directives from management;

(b) Assessing and documenting the impact of changes to user requirements and/or the hardware and software on performance;

(c) Evaluating purchased hardware and software to ensure it meets user requirements and complies with applicable contractual requirements and standards; and

(d) Ensuring that data and information produced from, or collected by, computers meet applicable information resource management requirements and standards.
3.7 Planning

3.7.1 Purpose

To document how individual data operations will be planned within the institutions to ensure that data or information collected are of the needed and expected quality for their desired use.

3.7.2 Specifications

The institution shall provide a description of, or reference to the document describing the procurement process(es). The description should include the roles, responsibilities, and authorities of management and staff, for:

(a) Planning educational data operations using a systematic planning process that includes:

(i) Identification and involvement of the project manager, sponsoring organization and responsible official, project personnel, stakeholders, scientific experts, etc. (e.g., all customers and suppliers);

(ii) Description of the project goal, objectives, and questions and issues to be addressed;

(iii) Identification of important schedules, resources (including budget), milestones, and any applicable requirements (e.g., regulatory and contractual requirements);

(iv) Identification of the type and quantity of data needed and how the data will be used to support the project’s objectives;

(v) Specification of performance criteria for measuring quality;

(vi) Specification of needed QC and QA activities to assess the quality performance criteria;

(vii) Description of how, when, and where the data will be obtained (including existing data) and identification of any constraints on data collection; and
(viii) Description of how the acquired data will be analyzed (either in the field or
the laboratory), evaluated (i.e., QA review, verification, validation), and
assessed against its intended use and the quality performance criteria;

(b) Developing, reviewing, approving, implementing, and revising a QC and QA
Project Plan or equivalent planning document; and

(c) Evaluating and qualifying data collected for other purposes or from other sources,
including the application of any statistical methods, for a new use.

3.8 Implementation of Teaching and Research

3.8.1 Purpose

To document how teaching and research will be implemented within the institution to
ensure that data or information collected are of the needed and expected quality for their
desired use.

3.8.2 Specifications

The institution shall provide a description of, or reference to the document describing the
procurement process(es). The description should include the roles, responsibilities, and
authorities of management and staff, for:

(a) Ensuring that teaching and research is performed according to approved planning
and technical documents;

(b) Identification of operations needing procedures (e.g., standardized, special, or
critical operations), preparation (including form, content, and applicability),
review, approval, revision, and withdrawal of these procedures; and policy for use;
and

(c) Controlling and documenting the release, change, and use of planned procedures,
including any necessary approvals, specific times and points for implementing
changes, removal of obsolete documentation from work areas, and verification that
the changes are made as prescribed.
3.9 Assessment and Response

3.9.1 Purpose

To document how the institution will determine the suitability and effectiveness of the implemented quality system and the quality performance of the educational programmes to which the quality system applies.

3.9.2 Specifications

The institution shall provide a description of, or reference to the document describing the procurement process(es). The description should include the roles, responsibilities, and authorities of management and staff, for:

(a) Assessing the adequacy of the quality system at least annually;

(b) Planning, implementing, and documenting assessments and reporting assessment results to management including how to select an assessment tool, the expected frequency of their application to educational programmes, and the roles and responsibilities of assessors;

(c) Determining the level of competence, experience, and training necessary to ensure that personnel conducting assessments are technically knowledgeable, have no real or perceived conflict of interest, and have no direct involvement or responsibility for the work being assessed;

(d) Ensuring that personnel conducting assessments have sufficient authority, access to programmes, managers, documents, and records, and institutional freedom to:

   (i) Identify both quality problems and noteworthy practices,
   
   (ii) Propose recommendations for resolving quality problems,
   
   (iii) Independently confirm implementation and effectiveness of solutions;

(e) Management’s review and response to findings;

(f) Identifying how and when corrective actions are to be taken in response to the findings of the assessment, ensuring corrective actions are made promptly, confirming the implementation and effectiveness of any corrective action, and
documenting (including the identification of root causes, the determination of whether the problem is unique or has more generic implications, and recommendation of procedures to prevent recurrence) such actions;

(g) Addressing any disputes encountered as a result of assessments. Available assessment tools include quality systems audits, management systems reviews, peer reviews, technical reviews, performance evaluations, data quality assessments, readiness reviews, technical systems audits, and surveillance.

3.10 Quality Improvement

3.10.1 Purpose

To document how the institution will improve the institutional quality system.

3.10.2 Specifications

Identify a person in an institution responsible for planning, implementing, and evaluating the effectiveness of quality improvement activities and describe the process to ensure continuous quality improvement, including the roles and responsibilities of management and staff, for:

(a) Ensuring that conditions adverse to quality are:

   (i) Prevented,

   (ii) Identified promptly including a determination of the nature and extent of the problem,

   (iii) Corrected as soon as practical, including implementing appropriate corrective actions and actions to prevent reoccurrence,

   (iv) Documenting all corrective actions, and

   (v) Tracking such actions to closure;
(b) Encouraging staff at all levels to establish communications between customers and suppliers, identify process improvement opportunities, and identify and offer solutions to problems.
4.0 PREPARATION OF A QUALITY MANAGEMENT PLAN

It is important that descriptions of the elements provided in 3.0 above are sufficiently inclusive, explicit, and readable to enable both management and staff to understand the priority which management places on QC and QA activities, the established quality policies and procedures, and their respective quality-related roles and responsibilities. The QMP elements must be presented in such a way that an assessment of the suitability and effectiveness of the institution’s quality system can be accomplished. Such assessments will enable management to determine if the quality system meets the needs of the institution.

In all cases, the QMP should focus on the processes and procedures used to plan, implement, and assess the educational programmes to which it is applied, and must include definitions of appropriate authorities and responsibilities for managers and staff.

For these reasons, it is the senior management of an institution that shall be responsible for the preparation of QMP. In this context, senior management of an institution implies the Executive Head of Institution (i.e. Principal, Director, Provost, Rector, as the case may be) and Senior Academic and Non–Academic Staff who are responsible and accountable for mission accomplishment and overall operations of the institution. While senior management is responsible for the preparation of the QMP and ensuring that the quality system documented in the QMP satisfies all NACTE Quality Policy requirements, the actual preparation may be assigned to the Institution’s staff so long as it is assured that all Senior Staff support the effort.

For example, it is often the practice that the QA Manager of an Institution directs a senior member of staff to prepare a QMP to cover all educational programmes supported or undertaken by the institution. While doing so, the QA Manager shall ensure that the senior management understands fully the contents of the QMP and concur with its implementation.

The QMP must be approved and signed by the senior management of the institution. This will certify that the institution has conducted an internal review of the QMP and that management has concurred with its contents. Further the QMP shall be submitted to Governing/Advisory Boards for approval.

5.0 REVIEW OF A QUALITY MANAGEMENT PLAN
Each institution shall review its QMP at least annually to reconfirm the suitability and effectiveness of the approved quality management practices. The process of developing, annually reviewing, and revising (as needed) the QMP provides an opportunity for management and staff to clarify roles and responsibilities, address problem areas, and institutionalize improvements. Having an accurate QMP at all times is an essential element in every quality system. Thus, all changes in QA policy and procedures shall be documented in the QMP in a timely fashion.

Conditions requiring the revision of an approved QMP include:

(a) Expiration of the five-year life span (or any other fixed life span) of the QMP;

(b) Major changes in mission and responsibilities, such as changes in the delegation status of an educational programme;

(c) Re-institution of existing functions that affect educational programmes covered by the QMP; and

(d) Assessment findings requiring corrective actions and response.

The senior management of the institution is responsible for the review of QMP and ensuring that all revisions satisfy the NACTE Quality Policy requirements. As it is the case with the preparation of QMP, the actual incorporation of the revisions in the QMP document may be assigned to the Institution’s staff so long as it is assured that all Senior Staff support the effort. The revisions in the QMP must also be approved and signed by the senior management of the institution and subsequently be submitted to Governing/Advisory Boards for approval. Having revised the QMP, all appropriate personnel in the institution performing work covered by the scope of the QMP shall be notified of changes to the quality system and the QMP to keep them informed of the current requirements.

In general, a copy of any QMP revision(s) made during the year shall be submitted to NACTE as a report when such changes occur. However, if significant changes have been made to the quality system that affect the performance of work for the institution, it shall be necessary to re-submit the entire QMP to NACTE for reference.

6.0 QUALITY MANAGEMENT STRUCTURES
6.1 Recommended Quality Management Structure for Institutions

In most institutions the academic departments are responsible for ensuring quality of teaching and learning, while the financial and administration departments are responsible for ensuring quality of non-teaching elements. In order to coordinate quality aspects of teaching and non-teaching elements it is recommended that institutions should establish Quality Control and Assurance Committee with a typical structure as indicated in Fig. 1. The main function of the Quality Control and Assurance Committee shall be to keep under review the standards and the quality of education offered by the institutions in conformity with NACTE accreditation and academic standards. It shall also review various issues of an institution not related to teaching and learning to ensure that they provide the necessary input towards good quality education. In carrying out all its functions, the Committee shall be responsible to the Institution’s Governing or Advisory Board, as the case may be.

![Figure 1: Recommended Structure of Quality Management in Institutions](image)

(i) The Head of an institution;
(ii) Heads of relevant academic departments;

(iii) Financial and administrative Officer;

(iv) Students representatives;

(v) At least two members from the Institutions governing Board.

Under the Institution’s Quality Control and Assurance Committee, there will be Departmental Quality Assurance and Control Committees. These shall constitute mainly members of departments chaired by the Head of Department. This committee shall be entrusted to ensure that the systems and processes within the department lead to provision of quality education to the students.

The Departmental Quality Control and Assurance Committee may form various task forces to deal with specific issues related teaching and learning e.g. graduate and employers tracer studies, formulation of enabling outcomes during curriculum development, reconciliation of course modules/subjects with enabling learning outcomes, review of enabling learning outcomes/course modules in a curriculum; curriculum approval/validation at institutional level, etc.

It is important to note that the Quality Management Structure indicated in Fig. 1 is only a recommendation for institutions accredited by NACTE. Institutions are however free to formulate their Quality Management Structures in line with their Organisation Structure.

Critical is to ensure that any such committee established for the purpose keeps under continuous review the standards and the quality of education offered by the institution in conformity with NACTE accreditation and academic standards. It shall also review various issues of an institutions not related to teaching and learning to ensure that they provide the necessary input towards good quality education.

6.2 Quality Management Structure for NACTE

The Quality Management structure for NACTE is shown in Figure 1. It is important to note that under Subject Boards Quality Control and Assurance Committees, various task forces may be constituted to approve and review aspects related to courses, awards etc.
The NACTE Quality Control and Assurance Committee (NACTE-QCAC) is responsible to the Council for keeping under review, in cooperation with Subject Boards, the standards and the quality of the awards offered by various institutions accredited by NACTE. This is quite in line with the provisions in the Act that established NACTE [3]. In carrying out its function, NACTE-QCAC will present reports and recommendations to the Council on policy issues and matters connected with academic standards and quality, including an annual report on academic work, derived from reports received from the institutions. The report on academic work enables problems in the assurance of quality within the
institutions to be identified so that remedial action can be initiated. The NACTE-QCAC shall also coordinate the process of approval, monitoring, evaluation and progress review of courses in association with Subject Boards. In addition, the NACTE-QCAC shall assess the ability of the institutions to provide suitable educational experience for its students and those involved in the partnership arrangements respectively. The reviews examine both the teaching and learning environment and non-academic aspects of the overall student experience.

NACTE-QCAC will be composed of seven members including the Chairperson as follows:

(i) Executive Secretary of NACTE – Chairperson;

(ii) Deputy Secretary of Registration and Accreditation – Secretary;

(iii) Deputy Secretary of Examinations and Awards;

(iv) Deputy Secretary of Information, Research and Development;

(v) One member representing Technical Education and Training Institutions;

(vi) One member representing employers;

(vii) One member representing relevant professional bodies; and

(viii) One member representing the Ministry that is responsible for Science and Technology.

The detailed functions of NACTE-QCAC are appended in another document of NACTE [2].

Looking at the overall structure of NACTE most of the quality control aspects of the institutions and NTA is vested with the five Subject Boards. As such, the work of NACTE-QCAC as highlighted above need to be complemented by the Subject Board’s Quality Control and Assurance Committees (SB-QCAC). The latter are responsible to keep under review the standards and quality of awards offered by various institutions and falling within the Subject Board. The SB-QCAC will report directly to NACTE-QCAC.

For effective functioning, the SB-QCAC shall be composed as follows:

(i) One member from the relevant Subject Board or a member from appropriate professional body (Chairman);
(ii) Chief Co-coordinator of the Subject Board (Secretary);

(iii) One member nominated from appropriate professional bodies;

(iv) One professionally qualified member from industries or professions directly concerned with the employment of the holder of Council awards in the subject area of the Board;

(v) Subject experts currently employed in a University, who have professional qualifications in the subject areas covered by the Board; and

(vi) Two Principals of Institutions accredited to NACTE offering courses covered by the Subject Board.

The relevant Subject Board shall form various task forces to handle the various issues related with quality of provision of technical education. Typical examples of the task forces that can be formed include a Course Approval and Review Task Force with responsibility to assess the validity of new or significantly revised course proposal and to conduct course reviews for institutions accredited to NACTE, a Module Approval and Review Task Force to assess the quality of new or revised modules within the subject areas and those under review and many more task forces that may be formulated depending on the specific needs of the SB-QCAC.
GLOSSARY OF TERMS USED IN THE DOCUMENT

The following, arranged in alphabetical order, are the definitions of the terms used in this document, unless the context required otherwise:

G1. **Assessment**

    Systematic analysis of the effectiveness of teaching and learning that is carried out according to established standards.

G2. **The Council**

    The National Council for Technical Education (NACTE) established under section 3 of the National Council for Technical Education Act No. 9 of 1997

G3. **Course**

    Means a course as approved by the Council and leading to award of the Council. It is essentially synonymous to a learning programme.

G4. **Course Module**

    A course module (or simply a module) is a set of learning outcomes (professional competencies) that has been pedagogically structured to respond to a meaningful stage of the work process, to represent a meaningful phase of the learning process, and to constitute the basic units for evaluation.

G5. **Curriculum**

    Curriculum is a teaching and learning experiences taking place in learning institution and includes the aims and objectives of learning, what is taught, provided in terms of learning outcomes for realization of target qualification requirements, teaching and learning strategies for realization of outcomes, and form of assessment and evaluation.

G6. **Indicators**

    Critical information about selected areas of performance, usually expressed as an index or ratio, monitored at regular intervals, and compared to one or more standards. Indicators describe various aspects of the operation of a program, service, or institution.

G7. **Learning Outcomes**

    The knowledge, skills, and values acquired through a pursuit of an educational activity.
G8. NACTE Norms

These include NACTE Standards as described in G15 below, and all other relevant procedures for realizing such Standards as stipulated in the various NACTE Documents.

G9. Qualification

A planned combination of broad learning outcomes which has a defined purpose or purposes, and which is intended to provide qualifying students with applied competence and a basis for further learning. In other words, qualification means the formal recognition of the achievement of the required number and range of credits and such other requirements at specific levels of the National Technical Awards as determined by the Council.

G10. Qualification Standard

Statements of the purpose of qualification and corresponding principal learning outcomes from technical education and training and their associated assessment criteria as registered/specified by NACTE.

G11. Quality Control and Quality Assurance Committee

A committee of NACTE with responsibility to implement, monitor and maintain policies and procedures that govern the institutional evaluation process under the direction of the Council.

G12. Technical Education

Education and training undertaken by students to equip them to play roles requiring higher levels of skill, knowledge and understanding and in which they take responsibility for their area of specialization.

G13. Technical Institution

An institution registered by the Council and accredited to deliver courses leading to the awards of the Council

G14. Training Programme or Learning Programme

A sequential learning activities, associated with curriculum implementation
REFERENCES


FOREWORD

The National Council for Technical Education (NACTE) is a regulatory body established by the National Council for Technical Education Act, 1997 to oversee and coordinate the provision of technical education and training in Tanzania. Amongst the functions of NACTE is to assist technical institutions in the overall development of the quality of education they provide. In order to assist technical institutions in the provision of quality education and training, NACTE has, therefore, to establish policies, regulations and procedures for setting and maintaining standards and quality of technical education and training.

All institutions under the auspices of NACTE are required to have quality control and quality assurance systems in place to ensure that respective institution have conducive environments for the provision education and training to the required standard. This requires availability of clear institutional policies and procedures on quality control and quality assurance. The key purpose is to guarantee quality of outputs from technical institutions and win confidence of stakeholders in the technical education provided. Quality control involves operational techniques and activities that are aimed both at monitoring process(es) and at eliminating causes of unsatisfactory performance in all stages of the quality loop. The ultimated goal is to achieve desired effectiveness.

This document provides a guiding framework to technical institutions in formulating institutional policies and procedures on quality control and quality assurance. It also provides guidelines for carrying out internal audits of respective quality control systems and reporting findings and conclusions. In doing so the document clarifies the objectives of institutional policy on quality assurance and provides the major components of the required policy with key assessment criteria.

J. M. Maggila
EXECUTIVE SECRETARY
EXECUTIVE SUMMARY

**ES1:** All institutions under the auspices of NACTE are required to have quality control systems in place to ensure that respective institution meets the accreditation requirements. This requires availability of clear institutional policies and procedures on quality control and quality assurance. The key purpose is to guarantee quality of outputs from technical institutions and win confidence of stakeholders in the technical education provided. Quality control involves operational techniques and activities that are aimed both at monitoring process(es) and at eliminating causes of unsatisfactory performance in all stages of the quality loop. The ultimate goal is to achieve economic or desired effectiveness.

**ES2:** This document provides a guiding framework to training institutions in formulating institutional policies and procedures on quality control and quality assurance. It also provides guidelines for carrying out internal audits of respective quality control systems and reporting findings and conclusions. In doing so the document clarifies the objectives of institutional policy on quality assurance and provides the major components of the required policy with key assessment criteria.

**ES3:** Modalities for monitoring of the implementation of the institutional policies are also presented in the document covering the focus, length of review cycle, constitution of a quality control and quality assurance committee, its work process and outcomes, as well as the review of the NACTE monitoring process.

**ES4:** The intention of NACTE is to focus on the guidelines of preparing policies and procedures so as to ensure sustainability of institutions' own quality assurance processes rather than on the detail of those processes and their related procedures.
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1.0 INTRODUCTION

The National Council for Technical Education (NACTE) was established by an Act of Parliament, “The National Council for Technical Education Act, 1997 (No. 9 of 1997)”, as a regulatory body to register, accredit technical institutions and coordinate technical education in the country[1]. In line with its Mission, NACTE aims at working with institutions and other stakeholders to provide public assurance of the quality and standards of the technical education in Tanzania.

The ultimate goal is to assure stakeholders that any learner who has been deemed successful after participating in a learning programme at a training institution and hence eligible for a particular National Technical Award (NTA) is able to display the prescribed learning outcomes of the respective qualification. NACTE will mainly achieve that assurance through the process of accrediting institutions. During accreditation, NACTE evaluates curricula/learning programmes and confirms the appropriateness and adequacy of teaching and learning resources and support infrastructure at respective institutions, as well as the availability of quality management systems to ensure quality delivery of targeted programmes and valid assessment of learners in demonstration of achievement of competencies as specified for the respective Qualification Standard.

For that purpose, all institutions under the auspices of NACTE are required to have quality control systems in place to ensure that respective institution meets the accreditation requirements. NACTE requires that there be evidence that the quality control systems function as intended. In this requirement, NACTE modalities allow considerable liberty in how an institution will make its case and what kinds of evidence it will bring forth to support the case that it has fulfilled or is maintaining the requirements of accreditation. In either case, an internal self-evaluation or an internal audit of the institution is carried out.

This document provides a guiding framework to training institutions in formulating institutional policies and procedures on quality control and quality assurance. It also provides guidelines for carrying out internal audits of respective quality control systems and reporting findings and conclusions.

2.0 GUIDELINES FOR INSTITUTIONAL QUALITY CONTROL

2.1 Purpose of Quality Control and its Basis
The key purpose of quality control is to guarantee quality of outputs from technical institutions and win confidence of stakeholders in the technical education provided. Quality control involves operational techniques and activities that are aimed both at monitoring process(es) and at eliminating causes of unsatisfactory performance in all stages of the quality loop. The ultimate goal is to achieve economic or desired effectiveness. Every quality control aspect should be aimed at fulfilling the relevant NACTE standards [2]. Specifically, the NACTE Academic Quality Standards and NACTE Accreditation Standards shall provide the basis for quality control. Based on the provisions in these standards the degree of effectiveness of a particular parameter checked for can be quantitatively determined. Quantification of the degree of effectiveness is achieved using a quality effectiveness index (QEI). This is a ratio of the current achievement situation and the ideal or preferred situation and is expressed as,

$$QEI = \frac{R_C}{R_I},$$

where,

- **QEI**: Quality Effectiveness Index
- **$R_C$**: Rating of Current Situation
- **$R_I$**: Rating of Ideal or Preferred Situation

Calculating QEI permits a basis for comparison across institution systems as to the level of quality that is considered ideal or favorable for that particular system. The given ratio expresses a bi-directional assessment of quality, and indicates a diminution of quality as the ratio is decreased from 1.0, and an achievement of expectations as the ratio is increased above 1.0. In other words, if an institution system has a quality effectiveness ratio of 0.5, it is only approximately 50% of the way towards the level of quality it perceived as desirable. On the other hand, if an institution system has a quality effectiveness ratio of 1.25, it indicates that its has surpassed those same expectations by approximately 25%.

### 2.2 Major Factors for Consideration

In any quality control system and particularly that involve self-evaluation or internal audits, there are some basic factors that have to be considered for the same to be successful. These include the needs of clarity in the description of the quality control system, transparency in the procedures, sensitivity of the procedures to weaknesses in the quality control system, proper sampling of audit probes, clear conclusions and recommendations from internal audits. The guidelines for consideration of the major factors are provided in the subsequent sub-sections.
2.2.1 Clarity

One long-standing principle of any internal audit as part of institutional quality control system, is that the matter being audited, e.g. a teaching technique, a curriculum, a screening process, etc. must be well defined so that the audience and the auditors themselves know what is being evaluated. Quality control systems for all programmes in an institution should therefore be clear, well defined and address all the NACTE Academic Quality Standards. For clarity, the quality control systems should be represented with a schematic diagram as well as in narrative form. Fig. 1 provides a generic schematic diagram of a typical quality control system in a higher learning institution. It is important to note that the schematic diagram is only an example or prototype. As such, a quality control system of particular institution may differ from that prototype. However, any such differences will have to be specified in the Internal Audit Report.

2.2.2 Transparency

If the members of staff at an institution are going to have confidence in the internal audit and its conclusions, they must be aware of the procedures that were used to arrive at the conclusions. It helps if they are asked to approve the plan for conducting the internal audit in advance in some formal way so that they will have accepted the procedures as reasonable.

In any case, the internal audit procedures should be clear and well known to the members of staff at the institution.
2.2.3 Sensitivity

The procedures for entering the quality control system to begin the internal audit must be clear and sensitive to potential weaknesses in the system. Normally, the member of staff may enter the system in several ways. One such possibilities is as follows:

(i) A course grade in a randomly selected course in a programme is identified by an unbiased method (e.g. randomly selection etc.).

(ii) Following the schematic diagram of the system (as in Fig. 1), each element in the system that is linked to that grade is probed to see if the quality control system worked as it was designed to work in that instance. The audit probe would determine, for example; whether the particular academic member of staff who gave the grade was appointed, reviewed, and assigned properly; whether the student was admitted and enrolled properly; whether the work on which the grade was given was evaluated properly; whether the enrolment to the course was done properly; whether the course was evaluated and
reviewed properly; whether the course was properly funded; whether the course was
given in an appropriate facility; whether the program in which the course was required
was properly evaluated; and so forth.

This entails that all links to the course grade that are implicated in the system are
examined to see whether the system functioned properly in this particular instance.

(iii) The Internal Audit probe can begin at any point in the system. One example might be by
starting with a particular member of staff, the probe can begin there and move through the
system from that point. The questions of the system are the same and for this case will
take the following form: Was his/her appointment assignment proper? Was his/her tenure
or promotion decision conducted properly? Were his/her students selected properly?
Does he/she evaluate student learning properly? Was his/her course properly approved
and evaluated? Was his/her course properly funded? Was the course given in an
appropriately equipped classroom? And so forth. Again each element in the system that
bears on quality of particular selected case is examined.

The entry point has no particular significance and merely provides a manageable way to
begin the audit probe and constrain the amount of information that must be considered.

2.2.4 Sampling

The number of internal audit probes that would be necessary depends, as in all sampling, on the
degree of variability that is revealed. The number should be of a magnitude that would convince
the academic member of staff and others that a reasonably accurate reading of the system had
been taken. Sampling just one or two students, for example, or one or two courses, may not
provide sufficient confidence to the interpretations gleaned from the audit.

When the member of staff determines how many elements should be sampled, a rationale for the
number should be provided so that the reader can be assured that the audit findings are truly
representative of the system.

2.2.5 Reporting

In the report of the internal audit, the findings from the audit are distinct and derived from the
conclusions made by the members of staff about the quality control system. The purpose of the
internal audit is for the members of staff to make some judgments about how well its quality control system is working. The conclusions advanced by the staff, for example, could include any one (or more) of the following:

(i) Our quality control system is working just as it was designed.

(ii) Our quality control system is working well, overall, except we have learned that we cannot put a great deal of faith in the course grades our students receive because they are not predictors of the subsequent performance in student teaching.

(iii) Our quality control system has several significant breakdowns e.g. violations of the appointment policies in the hiring of adjunct academic members of staff, inconsistencies in content and practices within various sections of the same course, and inconsistencies in the way clearances into student teaching are administered.

For all cases where the system is not found to be coherent, it seems reasonable that these judgments would give direction to members of staff for strengthening their quality control system. However, to avoid misinterpretation and queries seeking evidence leading to particular conclusions or recommendations, the basis and evidence leading to the conclusion must be presented.

Questions like “What makes you conclude that the system is working well, or that breakdowns exist?” should not be go unanswered by the evidence that is collected during the Internal Audit. So, it makes sense to see judgments as flowing from evidence and for this reason it is important to keep the reporting of the evidence separate from the reporting of the judgments or conclusions about the quality control system.
3.0 GUIDELINES FOR INSTITUTIONAL POLICY ON QUALITY ASSURANCE

3.1 Purpose of the Guidelines

The aim of these proposed guidelines is to assist technical institutions in establishing or improving their policies and processes and to support NACTE when assessing the policies and processes in place.

3.2 Focus of the Institutional QA Policy

An institutional policy should reflect the institution’s mission and values. All institutions should have a QA policy in place. A quality assessment policy should focus on units (academic and other) and/or on programmes (or groups of programmes). The policy should include provisions to cover all the functions and units of the institution (research, administration, community service, etc.).

3.3 Objective of Institutional QA Policy

The objectives of institutional policy on quality assurance should be, at a minimum to improve the quality of programmes offered and ensure that the stated learning outcomes could be realized. The policy should ultimately answer how well is the unit or the programme achieving what it set out to accomplish and whether the same is doing what it should be doing.

3.4 Components of an Institutional QA Policy

In addition to reflecting institutional mission and values, the institutional QA policy should be comprehensive and apply to all programmes and units. It should also at least provide the following:

(a) Establish a coordinating or administrative unit responsible for the overall management of the QC & QA process. This unit should be located at a higher echelon of the institution’s administrative structure, and be accountable to the institution’s leaders.

(b) Define the assessment criteria (refer to section 3.5 Key Assessment Criteria).

(c) Require a self-study component, usually involving academic staff and students participating in the programme or unit. The self-study should be student-centred as it would aim, in most cases to assess the quality of learning. The self-study should be
structured according to the defined assessment procedures criteria. When and where appropriate, the results of accreditation may be included and/or substituted for this component, or a portion thereof.

(d) Entail an external review component. At least two experts that are external to the institution are recommended to carry out the review. As appropriate, the results of accreditation may be included and/or substituted for this component, or a portion thereof.

(e) Incorporate the participation of academic staff not directly involved in the reviewed programme (or discipline or unit).

(f) Enable the participation of the wider network of stakeholders, such as employers, graduates, professional associations, the local community, etc.

(g) Include appropriate mechanisms that are at a minimum providing the procedures and areas of responsibility, to ensure a proper follow up to the assessment.

(h) Establish the assessment cycle, which should not exceed five years. Newly established programmes or units should be assessed once fully implemented, this will be at the end of one- to five-year mark.

(i) Include provisions to review the policy periodically.

(j) The policy should be submitted to NACTE as the body responsible for quality assurance for reference.

3.5 **Key Assessment Criteria**

The assessment procedures and criteria should be student-centred, and should reflect institutional mission and values. The assessment criteria should be comprehensive enough (i.e. to include all programmes and units) and should at least provide the following:

(a) Assess intended and delivered curriculum;

(b) Review teaching learning processes;

(c) Clarify the expected outcomes for students;
(d) Examine the degree to which those outcomes are realized;

(e) Evaluate the appropriateness of support provided to students;

(f) Appraise the research carried out by the academic unit or by academic staff involved in the reviewed programme;

(g) Value the contribution of the unit or programme to other aspects of the institutional mission (for example community service); and

(h) Value the contribution of the unit or programme to the larger community or society in general.
4.0 MONITORING THE IMPLEMENTATION OF INSTITUTIONAL QC AND QA POLICY BY NACTE

4.1 Objective

The monitoring of quality assessment procedures and practices is especially important given that the cornerstone of QC & QA is self-assessment by the institutions. The specific objective of the NACTE monitoring function is therefore to ascertain that the procedures used by institutions to assess the quality of existing programmes, and other functions as appropriate, are performing adequately as quality control mechanisms. Specifically, the monitoring process should answer how well is the institution achieving what it set out to accomplish in its QC & QA policy and whether it is doing what it should be doing in the area of quality assurance.

Procedurally, the monitoring process is a formative one, whereby institutional policies and practices are reviewed with a view to providing assistance and advice to institutions.

4.2 Focus of the Monitoring

NACTE has the mandate to oversee tertiary technical education and training in its entirety. Hence, the Council shall monitor/review all institutions falling under this category. In doing so, NACTE will focus on three elements, namely:

(a) The institutional quality assessment policy;
(b) Quality assessment practices; and
(c) Follow-up mechanisms.

The process will pay particular attention to each institution’s mission and values.

4.3 Length of Review Cycle

Monitoring of quality assessment procedures and practices shall be performed once at each institution in a five-year cycle. It shall consist of one review per year conducted for the first three years, and two reviews per year may be conducted in each of the remaining two years of the cycle. This increase in frequency may be necessitated by the need of NACTE to gather information for the purpose of renewing accreditation of institutions. The NACTE Quality Control and Quality Assurance Committee, in consultation with the institutions, may change this order. For institutions to be granted accreditation for the first time, the first review is recommended to start the year preceding an institution’s accreditation. For those requiring reaffirmation of accreditation, the review is recommended to start the year preceding an institution’s reaffirmation of accreditation.

4.4 Establishing a Baseline
Given that it will take five years to complete the first cycle of the monitoring process, the first step in the overall monitoring process will focus on establishing a baseline defining institutional activities and priorities in the area of quality assurance. One year after accreditation, each institution will be asked to provide a statement describing how compatible their current activities in the area of quality assurance are with the NACTE quality assurance policy in general, and with the Guidelines for Institutional Quality Assurance Policies in particular. In addition, the statement should identify future priorities in the area of quality assurance. The statement will be submitted by the end of the year of reporting.

4.5 Quality Control and Quality Assurance Committee

The Quality Control and Quality Assurance Committee is part of the Quality management Structure of NACTE. It carries out the monitoring function on behalf of Council. It is essentially established as a peer review committee. The members and Terms of Reference of the Committee are listed in Appendix 1.

4.6 Process and Outcomes

It is proposed that the monitoring process should take place over a 10 to 12-month period in which two or three institutions could be reviewed simultaneously. Specifically, the quality assurance monitoring process includes the following steps:

Step 1: Initial meeting

The first step of the process will be a meeting to clarify the expectations and the process, as well as to establish the time frame for each step.

Step 2: Self-study

The self-study focuses on the quality assessment and improvement processes in place at the institution under review. It is both descriptive and analytical and includes clear statements as to how well the quality assessment and quality improvement processes are performing, and whether these processes are adequate for the task.

The self-study provides answers to the two key questions guiding the monitoring process included in the objectives. The institution has a three to four months period after the initial meeting to produce the self-study and forward it to NACTE [3].

Step 3: Analysis of all pertinent documentation

Over the course of the following six to twelve weeks, the Committee and staff will analyze the documentation and request any additional information deemed necessary. The basis of the
Committee’s report is the documentation forwarded by the institution. This information shall include but not limited to the following:

(i) The institutional quality assessment policy. The Monitoring Committee uses the policy components and assessment criteria in the NACTE Quality Assurance Policy as the backdrop to review each institutional policy;

(ii) The institutional self-study;

(iii) The list of all programme or unit assessments conducted in the proceeding five years if applicable. The institution may indicate which units or programmes in that list reflect particularly well the institution’s mission and values;

(iv) The schedule of forthcoming assessments. From the list of assessments carried out by the institution, the Committee selects a number of assessments, preferably from three to five, for further review by the Committee. The programme or unit assessments are chosen to reflect as accurately as possible the institution’s mission and values; and

(v) Any other documents the Institution my feel beneficial for their assessment.

**Step 4: On-site visit**

The on-site visit completes the monitoring of institutional policy and practices. The Committee meets with individuals identified during Step 2 and those identified during consultations with the institution in preparation for the visit. The objective of the on-site visit is to validate the statements offered in the self-study, as well as to verify elements contained in the assessments reviewed by the Committee.

**Step 5: Reporting**

The Committee prepares a report on its findings and formulates recommendations, first and foremost, to the institution. The report is forwarded to the institution to validate factual information within eight to twelve weeks following the on-site visit. The institution can submit any correction to the report within 30 days of receipt. The report is then submitted to NACTE, accompanied by the comments and advice given by the institution. Once approved by the Council, the report is made available by request to the public, listed as a NACTE publication, and mentioned in the annual report filed by NACTE.

**Step 6: Institutional response**

The institution then develops a plan of action to respond to the report, to be filed with NACTE no later than one year following the publication of the monitoring report. The Committee and the Council may comment and respond to the plan of action. A brief description of the institution’s
plan of action, and of the response by the Committee or Council (NACTE), when applicable, are included in the next NACTE annual report.

The summary of the monitoring cycle is as depicted on Fig. 2.

4.7 **Review of the NACTE Monitoring Process**

At the end of the first five-year cycle, a 12-month interval will be imposed to review and analyze the process. Institutions will be consulted in this review. Among the questions to be answered at that time are:

(a) Has the process met the anticipated objectives and outcomes?
(b) What are its strengths and weaknesses?
(c) How can it be improved?
(d) Is there value in pursuing it into a second cycle?
5.0 EXPECTED INSTITUTIONAL OUTPUTS

The intention of NACTE is to focus on the guidelines of preparing policies and procedures so as to ensure sustainability of institutions' own quality assurance processes rather than on the detail of those processes and their related procedures. The proposed form of the policies and procedures is short precepts accompanied by guidance notes and commentary.

For that purpose, the production of a single handbook, with separate sections covering discrete areas appearing progressively, rather than a series of unrelated codes is recommended. Consultations and thorough detailed discussions of draft texts with active practitioners, drawn from relevant sectors, who have relevant expertise, followed by a more general invitation to comment is also proposed as a general way of proceeding in formulating the policies and procedures.
GLOSSARY OF TERMS USED IN THE DOCUMENT

The following, arranged in alphabetical order, are the definitions of the terms used in this document, unless the context required otherwise:

G1. **Capability**
   Capability is in essence a combination of knowledge understanding and skills, usually in a particular field of activity.

G2. **Competence**
   Competence is associated with clear ability to successfully carry out some occupational activity and it is described in terms of ‘skills’, ‘knowledge’, and ‘aptitude or understanding’ as well as typical ‘context’ and ‘level’ that person who possesses such competence could work in.

G3. **The Council**

G4. **Competitive Advantage (of a curriculum)**
   In this context, competitive advantage implies existence of the enabling environment to ensure that students who qualify at a technical institution are better equipped for their career than students who graduated from another institutions.

G5. **Course**
   Means a course as approved by the Council and leading to award of the Council. It is essentially synonymous to a learning programme.

G6. **Course Module**
   A course module (or simply a module) is a set of learning outcomes (professional competencies) that has been pedagogically structured to respond to a meaningful stage of the work process, to represent a meaningful phase of the learning process, and to constitute the basic units for evaluation.

G7. **Credit**
   A Credit is an instrument for measuring and expressing learning equivalence. A credit plays an important role in rewarding the incremental progress of learners, facilitating student transfer, recognizing prior learning and contributing to the definition of academic standards.

G8. **Credit Value**
Credit Value is the number of credits awarded for successful completion of a module at particular study level. A credit value is achieved when the learner has satisfied the assessment criteria for all (or the majority) of the designated learning outcomes of the module.

G8. Credit Transfer
Implies transferring of credit value(s) from one programme to another, both programmes belonging to the same institution, or from one learning environment to another, i.e. involving programmes of two different institutions.

G10. Cross Crediting
In the context of the present procedures it implies transferring of credit value(s) from one study level to another, both levels being offered by the same institution, i.e. same learning environment.

G11. Curriculum
Curriculum is a teaching and learning experiences taking place in learning institution and includes the aims and objectives of learning, what is taught, provided in terms of learning outcomes for realization of target qualification requirements, teaching and learning strategies for realization of outcomes, and form of assessment and evaluation. Curriculum is not syllabus documentation.

G12. Curriculum Renew
Curriculum Renew is a process of making an old curriculum anew. It involves realization of the interventions qualified during curriculum review. Curriculum renew could therefore entail updating of goals and objectives of curriculum and either relevance of enabling learning outcomes (course contents), or teaching and learning strategies, or assessment criteria, etc., or combination thereof.

G13. Curriculum Review
Curriculum Review is a process of assessing implementation of an old curriculum to confirm its present and future validity. It involves qualifying required interventions in the curriculum for meeting the present and future market demands. It is a basis for curriculum renew. Curricula are first reviewed before they can be renewed. However, not all curriculum review may lead to curriculum renew.

G14. Cutting Edge (technology/process/method)
Cutting edge technology/process/method is a technology/process/method that is very appreciable in one way or another, e.g. very efficient, precise, accurate, safe, etc. Cutting edge technologies/processes/methods, as the case may be, and future trends are normally
identified and incorporated in curriculum to achieve competitive advantage (For definition of “Competitive Advantage” please refer G4).

G15. **Enabling Learning Outcomes (Enabling Outcomes)**
Enabling Outcomes are outcomes that enable the achievement of higher-level Principal Outcomes. While Principal Outcomes are fixed by NACTE, enabling outcomes are formulated by curriculum developers. They are non-standards. These are statements that describe the knowledge, skills and understanding that learners will develop after following a curriculum, making curriculum goals clear and transparent to all stakeholders. Enabling Outcomes describe more clearly what a student will be able to do with what they have learned in course modules and are verifiable and assessable.

G16. **Generic Curriculum Needs**
Generic curriculum needs are technical education and training qualities that must be developed in all learners regardless of the specific area or content of learning, in order to facilitate life-long learning within and across fields.

G17. **Knowledge**
Knowledge is regarded as information that has been gathered and recorded in one’s memory and that which can be recalled in answer to a question.

G18. **Learning Outcomes**
Learning outcomes are statements on competencies expected to be imparted to a learner during the learning experience. Learning outcomes may be standard and non-standard.

G19. **Level Descriptors (Competence Level Descriptors or Competence Descriptors)**
Level Descriptors are broad, cross-fields standards of achievement. One main difference between level descriptors and qualification outcomes (G12) is that the latter is field-specific and hence relatively more detailed than the level descriptors.

G20. **NACTE Norms**
These include NACTE Standards as described in G17 below, and all other relevant procedures for realizing such Standards as stipulated in the various NACTE Documents.

G21. **NACTE Standards**
Statements of learning outcomes from technical education and training and their associated assessment criteria as registered/specified by NACTE

G22. **Notional Time**
Notional time is a period spent by an average student in learning about something towards realizing a learning outcome. This could include formal learning in classroom, out of class formal learning, and learning gained through on the job experience.

G23. **Principal Learning Outcomes (Principal Outcomes)**
These are broad Standards of achievement at a particular level of study and context specified by NACTE to facilitate realisation of the purpose(s) of a particular NTA or qualification.

G24. **Qualification**
A planned combination of broad learning outcomes which has a defined purpose or purposes, and which is intended to provide qualifying students with applied competence and a basis for further learning. In other words, qualification means the formal recognition of the achievement of the required number and range of credits and such other requirements at specific levels of the National Technical Awards as determined by the Council.

G25. **Qualification Outcomes**
These are exit level outcomes at a high level of abstraction specified by NACTE. They are *standards* and are used to indicate the main objectives of the qualification, i.e. what the learner should be able to demonstrate following completion of a particular training programme at the designated level.

G26. **Technical Education**
Education and training undertaken by students to equip them to play roles requiring higher levels of skill, knowledge and understanding and in which they take responsibility for their area of specialization.

G27. **Technical Institution**
An institution registered by the Council and accredited to deliver courses leading to the awards of the Council.

G28. **Training Programme or Learning Programme**
A sequential learning activities, associated with curriculum implementation.

G30. **Skill**
Skill is defined by the ability to do specific things without necessarily understanding the processes by which one does them.

G31. **Specific Curriculum Needs**
Specific curriculum needs refer to the abilities to *do* a set of tasks, to *understand* the theory underpinning the tasks and the ability to *pass reasoned judgment* on different ways to do the tasks.

**G22. Syllabus**

Syllabus is a documentation of module or subject contents, what is taught, provided in terms of learning outcomes for realization of target qualification requirements.

**G33. Understanding**

Understanding involves grasping concepts and being able to use them creatively.
REFERENCES


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APPENDIX XV: FORMAT FOR ASSESSING FINANCIAL IMPLICATION FOR IMPLEMENTING A CURRICULUM

APPENDIX I: FORMAT FOR PRESENTATION OF ENABLING OUTCOMES

1.0 Qualification: ...............................................................
   (e.g. Higher Diploma in …….; Technicians Certificate in …… etc.)

2.0 Purpose of Qualification: .................................................
3.0 NTA Level:

(Please indicate Level Number)

4.0 Level Descriptors:

5.0 Entrance Requirement:

6.0 NACTE Standards and Related Enabling Outcomes

<table>
<thead>
<tr>
<th>PRINCIPAL OUTCOMES</th>
<th>ENABLING OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>(NACTE Standards)</td>
<td>(As Identified and Formulated by Curriculum Developers)</td>
</tr>
</tbody>
</table>

Note: The Grid should cover the whole Training Programme, i.e. should include all related Principal Outcomes.

APPENDIX II: EXAMPLE OF PRESENTATION OF ENABLING OUTCOMES
1.0 Qualification: **Higher Diploma in Meteorology**

2.0 Purpose of Qualification: This qualification is intended for persons who will conduct research on, improve or develop concepts and operational methods, and prepare detailed or long-term weather forecasts used in aviation, shipping, agriculture and other branches, and for the information of the general public.

3.0 NTA Level: 7

4.0 Level Descriptors: This level (Level 7) is characterized by competence involving application of knowledge and skills in a broad range of complex technical activities, a high degree of personal responsibility and some responsibility for work of others.

5.0 Entrance Requirement: **Ordinary Diploma in Meteorology**

6.0 **NACTE Standards and Related Enabling Outcomes**

<table>
<thead>
<tr>
<th>PRINCIPAL OUTCOMES (NACTE Standards)*</th>
<th>ENABLING OUTCOMES (As Identified and Formulated by Curriculum Developers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Conduct research on weather related issues</td>
<td>1.1 Study composition, structure and dynamics of the atmosphere</td>
</tr>
<tr>
<td></td>
<td>1.2 Interpret various weather information and related phenomena</td>
</tr>
<tr>
<td></td>
<td>1.3 Identify weather related problems and other phenomena</td>
</tr>
<tr>
<td>2. Analyze and synthesize results to facilitate weather control</td>
<td>2.1 Conduct experiments in fog dispersal and interpret results</td>
</tr>
<tr>
<td></td>
<td>2.2 Conduct experiments in rainmaking and interpret results</td>
</tr>
<tr>
<td></td>
<td>2.3 Analyze data collected from weather stations</td>
</tr>
<tr>
<td>3. Solve various practical weather related problems by using meteorological concepts and principles</td>
<td>3.1 Prepare weather maps and forecasts used in aviation</td>
</tr>
<tr>
<td></td>
<td>3.2 Prepare weather maps and forecasts used in shipping</td>
</tr>
<tr>
<td></td>
<td>3.3 Prepare weather maps and forecasts used in agriculture</td>
</tr>
<tr>
<td></td>
<td>3.4 Prepare weather maps and forecasts for general public use</td>
</tr>
<tr>
<td>4. Communicate effectively to the users and the general public respective weather information</td>
<td>4.1 Produce reports and other documents on weather related issues</td>
</tr>
<tr>
<td></td>
<td>4.2 Understand specific information requirements of various users</td>
</tr>
<tr>
<td></td>
<td>4.3 Use visual, numerical, language and other skills to communicate the weather reports</td>
</tr>
</tbody>
</table>

**Note:** The Grid above shows a selection of possible Learning Outcomes, as an example. Otherwise, it should cover the whole Training Programme, i.e. should include all related Principal Outcomes as specified by NACTE.

*Relevant NACTE Standards not available by the time of preparation of this document.*
**APPENDIX III: FORMAT FOR PRESENTATION OF SUB-ENABLELING OUTCOMES**

1.0 Qualification: .................................................................
   (e.g. Higher Diploma in …….; Technicians Certificate in …… etc.)

2.0 Purpose of Qualification: .................................................................
   .................................................................
   .................................................................

3.0 NTA Level: .................................................................
   (Please indicate Level Number)

4.0 Level Descriptors: .................................................................
   .................................................................
   .................................................................

5.0 Entrance Requirement: .................................................................
   .................................................................

6.0 Desegregation of Enabling Outcomes

<table>
<thead>
<tr>
<th>ENABLING OUTCOMES</th>
<th>SUB-ENABLELING OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>
**Note:** The Grid should cover the whole Training Programme, i.e. should include all related Principal Outcomes.
## APPENDIX IV: EXAMPLE OF PRESENTATION OF SUB-ENABLING OUTCOMES

### 1.0 Qualification:  Higher Diploma in Meteorology

### 2.0 Purpose of Qualification:  This qualification is intended for persons who will conduct research on, improve or develop concepts and operational methods, and prepare detailed or long-term weather forecasts used in aviation, shipping, agriculture and other branches, and for the information of the general public.

### 3.0 NTA Level:  7

### 4.0 Level Descriptors:  This level (Level 7) is characterized by competence involving application of knowledge and skills in a broad range of complex technical activities, a high degree of personal responsibility and some responsibility for work of others.

### 5.0 Entrance Requirement:  Ordinary Diploma in Meteorology

### 6.0 Desegregation of Enabling Outcomes

<table>
<thead>
<tr>
<th>ENABLING OUTCOMES</th>
<th>SUB-ENABLING OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Study composition, structure and dynamics of the atmosphere</td>
<td>1.1.1 Measure and analyze speed and directions of air movement</td>
</tr>
<tr>
<td></td>
<td>1.1.2 Measure and analyze air pressure and temperature</td>
</tr>
<tr>
<td></td>
<td>1.1.3 Use effectively and efficiently ICT facilities</td>
</tr>
<tr>
<td></td>
<td>1.1.4 Investigate interaction of various air parameters</td>
</tr>
<tr>
<td>1.2 Interpret various weather information and related phenomena</td>
<td>1.2.1 Interpret measured speed and directions of air movement</td>
</tr>
<tr>
<td></td>
<td>1.2.2 Interpret measured air pressure and temperature</td>
</tr>
<tr>
<td></td>
<td>1.2.3 Interpret weather information to quantify precipitation</td>
</tr>
<tr>
<td>1.3 Identify weather related problems and other phenomena</td>
<td>1.3.1 Understand nature and cause of weather phenomena such as El Nino, La Nina, hurricane and other similar problems</td>
</tr>
<tr>
<td></td>
<td>1.3.2 Correlate weather information to determine extent of precipitation</td>
</tr>
<tr>
<td></td>
<td>1.3.3 Correlate weather information to determine fighting extent and electrical disturbances</td>
</tr>
<tr>
<td></td>
<td>1.3.4 Correlate weather information to determine extent of solar radiation and related effects</td>
</tr>
<tr>
<td>Learning Outcome</td>
<td>Sub-outcomes</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>2.1 Conduct experiments in fog dispersal and interpret results</td>
<td>2.1.1 Prepare appropriate materials and equipment for fog dispersal. 2.1.2 Prepare specimens for experiments, tests and analyses. 2.1.3 Conduct actual experiments in fog dispersal. 2.1.4 Interpret results in relation to problems.</td>
</tr>
<tr>
<td>2.2 Conduct experiments in rainmaking and interpret results</td>
<td>2.2.1 Prepare appropriate materials and equipment for clouds formation and precipitation. 2.2.2 Prepare specimens for experiments, tests and analyses. 2.2.3 Conduct actual experiments in rainmaking. 2.2.4 Interpret results in relation to problems.</td>
</tr>
<tr>
<td>2.3 Analyze data collected from weather stations</td>
<td>2.3.1 Use effectively and efficiently ICT facilities. 2.3.2 Organize data collected from various weather stations into different categories and into a comprehensible form. 2.3.3 Analyze and interpret data from various weather stations.</td>
</tr>
<tr>
<td>3.1 Prepare weather maps and forecasts used in aviation</td>
<td>3.1.1 Use effectively and efficiently conventional equipment for map preparation. 3.1.2 Use effectively and efficiently ICT facilities. 3.1.3 Apply appropriate concepts and principles to prepare weather maps and forecasts for aviation use.</td>
</tr>
<tr>
<td>3.2 Prepare weather maps and forecasts used in shipping</td>
<td>3.2.1 Use effectively and efficiently conventional equipment for map preparation. 3.2.2 Use effectively and efficiently ICT facilities. 3.2.3 Apply appropriate concepts and principles to prepare weather maps and forecasts for marine use.</td>
</tr>
<tr>
<td>3.3 Prepare weather maps and forecasts used in agriculture</td>
<td>3.3.1 Use effectively and efficiently conventional equipment for map preparation. 3.3.2 Use effectively and efficiently ICT facilities. 3.3.3 Apply appropriate concepts and principles to prepare weather maps and forecasts for agricultural use.</td>
</tr>
<tr>
<td>3.4 Prepare weather maps and forecasts for general public use</td>
<td>3.4.1 Use effectively and efficiently conventional equipment for map preparation. 3.4.2 Use effectively and efficiently ICT facilities. 3.4.3 Apply appropriate concepts and principles to prepare weather maps and forecasts for general public use.</td>
</tr>
<tr>
<td>4.1 Produce reports and other documents on weather related issues</td>
<td>4.1.1 Understand various formats for report preparations. 4.1.2 Use effectively and efficiently ICT facilities. 4.1.3 Compile weather reports using appropriate formats.</td>
</tr>
<tr>
<td>4.2 Understand specific information requirements of various users</td>
<td>4.2.1 Identify requirements of various users of weather information. 4.2.2 Cluster related users in terms of requirements. 4.2.3 Establish how the requirements of various clusters of users of weather information can be accommodated.</td>
</tr>
<tr>
<td>4.3 Use visual, numerical, language and other skills to communicate the weather reports</td>
<td>4.3.1 Identify requirements of various users of weather information. 4.3.2 Apply correct skills to communicate to various audiences. 4.3.3 Assess correctly the response of various audiences to the weather reports and act accordingly.</td>
</tr>
</tbody>
</table>

**Note:** The Grid above shows a selection of possible Learning Outcomes, as an example. Otherwise, it should cover the whole Training Programme, i.e. should include all related Principal Outcomes.
## APPENDIX V: A TYPICAL EXAMPLE OF PROPORTIONING ENABLING OUTCOMES ACCORDING TO NTA LEVEL

<table>
<thead>
<tr>
<th>NTA LEVEL (Title of Award)</th>
<th>LEVEL DESCRIPTORS (Standards)</th>
<th>TYPICAL CATEGORIES OF ENABLING OUTCOMES</th>
<th>Knowledge and Understanding</th>
<th>Practical Acts</th>
<th>Supervision</th>
<th>Communication</th>
<th>Behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level 4</strong> (Pre-Technician Certificate)</td>
<td>Competence involving application of skills and knowledge at routine level.</td>
<td>Ability to imitatively apply concepts and principles</td>
<td>None. Almost everything is tutor directed</td>
<td>Ability to perform routine tasks</td>
<td>Ability to produce clearly and concisely obtained information in given modes (e.g. communicate results of work accurately and reliably)</td>
<td>Ability to produce clearly and concisely obtained information in given modes (e.g. communicate results of work accurately and reliably)</td>
<td>Ability to work in a group, consider environmental and safety issues, apply entrepreneurial skills in performing routine tasks.</td>
</tr>
<tr>
<td><strong>Level 5</strong> (Technicians Certificate)</td>
<td>Competence involving application of skills and knowledge in a range of activities, some of which are non-routine. It covers occupations whose main tasks require skills and knowledge to assume operational responsibilities.</td>
<td>Ability to perform routine and some non-routine tasks</td>
<td>Ability to manage self and others in performing simple operational tasks</td>
<td>Ability to produce clearly and concisely given information in given and other modes (e.g. communicate and discuss results of work accurately and reliably)</td>
<td>Ability to produce clearly and concisely given information in given and other modes (e.g. communicate and discuss results of work accurately and reliably)</td>
<td>Ability to work in a group, consider environmental and safety issues, apply entrepreneurial skills in performing routine and some non-routine tasks.</td>
<td></td>
</tr>
<tr>
<td><strong>Level 6</strong> (Ordinary Diploma)</td>
<td>Competence involving application of skills and knowledge in a broad range of work activities, most of which are non-routine.</td>
<td>Ability to perform predictable complex tasks under supervision</td>
<td>Ability to manage self in performing predictable complex tasks</td>
<td>Ability to select information and produce clearly and concisely the information in selected modes</td>
<td>Ability to select information and produce clearly and concisely the information in selected modes</td>
<td>Ability to work in a group, consider environmental and safety issues, apply entrepreneurial skills in a broad range of activities mostly involving non-routine tasks.</td>
<td></td>
</tr>
<tr>
<td><strong>Level 7</strong> (Higher Diploma)</td>
<td>Competence involving application of knowledge and skills in a broad range of complex technical activities, a high degree of personal responsibility and some responsibility for work of others</td>
<td>Ability to perform predictable complex tasks independently</td>
<td>Ability to manage self and others in performing predictable complex tasks</td>
<td>Ability to analyze and select information and produce clearly and concisely the analyzed information in various modes</td>
<td>Ability to analyze and select information and produce clearly and concisely the analyzed information in various modes</td>
<td>Ability to work in a group, consider environmental and safety issues, apply entrepreneurial skills in a broad range of complex activities.</td>
<td></td>
</tr>
<tr>
<td><strong>Level 8</strong> (Bachelors Degree)</td>
<td>Competence involving application of knowledge and skills in a wide and unpredictable variety of contexts with substantial personal responsibility, responsibility for the work of others and responsibility for the allocation of resources, policy, planning, execution and evaluation.</td>
<td>Ability to perform unpredictable complex tasks independently</td>
<td>Ability to manage self and others in performing unpredictable complex tasks</td>
<td>Ability to produce professional and non-professional reports</td>
<td>Ability to produce professional and non-professional reports</td>
<td>Ability to work in a group, consider environmental and safety issues, apply entrepreneurial skills in a wide and unpredictable variety of contexts.</td>
<td></td>
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</tbody>
</table>
APPENDIX VI: FORMAT FOR PRESENTATION OF COURSE MODULES

1.0 Qualification:

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2.0 Purpose of Qualification:

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3.0 NTA Level:

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4.0 Level Descriptors:

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5.0 Minimum Overall Credits:

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6.0 Minimum Credits at this Level:

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7.0 Maximum Credits from lowest Level:

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8.0 Lowest NTA Level of Entry:

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9.0 Course Modules

9.1 Description of Module 1
9.1.1 **Code:**

.................................................................

9.1.2 **Name:**

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9.1.3 **Number of Credits:**

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9.1.4 **Sub-Enabling Outcomes:**

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9.1.5 **Prerequisite Module:**

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(Please indicate Module Code and Name)

9.1.6 **Learning Context:**

(Please indicate whether the module will be taught through lectures, seminars, guided independent work, laboratory work, etc. or combination thereof)

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9.1.7 **Learning Materials:**

(Please specify major learning materials to be used, including textbooks, manuals, journals, handouts, ICT learning aids, and other references)

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9.1.8 Integrated Method of Assessment:
(Please indicate the assessment instruments to be used in the course module, i.e. whether through Examinations, Tests, Reports, etc. or combinations thereof)

9.2 Description of Module 2

9.2.1 Code:

9.2.2 Name:

9.2.3 Number of Credits:

9.2.4 Sub-Enabling Outcomes:
9.2.5 Prerequisite Module:
(Please indicate Module Code and Name)

9.2.6 Learning Context:
(Please indicate whether the module will be taught through lectures, seminars, guided independent work, laboratory work, etc. or combination thereof)

9.2.7 Learning Materials:
(Please specify major learning materials to be used, including textbooks, manuals, journals, handouts, ICT learning aids, and other references)

9.2.8 Integrated Method of Assessment:
(Please indicate the assessment instruments to be used in the course module, i.e. whether through Examinations, Tests, Reports, etc. or combinations thereof)

9.3 Description of Module 3
9.3.1 Code:

………………………………………………

9.3.2 Name:

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9.3.3 Number of Credits:

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9.3.4 Extended Enabling Learning Outcomes:

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9.3.5 Prerequisite Module:

…………………………………………………………………………………
(Please indicate Module Code and Name)

9.3.6 Learning Context:
(Please indicate whether the module will be taught through lectures, seminars, guided independent work, laboratory work, etc. or combination thereof)

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9.3.7 Learning Materials:
(Please specify major learning materials to be used, including textbooks, manuals, journals, handouts, ICT learning aids, and other references)

…………………………………………………………………………………
……
9.3.8 Integrated Method of Assessment:
(Please indicate the assessment instruments to be used in the course module, i.e. whether through Examinations, Tests, Reports, etc. or combinations thereof)

9.4 Description of Module 4
(Include Items as indicated in 9.1 to 9.3 above)

9.5 Description of Module 5
(Include Items as indicated in 9.1 to 9.3 above)

9.6 Description of Module 6
(Include Items as indicated in 9.1 to 9.3 above)

9.7 Description of Module 7
(Include Items as indicated in 9.1 to 9.3 above)

9.8 Description of Module 8
(Include Items as indicated in 9.1 to 9.3 above)

..... Description of Module “n”
(Include Items as indicated in 9.1 to 9.3 above)
APPENDIX VII: FORMAT FOR PRESENTATION OF ASSESSMENT CRITERIA AND THEIR BENCHMARKING

1.0 Qualification:

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2.0 Purpose of Qualification:

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3.0 NTA Level:

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4.0 Level Descriptors:

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5.0 Level of Entry:

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6.0 Assessment Criteria and Instruments

<table>
<thead>
<tr>
<th>SUB-ENABLING OUTCOME</th>
<th>RELATED TASKS</th>
<th>ASSESSMENT CRITERIA</th>
<th>ASSESSMENT INSTRUMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>
### Note

*Please refer Chapter 2, Section 2.5 (Table 2.4) for an example towards formulating Tasks and Assessment Criteria from Sub-Enabling Outcomes*

### 7.0 Benchmarking of Assessment Criteria

<table>
<thead>
<tr>
<th>Assessment Criteria</th>
<th>Benchmarking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Satisfactory</td>
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<tr>
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</tbody>
</table>
**NOTE:** PLEASE REFER CHAPTER 2, SECTION 2.5 (TABLE 2.5) FOR AN EXAMPLE TOWARDS BENCHMARKING OF ASSESSMENT CRITERIA
**APPENDIX VIII:** FORMAT FOR PREPARATION OF CURRICULUM INFORMATION REPORT

1.0 Qualification:

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2.0 Purpose of Qualification:

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3.0 NTA Level:

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4.0 Level Descriptors:

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5.0 Minimum Overall Credits:

.................................................................

6.0 Minimum Credits at this Level:

.................................................................

7.0 Maximum Credits from lowest Level:

.................................................................

8.0 Lowest NTA Level of Entry:

.................................................................
9.0 **DATE OF LAST REVIEW:**


10.0 **NACTE Standards and Related Enabling Outcomes**
*(Extract information as it is from Item 6.0 of Appendix I of the present document)*

<table>
<thead>
<tr>
<th>PRINCIPAL OUTCOMES (NACTE Standards)</th>
<th>ENABLING OUTCOMES (As Identified and Formulated by Curriculum Developers)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

11.0 **Sub-Enabling Outcomes**
*(Extract information as it is from Item 6.0 of Appendix III of the present document)*

<table>
<thead>
<tr>
<th>ENABLING OUTCOMES</th>
<th>SUB-ENABLING OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

12.0 **Assessment Criteria and their Benchmarking**
*(Extract information as it is from Items No. 6 and 7 in Appendix VII)*

12.1 **Assessment Criteria and Instruments**

<table>
<thead>
<tr>
<th>SUB-ENABLING OUTCOME</th>
<th>RELATED TASKS</th>
<th>ASSESSMENT CRITERIA</th>
<th>ASSESSMENT INSTRUMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
12.2 Benchmarking of Assessment Criteria

<table>
<thead>
<tr>
<th>ASSESSMENT CRITERIA</th>
<th>BENCHMARKING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SATISFACTORY</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
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<tr>
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<td></td>
</tr>
</tbody>
</table>

12.0 Description of Course Modules
(Extract information as it is from Item 9.0 of Appendix VI of the present document)

13.0 Eligibility for Higher Award:
(Indicate higher qualification that the learner is eligible upon successful completion of the current Programme)
### APPENDIX IX: GUIDELINES FOR ASSESSING NATIONAL AND INTERNATIONAL RELATIONS

#### 1.0 LINKS WITH OTHER SIMILAR TRAINING INSTITUTIONS

<table>
<thead>
<tr>
<th>NAME OF COLLABORATING TRAINING INSTITUTION</th>
<th>OBJECTIVE OF THE LINK (Please Tick)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Staff Exchange</td>
</tr>
<tr>
<td></td>
<td>Student Exchange</td>
</tr>
<tr>
<td></td>
<td>Joint use of Facilities</td>
</tr>
<tr>
<td></td>
<td>Other (Specify)</td>
</tr>
</tbody>
</table>

#### 1.0 ACADEMIC RELATED LINKS WITH RELEVANT PRODUCTION OR SERVICE INSTITUTIONS

<table>
<thead>
<tr>
<th>NAME OF PRODUCTION/SERVICE INSTITUTION</th>
<th>OBJECTIVE OF THE LINK (Please Tick)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Offers Staff for Part Time Teaching</td>
</tr>
<tr>
<td></td>
<td>Offers Field Training to Students</td>
</tr>
<tr>
<td></td>
<td>Offers Consultancy Opportunity</td>
</tr>
<tr>
<td></td>
<td>Sponsors Students</td>
</tr>
<tr>
<td></td>
<td>Provides Curriculum Advise</td>
</tr>
<tr>
<td></td>
<td>Other (Specify)</td>
</tr>
</tbody>
</table>
1.0 PARTICULARS OF TRAINING PROGRAMME

Indicate name of programme, minimum duration for realizing the learning outcomes from programme, minimum entry qualifications

2.0 EQUIVALENT EMPLOYMENT GROWTH RATE

2.1 Identify major employers of graduates from the Technical Institution, sector-wise.

2.2 From each employer, obtain respective current requirements of graduates with qualification related to the proposed curriculum, $R_{ci}$.

2.3 Compile GDP growth rates for specific sectors covering the employers identified in 2.1 above, $GDP_i$. These can be obtained from relevant authorities (e.g. Presidents Office-Planning and Privatization).

2.4 Estimate sector-specific Employment Growth Rate by adding 2.0 percent to GDP Growth rates, $R_{i}$, from 2.3 above as follows:

$$ER_i = GDP_i + 2$$  \hspace{1cm} (A36.1)

The recommended addition of 2.0% to the GDP is based on recommendations in the Report of a project funded by the African Development Bank for the Government of the United Republic of Tanzania titled: “Employment and Technical Education Studies, Tanzania, Ed. CIL, 1998”. This is intended to consider replacement requirement as a result of annual job openings due to normal retirements, voluntary retirements, terminations, dismissals and deaths.

2.5 Project additional annual requirement of graduates with qualification related to the proposed curriculum, $AR_{ci}$. This is a product of corresponding current requirements, $R_{ci}$, and employment growth rates, $ER_{i}$.
Procedures for Curriculum Development and Review

\[ AR_{ci} = ER_{ci} \times R_{ci} \]  \hspace{1cm} (A36.2)

2.6 Find the total of current requirements of graduates with qualification related to the proposed curriculum, \( \sum R_{ci} \) and the corresponding total of additional annual requirement of graduates to meet the growth of the economy \( \sum AR_{ci} \).

2.7 Estimate Equivalent Employment Growth Rate \( (EER) \). This is a ratio of \( AR_{ci} \) over \( R_{ci} \), both obtainable from 2.6, above.

\[ EER = \frac{\sum AR_{ci}}{\sum R_{ci}} \]  \hspace{1cm} (A36.3)

3.0 PROJECTION OF ENROLMENT

3.1 Capacity of Training Institution

Capacity of a technical institution to run a particular training programme is assessed in terms of:

- Available staff to meet acceptable students to staff ratio as described in the NACTE document on “Situational Analysis for Curriculum Development/Review”, (Appendix X therein) [2].

- Available teaching and learning space as described in the NACTE document on “Situational Analysis for Curriculum Development/Review”, (Appendix XI therein) [2].

- Available teaching and learning facilities/equipment as described in the NACTE document on “Situational Analysis for Curriculum Development/Review”, (Appendix XII therein) [2].

- Sustainability of consumables and materials as described in in the NACTE document on “Situational Analysis for Curriculum Development/Review”, (Appendix XIII therein) [2].

- Existing national and international relations (refer the present document in Appendix IX).

3.2 Average Number of Graduates From an Existing Training Programme

For an existing programme, provide number of graduates for the immediate past five years and obtain the five-year average \( (\bar{G}_i) \), as follows:

\[ \bar{G}_i = \frac{G_{i-1} + G_{i-2} + G_{i-3} + G_{i-4} + G_{i-5}}{5} \]  \hspace{1cm} (A36.4)
In addition, it is necessary to obtain the following complementary data:

- Average students’ throughput, $\alpha$, i.e. proportion of students who graduate within the minimum specified duration from the whole batch of corresponding students who enrolled for the programme ($\alpha = \frac{\text{Graduates}}{\text{Entrants}}$)

$$\alpha_i = \frac{\alpha_{r-1} + \alpha_{r-2} + \alpha_{r-3} + \alpha_{r-4} + \alpha_{r-5}}{5}$$  \hspace{1cm} (A36.5)

- Average wastage rate, $\beta$

$$\bar{\beta}_i = \frac{\beta_{r-1} + \beta_{r-2} + \beta_{r-3} + \beta_{r-4} + \beta_{r-5}}{5}$$  \hspace{1cm} (A36.6)

This parameter takes care of the proportion of graduates who may not enter the profession after graduation or may not be formally employed (e.g. be self employed).

If the institution has the capacity as evaluated in 3.1 above, then the average number of graduates as obtained with Equation (A36.4) may be considered in the further assessment. Otherwise, the capacity of the training institution should determine the viable number of graduates from a training programme.

### 3.3 Average Number of Graduates From a New Training Programme

For projection of graduates from a new training programme, decide on the average proportion of graduates that the institution can initially output ($G_i$) from the existing employment opportunities, i.e. total of current requirements of graduates with qualification related to the proposed curriculum, ($\sum R_{ci}$).

In doing so, the Institution or NACTE on its behalf should be guided by deficits of employees with qualifications related to the proposed curriculum, available resources for offering the training programme, and ability to compete with other similar institutions (in possession of a clear competitive advantage).

#### (a) Deficit of employees with qualifications related to the proposed curriculum

Deficit of employees with qualifications related to the proposed curriculum ($D_c$) in the current year is obtained as follows:

$$D_c = N \sum_i D_{ci}$$  \hspace{1cm} (A36.7)

Where,

$$D_{ci} = R_{ci} - A_{ci}$$  \hspace{1cm} (A36.8)
Procedures for Curriculum Development and Review

$D_c$ - Current Deficit

$R_{ci}$ - Current requirement of employee with qualifications related to the proposed curriculum

$A_{ci}$ - Current number of employee available with qualifications related to the proposed curriculum

$N$ - Factor to take into account a likely possibility that some employers or potential employers may not be included in the Employer Survey/Tracer Study. If sampling was about 100% assume $N=1.0$ otherwise, take $N=1.0$….2.0, depending on the scope of Employer Survey/Tracer Study that was used to obtain $R_{ci}$ and hence $D_{ci}$.

Deficit of employees with qualifications related to the proposed curriculum ($D_n$) in the subsequent years is obtained by taking into account economic growth as follows:

$$D_1 = D_c (1 + EER)$$

(A36.9)

$$D_2 = D_1 (1 + EER)$$

(A36.10)

$$D_n = D_{n-1} (1 + EER)$$

(A36.11)

Where,

$D_1$ - Deficit in the first subsequent year

$D_2$ - Deficit in the second subsequent year

$D_{n}$ - Deficit in the $n$-th subsequent year

$D_{n-1}$ - Deficit in the $(n-1)$th subsequent year

$EER$ - Equivalent Employment Growth Rate
4.0 RECOMMENDED LEVELS OF STUDENTS ENROLMENT

4.1 Multiply the proportion of graduates ($G$) as described either in 3.2 or 3.3 above by the Equivalent Employment Growth Rate (EER) obtained in 2.7, to obtain number of graduates for the current year, ($G_0 = \bar{G}$). For any subsequent year, i.e. Year-$i$, where $i = 1,2,3,4,5$, use the following expression:

$$G_i = G_{i-1}(1 + \text{EER})$$  \hspace{1cm} (A36.12)

4.2 Using corresponding average students’ throughput ($\bar{\alpha}$) and average proportion of graduates who may not enter the profession or formal employment ($\bar{\beta}$) as presented in 3.2 above for existing training programmes, deduce respective levels of enrolment ($S_{i-j}$) from the projected outputs in 4.1 above as follows:

$$S_{i-j} = \frac{G_i}{\bar{\alpha}}(1 + \bar{\beta})$$  \hspace{1cm} (A36.13)

In Equation (A36.13) above, “$j$” is the minimum duration of the training programme. In case the values of $\bar{\alpha}$ and $\bar{\beta}$ are not known or for a new training programme, use the normally acceptable levels of $\bar{\alpha} = 0.9$ and $\bar{\beta} = 0.2$

4.3 The results from 4.2 above should be rounded either forwards or backwards to get a reasonable rounded figure as the institution may deem fit for the purpose.

5.0 REPORTING

Prepare a report on student enrolment for the first year of implementing the new/renewed curriculum and projection for the subsequent four years. Use the Format indicated in Appendices XI and XIII. Typical examples of projecting students enrolment using the present procedure is given in Appendices XII and XIV.
APPENDIX XI: FORMAT FOR PROJECTION OF STUDENTS ENROLMENT INTO AN EXISTING PROGRAMME

1.0 PARTICULARS OF TRAINING PROGRAMME

1.1 Name of Training Programme:

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1.2 Minimum Entry Qualifications: .................................................................

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1.3 Minimum Programme Duration: ...................... (Provide number of Semesters)

2.0 EQUIVALENT EMPLOYMENT GROWTH RATE

<table>
<thead>
<tr>
<th>S/NO</th>
<th>NAME OF ORGANIZATION</th>
<th>CURRENT REQUIREMENT OF GRADUATES $(R_{ci})$ [Number]</th>
<th>SECTOR COVERING THE ORGANIZATION</th>
<th>SECTOR SPECIFIC GDP $\text{GDP}_{(i)}$ [%]</th>
<th>ANNUAL EMPLOYMENT GROWTH RATE $\text{ER}_{(i)}$ [%]</th>
<th>PROJECTED ADDITIONAL ANNUAL REQUIREMENT $\text{AR}_{(i)}$ [Number]</th>
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</table>
### Procedures for Curriculum Development and Review

\[
EER = \frac{\sum AR_{ci}}{\sum R_{ci}} \times 100% = \]

3.0 **PROJECTION OF ENROLMENT**

3.1 **Current Capacity of the Training Institution**

<table>
<thead>
<tr>
<th>S/NO</th>
<th>INDICATOR</th>
<th>CURRENT STATUS</th>
<th>RECOMMENDED CRITERIA</th>
<th>STUDENTS THAT CAN BE ENROLLED</th>
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<td>Number of Staff</td>
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<td>Students to Staff Ratio</td>
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</tr>
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<td></td>
<td>Qualified Teaching Staff</td>
<td>...........</td>
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</tr>
<tr>
<td></td>
<td>Qualified Supporting Staff</td>
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<td>...........</td>
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</tr>
<tr>
<td>2</td>
<td>Teaching &amp; Learning Space, ([m^2])</td>
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<td>Students per ([m^2]) of space</td>
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<tr>
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<td>Classrooms</td>
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<td>Workshops</td>
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<td></td>
<td>Library</td>
<td>...........</td>
<td>...........</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Teaching &amp; Learning Facilities</td>
<td></td>
<td>For all relevant courses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Teaching Aids</td>
<td>...........</td>
<td>Students/Equipment: ...........</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Laboratory Equipment</td>
<td>...........</td>
<td>Students/Equipment: ...........</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Workshop Equipment</td>
<td>...........</td>
<td>For all relevant courses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Library Collections</td>
<td>...........</td>
<td>Students/Computer: ...........</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ICT Facilities</td>
<td>...........</td>
<td>Students/Textbook: ...........</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Textbooks</td>
<td></td>
<td>For all relevant courses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Textbook 1: ...........</td>
<td>...........</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Textbook 2: ...........</td>
<td>...........</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Textbook “q”: ...........</td>
<td>...........</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Procedures for Curriculum Development and Review

#### 4. Sustainability of teaching/learning consumables and materials, as per the mean budget allocations in the past 3 years, [TShs.]

<table>
<thead>
<tr>
<th></th>
<th>TS. per students:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainability of</td>
<td></td>
</tr>
<tr>
<td>teaching/learning</td>
<td></td>
</tr>
<tr>
<td>consumables and</td>
<td></td>
</tr>
<tr>
<td>materials, as per</td>
<td></td>
</tr>
<tr>
<td>the mean budget</td>
<td></td>
</tr>
<tr>
<td>allocations in the</td>
<td></td>
</tr>
<tr>
<td>past 3 years</td>
<td></td>
</tr>
<tr>
<td>[TShs.]</td>
<td></td>
</tr>
</tbody>
</table>

#### 5. Number of National Relations

<table>
<thead>
<tr>
<th></th>
<th>Ensure students’ field training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of National</td>
<td>Promote employers’ awareness</td>
</tr>
<tr>
<td>Relations</td>
<td>Facilitate staff training</td>
</tr>
<tr>
<td></td>
<td>Obtain feedback of outputs</td>
</tr>
</tbody>
</table>

#### 6. Number of International Relations

<table>
<thead>
<tr>
<th></th>
<th>Facilitate staff training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of International Relations</td>
<td>Facilitate students exchange</td>
</tr>
<tr>
<td></td>
<td>Facilitate staff exchange</td>
</tr>
<tr>
<td></td>
<td>Obtain feedback of outputs</td>
</tr>
</tbody>
</table>

### Conclusions:

- Ensure students' field training
- Promote employers' awareness
- Facilitate staff training
- Obtain feedback of outputs

### 3.2 Average Data on Graduates From an Existing Training Programme

<table>
<thead>
<tr>
<th>REFERENCE ITEM</th>
<th>NUMBER OF GRADUATES ($G_i$)</th>
<th>$\alpha = \frac{GRADUATES}{ENTRANTS}$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Previous Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second Previous Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Third Previous Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fourth Previous Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fifth Previous Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>AVERAGE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Graduates, if capacity of</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

21
the Institution can meet Average
Number of Graduates, if capacity of the Institution cannot meet Average

### 3.3 Recommended Number of Students to be Enrolled into a Training Programme

<table>
<thead>
<tr>
<th>YEAR OF ENROLMENT OF FRESH STUDENTS</th>
<th>( G_t = G_{t-1}(1 + EER) )</th>
<th>( S_{i-j} = \frac{G}{\alpha}(1 + \beta) )</th>
<th>RECOMMENDED NUMBER OF FRESH STUDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX XII: EXAMPLE OF PROJECTING STUDENTS ENROLMENT INTO AN EXISTING PROGRAMME

1.0 PARTICULARS OF TRAINING PROGRAMME

1.1 Name of Training Programme: Diploma in Geomatics

1.2 Minimum Entry Qualifications: Secondary School Certificate with at least two credit passes from Mathematics, Geography, Physics, Chemistry and Biology, both from same sitting

1.3 Minimum Programme Duration: 4 Semesters of 15 weeks each

2.0 EMPLOYMENT GROWTH RATE

<table>
<thead>
<tr>
<th>S/NO</th>
<th>NAME OF ORGANIZATION</th>
<th>CURRENT REQUIREMENT OF GRADUATES ( (R_{ci}) ) [Number]</th>
<th>SECTOR COVERING THE ORGANIZATION</th>
<th>SECTOR SPECIFIC GDP ( (GDP_i) ) [%]</th>
<th>ANNUAL EMPLOYMENT GROWTH RATE ( (ER_i) ) [%]</th>
<th>PROJECTED ADDITIONAL ANNUAL REQUIREMENT ( (AR_{ci}) ) [Number]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Employer 1</td>
<td>630</td>
<td>Mining</td>
<td>11*</td>
<td>13</td>
<td>82</td>
</tr>
<tr>
<td>2</td>
<td>Employer 2</td>
<td>745</td>
<td>Construction</td>
<td>8.5*</td>
<td>10.5</td>
<td>78</td>
</tr>
<tr>
<td>3</td>
<td>Employer 3</td>
<td>270</td>
<td>Energy</td>
<td>6.0*</td>
<td>8.0</td>
<td>22</td>
</tr>
<tr>
<td>4</td>
<td>Employer 4</td>
<td>725</td>
<td>Roads</td>
<td>6.5*</td>
<td>8.5</td>
<td>62</td>
</tr>
<tr>
<td>5</td>
<td>Employer 5</td>
<td>410</td>
<td>Construction</td>
<td>8.5*</td>
<td>10.5</td>
<td>43</td>
</tr>
<tr>
<td>6</td>
<td>Employer 6</td>
<td>980</td>
<td>Agriculture</td>
<td>6.9*</td>
<td>8.9</td>
<td>87</td>
</tr>
<tr>
<td>7</td>
<td>Employer 7</td>
<td>400</td>
<td>Construction</td>
<td>8.5*</td>
<td>10.5</td>
<td>42</td>
</tr>
<tr>
<td>8</td>
<td>Employer 8</td>
<td>440</td>
<td>Mining</td>
<td>11*</td>
<td>13</td>
<td>57</td>
</tr>
<tr>
<td>9</td>
<td>Employer 9</td>
<td>750</td>
<td>Agriculture</td>
<td>6.9*</td>
<td>8.9</td>
<td>67</td>
</tr>
<tr>
<td>10</td>
<td>Employer 10</td>
<td>375</td>
<td>Water</td>
<td>5.8*</td>
<td>7.8</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong> ( \sum R_{ci} )</td>
<td><strong>5,725</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>TOTAL</strong> ( \sum AR_{ci} ) <strong>569</strong></td>
</tr>
</tbody>
</table>

*For example only
\[ EER = \frac{\sum AR_{ci}}{\sum R_{ci}} \times 100\% = \frac{569}{5275} \times 100\% = 9.9\% \]

### 3.0 PROJECTION OF ENROLMENT

#### 3.1 Current Capacity of Training Institution

<table>
<thead>
<tr>
<th>S/NO</th>
<th>INDICATOR</th>
<th>CURRENT STATUS</th>
<th>RECOMMENDED CRITERIA</th>
<th>STUDENTS THAT CAN BE ENROLLED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Number of Staff</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Qualified Teaching Staff</td>
<td>11</td>
<td>12:1</td>
<td>132</td>
</tr>
<tr>
<td></td>
<td>Qualified Supporting Staff</td>
<td>30</td>
<td>4:1</td>
<td>120</td>
</tr>
<tr>
<td>2</td>
<td>Teaching &amp; Learning Space, [m²]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Classrooms</td>
<td>180</td>
<td>1:1</td>
<td>180</td>
</tr>
<tr>
<td></td>
<td>Laboratories</td>
<td>150</td>
<td>1:1</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>Workshops</td>
<td>250</td>
<td>1:2</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td>Library</td>
<td>250</td>
<td>1:1</td>
<td>250</td>
</tr>
<tr>
<td>3</td>
<td>Teaching &amp; Learning Facilities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Teaching Aids [% courses]</td>
<td>75%</td>
<td>For all relevant courses</td>
<td>180</td>
</tr>
<tr>
<td></td>
<td>Laboratory Equipment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Major Equipment 1</td>
<td>120</td>
<td>1:1</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>Major Equipment 2</td>
<td>100</td>
<td>1:1</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Major Equipment 3</td>
<td>88</td>
<td>1:1</td>
<td>88</td>
</tr>
<tr>
<td></td>
<td>Major Equipment 4</td>
<td>110</td>
<td>1:2</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td>Major Equipment 5</td>
<td>150</td>
<td>1:1</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>Workshop Equipment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Major Equipment 1</td>
<td>NA</td>
<td>Not Applicable (NA)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Major Equipment 2</td>
<td>NA</td>
<td>Not Applicable (NA)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Major Equipment 3</td>
<td>NA</td>
<td>Not Applicable (NA)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Library Collections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Volumes</td>
<td>575</td>
<td>For all relevant courses</td>
<td>180</td>
</tr>
<tr>
<td></td>
<td>Periodicals</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reference Books</td>
<td>42</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ICT Facilities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Computer</td>
<td>40</td>
<td>Students per Computer: 2:1</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>Printer</td>
<td>1</td>
<td>Students per Printer: 50:1</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>Plotter</td>
<td>1</td>
<td>Students per Plotter: 100:1</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Scanner</td>
<td>1</td>
<td>Students per Scanner: 25:1</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Textbooks</td>
<td></td>
<td>Students per Textbook: 1:1</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Textbook 1</td>
<td>200</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Textbook 2</td>
<td>124</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Textbook q</td>
<td>160</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Conclusions: From the above, it is evident that the Institution can accommodate 100 to 120 students. The observed shortfalls in some ICT facilities and one major equipment are tolerable and can be offset by multiple sessions and/or a modest additional investment.

3.2 Average Data on Graduates From an Existing Training Programme

<table>
<thead>
<tr>
<th></th>
<th>NUMBER OF GRADUATES ($G_i$)</th>
<th>$\alpha = \frac{GRADUATES}{ENTRANTS}$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous Year 1</td>
<td>105</td>
<td>0.95</td>
<td>0.25</td>
</tr>
<tr>
<td>Previous Year 2</td>
<td>100</td>
<td>0.91</td>
<td>0.20</td>
</tr>
<tr>
<td>Previous Year 3</td>
<td>103</td>
<td>0.92</td>
<td>0.15</td>
</tr>
<tr>
<td>Previous Year 4</td>
<td>95</td>
<td>0.88</td>
<td>0.18</td>
</tr>
<tr>
<td>Previous Year 5</td>
<td>97</td>
<td>0.89</td>
<td>0.17</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>100</strong></td>
<td><strong>0.91</strong></td>
<td><strong>0.19</strong></td>
</tr>
</tbody>
</table>

Number of Graduates, if capacity of the Institution can meet Average: 100

Number of Graduates, if capacity of the Institution cannot meet Average: Not Applicable
3.3 Recommended Number of Students to be Enrolled into a Training Programme

<table>
<thead>
<tr>
<th>YEAR OF ENROLMENT OF FRESH STUDENTS</th>
<th>( G_i = G_{i-1}(1 + \text{EER}) )</th>
<th>( S_{i-j} = \frac{G_i}{\alpha}(1 + \bar{\beta}) )</th>
<th>RECOMMENDED NUMBER OF FRESH STUDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>110</td>
<td>144</td>
<td>150</td>
</tr>
<tr>
<td>Year 2</td>
<td>121</td>
<td>158</td>
<td>150</td>
</tr>
<tr>
<td>Year 3</td>
<td>133</td>
<td>174</td>
<td>175</td>
</tr>
<tr>
<td>Year 4</td>
<td>146</td>
<td>191</td>
<td>175</td>
</tr>
<tr>
<td>Year 5</td>
<td>160</td>
<td>209</td>
<td>200</td>
</tr>
</tbody>
</table>

**APPENDIX XIII:** FORMAT FOR PROJECTION OF STUDENTS ENROLMENT INTO A NEW PROGRAMME

1.0 PARTICULARS OF TRAINING PROGRAMME

1.2 Name of Training Programme: ...........................................

...........................................

...........................................

......

1.2 Minimum Entry Qualifications: ...........................................

...........................................

...........................................

1.3 Minimum Programme Duration: ......................... (Provide number of Semesters)
## 2.0 EQUIVALENT EMPLOYMENT GROWTH RATE

<table>
<thead>
<tr>
<th>S/NO</th>
<th>NAME OF ORGANIZATION</th>
<th>CURRENT REQUIREMENT OF GRADUATES ($R_{ci}$) [Number]</th>
<th>SECTOR COVERING THE ORGANIZATION</th>
<th>SECTOR SPECIFIC GDP ($GDP_{i}$) [%]</th>
<th>ANNUAL EMPLOYMENT GROWTH RATE ($ER_{i}$) [%]</th>
<th>PROJECTED ADDITIONAL ANNUAL REQUIREMENT ($AR_{ci}$) [Number]</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[
EER = \frac{\sum_i AR_{ci}}{\sum_i R_{ci}} \times 100% =
\]

## 3.0 PROJECTION OF ENROLMENT

### 3.1 Required Capacity of the Training Institution

<table>
<thead>
<tr>
<th>S/NO</th>
<th>INDICATOR</th>
<th>RECOMMENDED CRITERIA</th>
<th>NUMBER OF STUDENTS</th>
<th>REQUIRED CAPACITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Number of Staff</td>
<td>Students to Staff Ratio</td>
<td>No. of Staff</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Qualified Teaching Staff</td>
<td>……………</td>
<td>……………</td>
<td>……………</td>
</tr>
<tr>
<td></td>
<td>Qualified Supporting Staff</td>
<td>……………</td>
<td>……………</td>
<td>……………</td>
</tr>
<tr>
<td>2</td>
<td>Teaching &amp; Learning Space</td>
<td>Students per $m^2$ of space</td>
<td>Space, [$m^2$]</td>
<td>……………</td>
</tr>
</tbody>
</table>
### Procedures for Curriculum Development and Review

<table>
<thead>
<tr>
<th>Teaching &amp; Learning Facilities</th>
<th>No. of Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching Aids</td>
<td>Aid 1: ...</td>
</tr>
<tr>
<td></td>
<td>Aid 2: ...</td>
</tr>
<tr>
<td></td>
<td>Aid n: ...</td>
</tr>
<tr>
<td>Laboratory Equipment</td>
<td>Equip 1: ...</td>
</tr>
<tr>
<td></td>
<td>Equip 2: ...</td>
</tr>
<tr>
<td></td>
<td>Equip m: ...</td>
</tr>
<tr>
<td>Workshop Equipment</td>
<td>Equip 1: ...</td>
</tr>
<tr>
<td></td>
<td>Equip 2: ...</td>
</tr>
<tr>
<td></td>
<td>Equip k: ...</td>
</tr>
<tr>
<td>Library Collections</td>
<td>Ref 1: ...</td>
</tr>
<tr>
<td></td>
<td>Ref 2: ...</td>
</tr>
<tr>
<td></td>
<td>Ref p: ...</td>
</tr>
<tr>
<td>ICT Facilities</td>
<td>Facility 1: ...</td>
</tr>
<tr>
<td></td>
<td>Facility 2: ...</td>
</tr>
<tr>
<td></td>
<td>Facility r: ...</td>
</tr>
<tr>
<td>Textbooks</td>
<td>Textbook 1: ...</td>
</tr>
<tr>
<td></td>
<td>Textbook 2: ...</td>
</tr>
<tr>
<td></td>
<td>Textbook q: ...</td>
</tr>
</tbody>
</table>

### Sustainability of teaching/learning consumables and materials, as per the mean budget allocations in the past 3 years

<table>
<thead>
<tr>
<th>TShs. per students: ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>TShs. per Year</td>
</tr>
</tbody>
</table>

### CONCLUSIONS:

………………………………………………………………………………………………………………

………………………………………………………………………………………………………………

………………………………………………………………………………………………………………

………………………………………………………………………………………………………………

………………………………………………………………………………………………………………

3.2 Average Number of Graduates From a New Training Programme
(a) Deficit of Employees with Qualifications Related to the Proposed Curriculum

<table>
<thead>
<tr>
<th>S/NO</th>
<th>NAME OF ORGANIZATION</th>
<th>CURRENT REQUIREMENT OF GRADUATES RELATED TO CURRICULUM [Number]</th>
<th>EMPLOYEE WITH QUALIFICATIONS RELATED TO THE PROPOSED CURRICULUM [Number]</th>
<th>DEFICIT [Number]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CURRENT DEFICIT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DEFICIT IN FIRST SUBSEQUENT YEAR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DEFICIT IN SECOND SUBSEQUENT YEAR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DEFICIT IN THIRD SUBSEQUENT YEAR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DEFICIT IN FOURTH SUBSEQUENT YEAR</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(b) Decision on number of graduates from a new Training Programme
(Fill number where applicable)

<table>
<thead>
<tr>
<th>NO. OF GRADUATES FROM ANALYSIS</th>
<th>NUMBER OF FIRST BATCH GRADUATES (( G ))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CAPACITY OF THE INSTITUTION CAN MEET 100% DEFICITS</td>
</tr>
<tr>
<td>Capacity:</td>
<td></td>
</tr>
<tr>
<td>Deficit:</td>
<td></td>
</tr>
</tbody>
</table>

* If no deficits recorded or data not available, assume 50% of capacity
3.3 **Recommended Number of Students to be Enrolled into a New Training Programme**

<table>
<thead>
<tr>
<th>YEAR OF ENROLMENT OF FRESH STUDENTS</th>
<th>( G_i = G_{i-1}(1 + EER) )</th>
<th>( S_{i-j} = \frac{G_i}{\alpha} \left( 1 + \beta \right) )</th>
<th>RECOMMENDED NUMBER OF FRESH STUDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**APPENDIX XIV:** **EXAMPLE OF PROJECTING STUDENTS ENROLMENT INTO A NEW PROGRAMME**

1.0 **PARTICULARS OF TRAINING PROGRAMME**

1.1 Name of Training Programme: *Diploma in Geomatics*

1.2 Minimum Entry Qualifications: *Secondary School Certificate with at least two credit passes from Mathematics, Geography, physics, chemistry and biology, both from same sitting*

1.3 Minimum Programme Duration: *4 Semesters of 15 weeks each*

2.0 **EMPLOYMENT GROWTH RATE**

<table>
<thead>
<tr>
<th>S/NO</th>
<th>NAME OF ORGANIZATION</th>
<th>CURRENT REQUIREMENT OF GRADUATES ((R_{ci})) [Number]</th>
<th>SECTOR COVERING THE ORGANIZATION</th>
<th>SECTOR SPECIFIC GDP ((GDP_i)) [%]</th>
<th>ANNUAL EMPLOYMENT GROWTH RATE ((ER_i)) [%]</th>
<th>PROJECTED ADDITIONAL ANNUAL REQUIREMENT ((AR_{ci})) [Number]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Employer 1</td>
<td>630</td>
<td>Mining</td>
<td>11*</td>
<td>13</td>
<td>82</td>
</tr>
<tr>
<td>2</td>
<td>Employer 2</td>
<td>745</td>
<td>Construction</td>
<td>8.5*</td>
<td>10.5</td>
<td>78</td>
</tr>
<tr>
<td>3</td>
<td>Employer 3</td>
<td>270</td>
<td>Energy</td>
<td>6.0*</td>
<td>8.0</td>
<td>22</td>
</tr>
<tr>
<td>4</td>
<td>Employer 4</td>
<td>725</td>
<td>Roads</td>
<td>6.5*</td>
<td>8.5</td>
<td>62</td>
</tr>
</tbody>
</table>
Procedures for Curriculum Development and Review

<table>
<thead>
<tr>
<th>S/NO</th>
<th>Employer 5</th>
<th>410</th>
<th>Construction</th>
<th>8.5*</th>
<th>10.5</th>
<th>43</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Employer 6</td>
<td>980</td>
<td>Agriculture</td>
<td>6.9*</td>
<td>8.9</td>
<td>87</td>
</tr>
<tr>
<td>7</td>
<td>Employer 7</td>
<td>400</td>
<td>Construction</td>
<td>8.5*</td>
<td>10.5</td>
<td>42</td>
</tr>
<tr>
<td>8</td>
<td>Employer 8</td>
<td>440</td>
<td>Mining</td>
<td>11*</td>
<td>13</td>
<td>57</td>
</tr>
<tr>
<td>9</td>
<td>Employer 9</td>
<td>750</td>
<td>Agriculture</td>
<td>6.9*</td>
<td>8.9</td>
<td>67</td>
</tr>
<tr>
<td>10</td>
<td>Employer 10</td>
<td>375</td>
<td>Water</td>
<td>5.8*</td>
<td>7.8</td>
<td>29</td>
</tr>
</tbody>
</table>

TOTAL ($\sum R_{ci}$) 5,725

TOTAL ($\sum AR_{ci}$) 569

*For example only

$$EER = \frac{\sum AR_{ci}}{\sum R_{ci}} \times 100\% = \frac{569}{5,725} \times 100\% = 9.9\%$$

3.0 PROJECTION OF ENROLMENT

3.1 Required Capacity of the Training Institution

<table>
<thead>
<tr>
<th>S/NO</th>
<th>INDICATOR</th>
<th>RECOMMENDED CRITERIA</th>
<th>NUMBER OF STUDENTS</th>
<th>REQUIRED CAPACITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Number of Staff</td>
<td>Students to Staff Ratio</td>
<td>75</td>
<td>No. of Staff</td>
</tr>
<tr>
<td></td>
<td>❑ Qualified Teaching Staff</td>
<td>12:1</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>❑ Qualified Supporting Staff</td>
<td>4:1</td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>2</td>
<td>Teaching &amp; Learning Space</td>
<td>Students per $m^2$ of space</td>
<td>75</td>
<td>Space, [$m^2$]</td>
</tr>
<tr>
<td></td>
<td>❑ Classrooms</td>
<td>1:1</td>
<td></td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>❑ Laboratories</td>
<td>1:1</td>
<td></td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>❑ Workshops</td>
<td>1:2</td>
<td></td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>❑ Library</td>
<td>1:1</td>
<td></td>
<td>75</td>
</tr>
</tbody>
</table>
### Procedures for Curriculum Development and Review

#### 3 Teaching & Learning Facilities

<table>
<thead>
<tr>
<th>Facilities</th>
<th>Description</th>
<th>No. of Facilities</th>
<th>Aid 1:</th>
<th>Aid 2:</th>
<th>Aid n:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching Aids</td>
<td>For all relevant courses</td>
<td>75</td>
<td>1</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Laboratory Equipment</td>
<td>Students/Equipment: 1:1</td>
<td></td>
<td>Equip 1: 75</td>
<td>Equip 2: 75</td>
<td>Equip n: 75</td>
</tr>
<tr>
<td>Library Collections</td>
<td>For all relevant courses (At least 5 Students/Collection)</td>
<td></td>
<td>Ref 1: 15</td>
<td>Ref 2: 15</td>
<td>Ref n: 15</td>
</tr>
<tr>
<td>ICT Facilities</td>
<td>Students/Facility 1: 2:1</td>
<td></td>
<td>Facility 1: 38</td>
<td>Facility 2: 38</td>
<td>Facility n: 75</td>
</tr>
<tr>
<td>Textbooks</td>
<td>Students/Textbook: 1:1</td>
<td></td>
<td>Textbook 1: 75</td>
<td>Textbook 2: 75</td>
<td>Textbook q: 75</td>
</tr>
</tbody>
</table>

#### 4 Sustainability of teaching/learning consumables and materials, as per the mean budget allocations in the past 3 years.

| Description                        | TShs. per student: 100,000/= | 75 | TShs. per Year | 7,500,000/= |

### Conclusions:

The required human, physical and infrastructural resources to train 75 students as indicated in the Table are the current ceiling ability of the Technical Institution. *(Otherwise, the above Table is filled in for different scenarios of students’ enrolment until the desired enrolment figure is obtained based on ability/potential ability to meet the corresponding resources implications)*. The result is therefore considered as the take-off capacity of the training institution.

#### 3.2 Average Number of Graduates From a New Training Programme

**(a) Deficit of Employees with Qualifications Related to the Proposed Curriculum**

<table>
<thead>
<tr>
<th>S/NO</th>
<th>NAME OF ORGANIZATION</th>
<th>CURRENT REQUIREMENT OF GRADUATES RELATED TO THE PROPOSED CURRICULUM [Number]</th>
<th>EMPLOYEE WITH QUALIFICATIONS RELATED TO THE PROPOSED CURRICULUM [Number]</th>
<th>DEFICIT [Number]</th>
</tr>
</thead>
</table>

32
### Procedures for Curriculum Development and Review

<table>
<thead>
<tr>
<th>Employer</th>
<th>NUMBER OF GRADUATES</th>
<th>NUMBER OF FIRST BATCH GRADUATES ((\bar{G}))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TOTAL</td>
<td>CURRENT DEFICIT</td>
</tr>
<tr>
<td>1</td>
<td>Employer 1</td>
<td>630</td>
</tr>
<tr>
<td>2</td>
<td>Employer 2</td>
<td>745</td>
</tr>
<tr>
<td>3</td>
<td>Employer 3</td>
<td>270</td>
</tr>
<tr>
<td>4</td>
<td>Employer 4</td>
<td>725</td>
</tr>
<tr>
<td>5</td>
<td>Employer 5</td>
<td>410</td>
</tr>
<tr>
<td>6</td>
<td>Employer 6</td>
<td>980</td>
</tr>
<tr>
<td>7</td>
<td>Employer 7</td>
<td>400</td>
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<tr>
<td>8</td>
<td>Employer 8</td>
<td>440</td>
</tr>
<tr>
<td>9</td>
<td>Employer 9</td>
<td>750</td>
</tr>
<tr>
<td>10</td>
<td>Employer 10</td>
<td>375</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>5,725</td>
</tr>
<tr>
<td></td>
<td>NUMBER OF GRADUATES</td>
<td>NUMBER OF FIRST BATCH GRADUATES ((\bar{G}))</td>
</tr>
<tr>
<td></td>
<td>FROM ANALYSIS</td>
<td>CURRENT DEFICIT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DEFICIT IN FIRST SUBSEQUENT YEAR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DEFICIT IN SECOND SUBSEQUENT YEAR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DEFICIT IN THIRD SUBSEQUENT YEAR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DEFICIT IN FOURTH SUBSEQUENT YEAR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>835</td>
</tr>
<tr>
<td></td>
<td></td>
<td>918</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,009</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,109</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,219</td>
</tr>
</tbody>
</table>

**Current Deficit:** 835

**Deficit in First Subsequent Year:** 918

**Deficit in Second Subsequent Year:** 1,009

**Deficit in Third Subsequent Year:** 1,109

**Deficit in Fourth Subsequent Year:** 1,219

---

**(b) Decision on number of graduates from a new Training Programme**

*(Fill number where applicable)*

<table>
<thead>
<tr>
<th>NUMBER OF GRADUATES FROM ANALYSIS</th>
<th>NUMBER OF FIRST BATCH GRADUATES ((\bar{G}))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity: 75</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Deficit: 1,109</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>
* If no deficits recorded or data not available, assume 50% of capacity

3.3 Recommended Number of Students to be Enrolled into a Training Programme

<table>
<thead>
<tr>
<th>YEAR OF ENROLMENT OF FRESH STUDENTS</th>
<th>( G_i = G_{i-1}(1 + EER) )</th>
<th>( S_{i-j} = \frac{G_j}{\alpha}(1 + \beta) )</th>
<th>RECOMMENDED NUMBER OF FRESH STUDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>82</td>
<td>109</td>
<td></td>
</tr>
<tr>
<td>Year 2</td>
<td>90</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>Year 3</td>
<td>99</td>
<td>132</td>
<td></td>
</tr>
<tr>
<td>Year 4</td>
<td>109</td>
<td>145</td>
<td></td>
</tr>
<tr>
<td>Year 5</td>
<td>120</td>
<td>160</td>
<td></td>
</tr>
</tbody>
</table>

Note: For a new programme it was recommended to assume \( \alpha = 0.9 \) and \( \beta = 0.2 \)

APPENDIX XV: FORMAT FOR ASSESSING FINANCIAL IMPLICATIONS FOR IMPLEMENTING A CURRICULUM

1.0 PARTICULARS OF TRAINING PROGRAMME

1.1 Name of Training Programme: .................................................................
                                .................................................................
                                ......                           

1.2 Minimum Entry Qualifications: .................................................................
                                .................................................................

1.3 Minimum Programme Duration: ................. (Provide number of Years)
### 2.0 RECURRENT EXPENDITURES

<table>
<thead>
<tr>
<th>COST CENTRE</th>
<th>COST ITEM</th>
<th>STUDENTS ENROLMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Scenario 1</td>
</tr>
<tr>
<td><strong>Staff</strong></td>
<td>Staff Salaries and Allowances</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Staff Development</td>
<td></td>
</tr>
<tr>
<td><strong>Space</strong></td>
<td>Repair and Maintenance of Buildings for Teaching Purposes only</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Repair and Maintenance of Buildings for Multiple Purposes (e.g. offices)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Repair and Maintenance of Students’ Hostels</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Depreciation on Buildings</td>
<td></td>
</tr>
<tr>
<td><strong>Equipment</strong></td>
<td>Repair and Maintenance of Equipment for Teaching Purposes only</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Repair and Maintenance of Equipment for Other Use</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Depreciation on Equipment</td>
<td></td>
</tr>
<tr>
<td><strong>Materials /</strong></td>
<td>Material/Consumables for Teaching</td>
<td></td>
</tr>
<tr>
<td><strong>Consumables</strong></td>
<td>Material/Consumables for Other Use</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Students Catering Expenses</em></td>
<td></td>
</tr>
<tr>
<td><strong>Utilities</strong></td>
<td>Electricity Bills</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Water Bills</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Telephone and Fax</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Postage</td>
<td></td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>Printing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transport (Fuel, lubricants, spares)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Travel (per Diem etc.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medical Services</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cleaning Services</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Other (Please Specify):</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other (Please Specify):</td>
<td></td>
</tr>
</tbody>
</table>

*Current Practice discourages Institutions to shoulder these and other similar costs in order to minimize fees chargeable to students, and hence promote private sponsorship.

### 3.0 DEVELOPMENT EXPENDITURES

<table>
<thead>
<tr>
<th>COST CENTRE</th>
<th>COST ITEM</th>
<th>STUDENTS ENROLMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Scenario 1</td>
</tr>
<tr>
<td><strong>Space</strong></td>
<td>Erection/Procurement of Buildings for Teaching Purposes only</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Erection/Procurement of Buildings for Multiple Purposes (e.g. offices)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Erection/Procurement of Students’ Hostels</em></td>
<td></td>
</tr>
<tr>
<td><strong>Equipment</strong></td>
<td>Procurement of Equipment for Teaching Purposes only</td>
<td></td>
</tr>
</tbody>
</table>
### Procedures for Curriculum Development and Review

#### Procurement of Equipment for Other Use

**Other**
- Procurement of Motor Vehicles etc.
- Other *(Please Specify)*:
- Other *(Please Specify)*:
- Other *(Please Specify)*:
- Other *(Please Specify)*:
- Other *(Please Specify)*:

#### 4.0 INCOME

<table>
<thead>
<tr>
<th>INCOME ITEM</th>
<th>STUDENTS ENROLMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Scenario 1</td>
</tr>
<tr>
<td>Owner’s Contribution</td>
<td></td>
</tr>
<tr>
<td>Income from Student Fees</td>
<td></td>
</tr>
<tr>
<td>Income from Consultation and Service Charges <em>(If available)</em></td>
<td></td>
</tr>
<tr>
<td>Income from Continuing Education Courses <em>(If available)</em></td>
<td></td>
</tr>
<tr>
<td>Income from Production Activities <em>(If available)</em></td>
<td></td>
</tr>
<tr>
<td>Other <em>(Please Specify)</em>:</td>
<td></td>
</tr>
<tr>
<td>Other <em>(Please Specify)</em>:</td>
<td></td>
</tr>
<tr>
<td>Other <em>(Please Specify)</em>:</td>
<td></td>
</tr>
<tr>
<td>Other <em>(Please Specify)</em>:</td>
<td></td>
</tr>
<tr>
<td>Other <em>(Please Specify)</em>:</td>
<td></td>
</tr>
</tbody>
</table>

#### 5.0 SUMMARY OF FINANCIAL IMPLICATION DATA

<table>
<thead>
<tr>
<th>DESCRIPTION OF FINANCIAL IMPLICATION</th>
<th>STUDENTS ENROLMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Scenario 1</td>
</tr>
<tr>
<td>Recurrent Expenditure</td>
<td></td>
</tr>
<tr>
<td>Development Expenditure</td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td></td>
</tr>
<tr>
<td><strong>Deficit <em>(Where Applicable)</em></strong></td>
<td></td>
</tr>
<tr>
<td><strong>Surplus <em>(Where Applicable)</em></strong></td>
<td></td>
</tr>
</tbody>
</table>