



**Report on the Quality Assurance of the DHET
April 2016 NATED Report 190/191:
Engineering Studies N2-N3
Examinations and Assessment**



REPORT ON THE
QUALITY ASSURANCE OF THE DHET
APRIL 2016 NATED REPORT 190/191:
ENGINEERING STUDIES N2-N3
EXAMINATIONS AND ASSESSMENT

UMALUSI



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1 INTRODUCTION AND BACKGROUND

The National Education (NATED) Report 190/191: Engineering Studies are offered as trimester programmes at Technical and Vocational Education and Training (TVET) colleges (public and private), correctional service centres and schools. Examinations in these programmes are conducted in April, August and November. The examinations are administered and managed by the Department of Higher Education and Training (DHET). Umalusi is only responsible for the quality assurance of the assessment of N2 and N3, which is the focus of this report.

All the question papers were set nationally. The DHET distributed question papers via courier to nodal points, from where the surrounding colleges/campuses collected them and where they had to return the answer scripts within 90 minutes after the stipulated finishing time of the examination session. The drawing subjects were written during the first week of the examination (a week earlier than in the past) as either morning or afternoon sessions. All the other April 2016 examinations were written in the morning sessions, starting at 9:00.

The Higher Education Portfolio Committee requested Umalusi to monitor the appointment of marking staff. The process was coordinated by the DHET with the marking centre management staff of the national and provincial marking centres involved in the screening process of the applications. Umalusi staff monitored this application evaluation process at the DHET.

The marking models followed were decentralised (provincial) marking for N2 and centralised (national) for most of the N3 subjects. The marking centres were the same as in 2015. The N2 marking guidelines were standardised by panels made up of the chief markers from three provinces (Gauteng, North West and Mpumalanga) and the internal moderator of Gauteng, after which they were distributed electronically to the provincial marking centres.

A total of 213 271 N2 and N3 subject (instructional offering) enrolments were registered for this examination. Table 1 indicates the total number of N2 and N3 subject enrolments for the NATED Report 190/191: Engineering Studies examinations, since the reintroduction of these programmes in August 2011.

Table 1: N2 and N3 subject/instructional offering enrolments per trimester for the period August 2011–April 2016

Examination	Subject enrolments
August 2011	38 720
November 2011	48 449
April 2012	64 011
August 2012	84 410
November 2012	78 265
April 2013	53 306
August 2013	106 803
November 2013	99 078
April 2014	91 320
August 2014	129 711

Examination	Subject enrolments
November 2014	138 137
April 2015	213 584
August 2015	114 694
November 2015	257 565
April 2016	213 271

The information in Table 1 makes it evident that enrolments have increased over most of the examination periods.

Table 2 indicates the N2 and N3 enrolments per year for the NATED Report 190/191: Engineering Studies examinations since the reintroduction of these programmes in August 2011. Table 2 clearly reflects the significant increase in enrolments from one year to the next.

Table 2: Combined N2 and N3 subject/instructional offering enrolments per year

Examination	April	August	November	Total subject enrolments per year
2011	31 644	38 720	48 449	118 813
2012	64 011	84 410	78 265	226 686
2013	53 306	106 803	99 078	259 187
2014	91 320	129 711	138 137	359 168
2015	213 584	114 694	257 565	585 843
2016	213 271			

Since the reintroduction of the programmes in 2011, there has also been a marked increase in number of private examination centres in particular. (In April 2016 examinations were conducted at 350 centres including five schools, 31 correctional services centres, 176 private colleges and 138 public colleges).

As repeatedly reported in the past, the implementation of the NATED Report 190/191: Engineering Studies programmes and examinations presents numerous challenges, of which the prevalent concerns include:

- Outdated syllabi;
- No requirement for exposure to practical component to develop skills;
- Too wide a variety of subjects at different levels offered at some of the colleges with a limited staff component (e.g. a total of 62 different N2 and N3 subjects);
- Lack of capacity for effective tuition;
- Candidates who are registered for examinations through other centres (i.e. not at the site of tuition);
- "Legacy" examination centres at colleges that are not accredited by Umalusi at which examinations are written; and
- High percentage of candidates who do not write the examinations.

2 PURPOSE OF THE REPORT

The purpose of this report is to provide feedback on the processes followed by Umalusi in the quality assurance of the 2016 April NATED Report 190/191: Engineering Studies examinations. The report also reflects on the findings, areas of good practice in the management and administration of these examinations, as well as areas of concern and directives for improvement. The findings are based on information obtained from the Umalusi moderation, monitoring, verification and standardisation processes, as well as from reports received from the DHET.

This report covers the following quality assurance processes implemented by Umalusi:

- Moderation of question papers from a sample of N2 and N3 subjects;
- Monitoring/moderation of internal assessment;
- Monitoring of the appointment process of marking personnel;
- Monitoring of the conduct of the examinations;
- Verification of marking; and
- Standardisation of examination results.

3 MODERATION OF QUESTION PAPERS

3.1 Introduction and Purpose

The NATED Report 190/191: Engineering Studies question papers are internally set and moderated by examiners and moderators appointed by the DHET. Umalusi is responsible for the external moderation of a sample of the N2 and N3 question papers.

As pointed out in the previous reports, there are concerns regarding the standard of the NATED Report 190/191: Engineering Studies syllabi, including:

- Outdated syllabi – some dating back as far as 1978;
- Content that has become obsolete; and
- Underspecified content and lack of learning outcomes, assessment standards or indications of the range that should be covered.

In addition, the following concerns occur in many cases:

- There are no subject assessment guidelines;
- The weighting of topics is not specified;
- The cognitive demand of the assessment is not stipulated;
- In some subjects, the syllabi are merely lists of topics that should be covered and, therefore, the topics and content are vague and open to a multitude of interpretations; and
- In some cases, the content has become highly predictable, owing to the limited content coverage, similarities in format and examination questions. What is a particularly serious concern, is that candidates, who have work through previous examination papers, would be able to pass a subject without actually having mastered its concepts or content.

All these concerns hinder effective analysis, in-depth evaluation and objective judgement of the standard and fairness of the question papers. Despite these obstacles, Umalusi rigorously moderated a sample of the N2 and N3 question papers written during the 2016 April NATED Report 190/191: Engineering Studies examinations. This section of the report covers the findings of this external moderation process.

The purpose of this section is to:

- Provide an indication of the sample size in terms of subjects moderated;
- Provide an overview of the crucial findings related to the standard and quality of the externally moderated question papers;
- Highlight areas of good practice; and
- Provide directives for improvement.

3.2 Scope and Approach

The 23 external moderators, who were involved in the quality assurance of assessment process, are subject matter experts from TVET colleges, universities of technology and provincial education

departments. These external moderators were required to moderate a sample of the N2 and N3 question papers and their accompanying marking guidelines.

The model used in the moderation process was an off-site approach in which the question papers, marking guidelines, assessment frameworks and internal moderators' reports were forwarded electronically to external moderators. The external moderators prepared assessment frameworks, with which to appraise the cognitive demand and weighting of the syllabi topics, and evaluated the question papers in terms of other specified criteria.

The criteria according to which the question papers were moderated covered the following aspects:

- Technical details related to the presentation of the question papers and marking guidelines;
- Internal moderation and its efficacy in assuring quality;
- The adherence to the syllabus;
- The consistency and appropriateness of mark allocation and distribution according to cognitive level and question type;
- The relevance and correctness of the marking guidelines;
- The level of language and absence of bias;
- The degree of predictability of questions; and
- An overall evaluation of the papers in terms of their suitability to the level assessed.

Once the initial external moderation had been completed, question papers were approved, conditionally approved or rejected, depending on the degree of compliance with the criteria. Proposed changes to question papers were communicated to the internal moderator prior to implementation. After consultation, and once consensus had been reached, the question papers, marking guidelines and supporting documents were returned via Umalusi to the DHET. Finally, question papers and marking guidelines were forwarded to the external moderators for final approval and sign-off.

Umalusi moderated a total of 36 question papers – 20 at N3 level and 16 at N2 level. This sample included the fundamental Engineering subjects, Mathematics and Engineering Science. Beyond these subjects, the focus was mostly on N2 and N3 subjects with substantial enrolments.

Table 3A: Subjects included in the moderated sample of question papers

Subject	Level
Bricklaying and Plastering Theory	N2
Building and Civil Technology	N3
Building Drawing	N2 and N3
Building Science	N2 and N3
Carpentry and Roofing Theory	N2

Subject	Level
Diesel Trade Theory	N2 and N3
Electrical Trade Theory	N2 and N3
Electro-Technology	N3
Engineering Drawing	N2 and N3
Engineering Science	N2 and N3
Fitting and Machining Theory	N2
Industrial Electronics	N2 and N3
Industrial Organisation and Planning	N3
Industrial Orientation	N3
Instrument Trade Theory	N3
Logic Systems	N3
Mathematics	N2 and N3
Mechanotechnology	N3
Motor Trade Theory	N2 and N3
Plant Operation Theory	N3
Platers' Theory	N2
Plating and Structural Steel Drawing	N2 and N3
Plumbing	N2
Supervision in Industry	N3
Waste-water Treatment Practice	N3
Water and Waste-water Treatment Practice	N2

Table 4 provides the approval status of the question papers after the initial moderation process. The following needs to be noted regarding Table 4:

- The four subjects marked with an asterisk were planned to be written in another examination but were used for this examination, as the papers received for moderation were repeat papers (papers already written); and
- The Industrial Electronics N2 and N3 question papers were rejected due to too many repeat questions from the November 2015 examination.

Table 4: Approval status of question papers after initial moderation

Approved – as only technical changes required (39%)	Conditionally approved (53%)	Rejected (8%)
Building and Civil Technology N3	Bricklaying and Plastering Theory N2	Industrial Electronics N2 and N3
Building Science N2 and N3	Building Drawing N2 and N3	Industrial Orientation N3
Carpentry and Roofing Theory N2	Diesel Trade Theory N2 and N3	
Electrical Trade Theory N2 and N3	Electro-Technology N3	
Engineering Science N2	Engineering Drawing N2 and N3	
Industrial Organisation and Planning N3*	Engineering Science N3	
Logic Systems N3	Fitting and Machining Theory N2	

Approved – as only technical changes required (39%)	Conditionally approved (53%)	Rejected (8%)
Platers' Theory N2 *	Instrument Trade Theory N3	
Plating and Structural Steel Drawing N2 and N3	Mathematics N2 and N3 *	
Plumbing N2	Mechanotechnology N3	
Supervision in Industry N3	Motor Trade Theory N2 and N3	
	Plant Operation Theory N3	
	Waste-water Treatment Practice N3*	
	Water and Waste-water Treatment Practice N2	

3.3 Findings

Table 5 records the most important findings as captured in the external moderator reports.

Table 5: Findings after initial moderation of 36 sampled question papers

Aspects and findings	Challenges	Subjects concerned
TECHNICAL CRITERIA The majority of the question papers and marking guidelines complied with almost all the technical requirements, but there were some papers that did not meet all these requirements.	Incomplete or incorrect contact details of examiner/internal moderator were evident in 14% of the papers.	Diesel Trade Theory N3 Electrical Trade Theory N3 Instrument Trade Theory N3 Plant Operation Theory N3 Waste-water Treatment Practice N3
	In 14% of the papers, some of the instructions to candidates were not clearly specified.	Bricklaying and Plastering Theory N2 Building Drawing N3 Engineering Drawing N2 Motor Trade Theory N2 Plating and Structural Steel Drawing N2
	In the three listed question papers, there was essential information missing in the diagrams.	Building Drawing N2 Mathematics N2 Plating and Structural Steel Drawing N3
	A numbering error occurred in one question paper.	Building and Civil Technology N3
	In twelve (33%) of the moderated papers, the quality of some of the diagrams, graphs, tables, etc. was poor and/or they were not print-ready.	Bricklaying and Plastering Theory N2 Building Science N2 Electrical Trade Theory N2 and N3 Industrial Electronics N3 Mathematics N2 Mechanotechnology N3 Motor Trade Theory N2 and N3 Plant Operation Theory N3 Plating and Structural Steel Drawing N3 Water and Waste-water Treatment Practice N2
	In three (8%) of the papers, marks were not indicated/not clearly indicated for some of the questions.	Bricklaying and Plastering Theory N2 Plating and Structural Steel Drawing N2 Water and Waste-water Treatment Practice N2

Aspects and findings	Challenges	Subjects concerned
TECHNICAL CRITERIA	In one paper, the figures were inserted as a separate diagram sheet, instead of directly below the instructions.	Engineering Drawing N2
	In one subject, the formula sheet was not attached to the question paper.	Building Science N2
	In 6% of the subjects, acceptable fonts and symbols were not used throughout the question paper.	Mathematics N2 and N3
INTERNAL MODERATION	Only 17% of the internal moderators' reports were of good quality.	Bricklaying and Plastering Theory N2 Building Drawing N2 Electrical Trade Theory N2 Industrial Electronics N2 Industrial Organisation and Planning N3 Plumbing Theory N2
	In 25% of the reports, little evidence of meaningful moderation was found.	Building Drawing N3 Building Science N2 Diesel Trade Theory N2 and N3 Fitting and Machining Theory N2 Mathematics N2 Mechanotechnology N3 Plant Operation Theory N3 Platers' Theory N2
	In 14% of the reports, there was no evidence of internal moderation.	Carpentry and Roofing Theory N2 Engineering Drawing N3 Industrial Orientation N3 Instrument Trade Theory N3 Plating and Structural Steel Drawing N3
	In some reports, the assessment framework was not of an appropriate standard or not received (8% and 6% respectively).	Engineering Drawing N3 (not received) Industrial Orientation N3 (not received) Plant Operation Theory N3 Waste-water Treatment Practice N3 Water and Waste-water Treatment Practice N2
	In 11% of the reports, there was no evidence of communication between the examiner and internal moderator.	Diesel Trade Theory N2 Motor Trade Theory N3 Waste-water Treatment Practice N3 Water and Waste-water Treatment Practice N2
	In two (6%) of the reports, there was a lack of evidence of history/implementation of the recommendations on the question paper/marketing guideline.	Engineering Science N2 and N3
	CONTENT COVERAGE AND COGNITIVE SKILLS	In two subjects (6%) of the papers did not cover the syllabus adequately.

Aspects and findings	Challenges	Subjects concerned
The majority of the question papers covered the prescribed content and included questions of varying cognitive demand.	Eight percent of the papers contained a question that was outside the scope of the syllabus.	Building Drawing N3 Engineering Drawing N2 Engineering Science N3
	In 11% of the papers, the weighting and spread of topics was inappropriate.	Industrial Orientation N3 Mathematics N2 Motor Trade Theory N3 Platers' Theory N2
	In 11% of the papers, there were some questions that were not of the appropriate cognitive demand.	Engineering Drawing N2 and N3 Mathematics N2 Plating and Structural Steel Drawing N3
	In some subjects, the latest developments could not be assessed, due the outdated syllabus.	Diesel Trade Theory N2 and N3 Electro-Technology N3 Industrial Organisation and Planning N3
	In 11% of the papers, some of the questions were ambiguous, not clear and confusing.	Engineering Science N3 Fitting and Machining Theory N2 Mathematics N2 Water and Waste-water Treatment Practice N2
	In 11% of the papers, a lack of variety of question types was evident.	Industrial Electronics N2 Mathematics N2 and N3 Motor Trade Theory N2
MARKING GUIDELINES Too many of the marking guidelines had errors.	In 33% of the question papers, the marking guideline/or certain responses on the marking guideline were incorrect.	Building and Civil Technology N3 Building Drawing N2 Building Science N2 Electrical Trade Theory N3 Engineering Drawing N2 Engineering Science N2 and N3 Fitting and Machining Theory N2 Instrument Trade Theory N3 Mathematics N2 Mechanotechnology N3 Waste-water Treatment Practice N3
	In 6% of the papers, the marks allocated for some of the questions were not in line with the amount of work that had to be done or difficulty level of the questions.	Building Drawing N3 Mathematics N3
	In 6% of the papers, the marking guidelines did not allow for alternative responses (where appropriate).	Mechanotechnology N3 Plant Operation Theory N3
	In one of the question papers, the mark allocation in the marking guidelines did not correspond to the mark allocation in the question paper.	Plating and Structural Steel Drawing N3
	Some papers contained questions for which the marking guidelines were incomplete, with omitted mark allocation.	Building Science N3 Engineering Drawing N2 Waste-water Treatment Practice N3 Water and Waste-water Treatment Practice N2

Aspects and findings	Challenges	Subjects concerned
MARKING GUIDELINES	In 28% of the subjects, the marking guideline would not facilitate marking, as the mark allocation was not clearly stipulated.	Bricklaying and Plastering Theory N2 Building Drawing N2 and N3 Electro-Technology N3 Engineering Drawing N2 and N3 Industrial Electronics N2 Instrument Trade Theory N3 Plating and Structural Steel Drawing N2 and N3
LANGUAGE AND BIAS In most papers, the language was pitched at the appropriate level. There were grammatical errors in some question papers.	Subject terminology/units or data was not always used correctly in 6% of the papers.	Engineering Drawing N2 Water and Waste-water Treatment Practice N2
	In 17% of the papers, there were ambiguities in the text that might have caused confusion.	Industrial Electronics N2 and N3 Plant Operation Theory N3 Platers' Theory N2 Plating and Structural Steel Drawing N3 Waste-water Treatment Practice N3
	The language used in some sections of one question paper was grammatically incorrect.	Waste-water Treatment Practice N3
PREDICTABILITY	Some questions in two (6%) question papers could easily be spotted or predicted.	Engineering Drawing N2 Motor Trade Theory N2
	Six question papers (17%) contained a question(s) taken verbatim from past question papers.	Bricklaying and Plastering Theory N2 Engineering Drawing N2 Industrial Electronics N2 and N3 Industrial Orientation N3 Mechanotechnology N3
	Three (8%) of the question papers showed a lack of innovation.	Engineering Drawing N2 Mathematics N2 and N3

3.4 Areas of Good Practice

In general, the quality and standard of question papers was of an acceptable standard.

3.5 Areas of Concern

3.5.1 Technical Aspects

The quality of illustrations, graphs and symbols was sometimes not of an acceptable standard.

3.5.2 Internal Moderation

The reports of the internal moderators did not always provide sufficient information or were of poor quality.

3.5.3 Content Coverage and Cognitive Skills

Some questions were not in line with the syllabi or they covered textbook content rather than the syllabus. In some papers, the weighting and spread of topics were inappropriate.

3.5.4 Quality of Questions

Some questions were vague, did not contain sufficient information for a proper response or contained factual errors or misleading information.

3.5.5 Marking Guidelines

There were the following concerns regarding marking guidelines:

- Some of the answers in the marking guidelines did not correspond to the question paper;
- The marking guidelines did not cater for alternative responses;
- Some marking guidelines contained incorrect answers; and
- Marks were not clearly indicated in some of the questions, thereby not facilitating marking.

3.5.6 Language Quality

Subject terminology was not always used correctly. In some cases, subtleties might have caused misunderstandings.

3.5.7 Predictability

The verbatim use of some questions from previous question papers was a great concern.

3.6 Directives for Compliance/Improvement

3.6.1 Technical Aspects

The following aspects of the internal quality assurance process of the DHET require attention:

- The question papers and marking guidelines should be print-ready when presented for external moderation;
- An appropriate mathematical software programme, e.g. Equation Editor, should be used for equations in Mathematics question papers; and
- Diagrams, illustrations, symbols, texts and graphics should be provided in a high resolution format and a computer-aided design programme should be used to ensure professional question papers.

3.6.2 Internal Moderation

If internal moderation is to be effective, it must be done thoroughly and with the aim of raising assessment standards. The following aspects require improvement:

- Contact details of both the examiner and the internal moderator must be provided;
- The assessment grids and internal moderators' reports should be completed in full and should correspond to the question paper;
- Internal moderators' reports should provide detailed and comprehensive recommendations/comments and evidence that these recommendations have been implemented or addressed; and
- The communication between the examiner and the internal moderator regarding recommendations and changes to the question paper and marking guideline should also be recorded as evidence.

3.6.3 Quality of Questions

Although the majority of question papers included a variety of question types, there is still a need for creativity in designing questions. Real-life problems and scenarios should be included in the question papers to link the theory to real work situations.

In order to improve the quality of questions, attention should be paid to the following:

- Questions must provide clear instructional words/verbs; and
- Questions should be free of vaguely defined statements and ambiguous wording.

3.6.4 Marking Guidelines

Attention to detail is required from examiners and moderators in improving the quality and standard of the marking guidelines of certain subjects. The following aspects require improvement:

- The answers in the marking guidelines must be correct/accurate;
- The marking guidelines should allow for alternative responses where applicable; and
- Mark allocation has to be clearly indicated to facilitate marking.

3.6.5 Adherence to Policy, Content Coverage and Cognitive Skills

Outdated and restrictive syllabi hamper effective teaching, learning and assessment. As has been repeatedly reported, the syllabi need to be revised as a matter of urgency and, as an interim measure, the cognitive demand should be stipulated for all subjects.

3.6.6 Predictability

The repetition of similar questions from recent past papers must be avoided.

4 MONITORING/MODERATION OF INTERNAL ASSESSMENT

4.1 Introduction

Registered learners for the NATED Report 190/191: Engineering Studies programme require a term mark, which serves as a compulsory component of the final promotion mark. It has a weighting of 40%.

Umalusi quality assures the internal assessment by:

- Assessing the adherence of the Educator Portfolio of Assessment (PoA) and the Learner Portfolio of Evidence (PoE) to the Report 191 ICASS Guidelines; and
- Confirming that the content coverage and cognitive demand of the tests meet the criteria as stipulated in the syllabi and the Report 191 ICASS Guidelines.

Umalusi moderators monitored the campus' and colleges' implementation of the internal assessment component. They observed the premises and students' evidence, questioned relevant members of the colleges and viewed documents related to assessments to make a fair and accurate judgement.

4.2 Purpose

The purpose of this section of the report is to:

- Identify the sampled sites and subjects;
- Outline the approach followed in quality assuring the internal assessment;
- Mention the crucial findings related to the quality and standard of internal assessment at the sampled sites;
- Focus on areas of good practice observed during the visits and areas in which improvement is needed; and
- Include recommendations which, once implemented, will enhance the quality of internal assessment.

4.3 Scope and Approach

During March 2016, Umalusi monitored the internal assessment at ten sites in a sample of eight subjects across public and private colleges. The sample was spread over six provinces. Umalusi informed all relevant stakeholders in advance about the intended monitoring visits.

A team of seven moderators and two Umalusi officials was deployed to various sites to conduct the monitoring/moderation of the internal assessment.

Table 6 indicates the sites and the subjects included in the monitoring/moderation process.

Table 6: Sites and subjects monitored/moderated during March 2016

Subject	Level	Province	College	Campus/site
Building Drawing	N2	North West	Vuselela College	Jouberton Campus
Building Science	N3	Gauteng	Denver Technical College	Pretoria
Diesel Trade Theory	N2	Gauteng	Ekurhuleni East College	Benoni Campus
Electro-Technology	N3	Mpumalanga	Gert Sibande College	Evander Campus
Engineering Science	N2	Free State	Maluti College	Itemoheleng Campus
Engineering Science	N3	Gauteng	Ressuct Centre for Skills*	Pretoria
Industrial Electronics	N3	Western Cape	Northlink College	Belhar Campus
Industrial Electronics	N2	Western Cape	College of Cape Town	Gugulethu Campus
Motor Trade Theory	N3	Gauteng	Ekurhuleni West College	Kempton Campus
Waste-water Treatment Practice	N3	KwaZulu-Natal	Majuba College	Majuba Technology Centre

* Clarity on the accreditation status of this site is currently being investigated. Discrepancies were found in the enrolments of the college, internal assessment marks obtained from DHET and the number of students who sat for the 2016 April NATED Report 190/191: Engineering Studies examination. During the visit to the site, the director of the college claimed that they had enrolled N2 and N3 candidates for examination purposes only and, therefore, no internal assessments were available for the Umalusi monitor to evaluate.

4.4 Findings

The ICASS Guidelines stipulate that marks of two tests must be used to compile the term mark. With the exception of one site, all sites complied with this requirement by the time of the moderation visits.

Table 7: Number of tests per site

Tests	Site	Subject	Level
2	Jouberton Campus	Building Drawing	N2
2	Denver, Pretoria	Building Science	N3
2	Benoni Campus	Diesel Trade Theory	N2
2	Evander Campus	Electro-Technology	N3
2	Itemoheleng Campus	Engineering Science	N2
0	Ressuct Centre for Skills	Engineering Science	N3
2	Belhar Campus	Industrial Electronics	N3
2	Gugulethu Campus	Industrial Electronics	N2
2	Kempton Campus	Motor Trade Theory	N3
2	Majuba Technology Centre	Waste-water Treatment Practice	N3

The relevant findings of the moderators when visiting the ten sites are presented in Table 8. It should be noted that one site – Ressuct Centre for Skills – was non-compliant and excluded from the findings except for statistical purposes and where information was made available for evaluation.

Table 8: Findings and challenges observed in the March 2016 internal assessment monitoring/moderation visits

Aspects	Findings and challenges	Site/Subject concerned
SUPPORT BY THE COLLEGE BEFORE ENROLMENT	30% of the colleges (as listed) provided some support before enrolment, e.g. competency tests/ aptitude test/placement tests.	Engineering Science N2 (Itemoheleng) Motor Trade Theory N3 (Kempton) Waste-water Treatment Practice N3 (Majuba)
EMPLOYMENT OF CANDIDATES	At 20% of the sites visited, some of the candidates were employed.	Building Drawing N2 (Jouberton) Building Science N3 (Denver)
PHYSICAL RESOURCES AND LEARNING MATERIAL Textbooks and teaching material	The available facilities were sufficient for the sites listed.	Building Drawing N2 (Jouberton) Building Science N3 (Denver) Electro-Technology N3 (Evander) Engineering Science N2 (Itemoheleng) Industrial Electronics N3 (Belhar) Industrial Electronics N2 (Gugulethu) Motor Trade Theory N3 (Kempton)
	30% of the sites enhanced learning with the inclusion of practical demonstrations and the use of models.	Building Drawing N2 (Jouberton) Diesel Trade Theory N2 (Benoni) Motor Trade Theory N3 (Kempton)
	At one site, candidates did not receive any tuition – neither theory nor practical.	Engineering Science N3 (Ressuct)
	At the five listed sites, students were not exposed to any practical implementation of the theory component of the subject.	Electro-Technology N3 (Evander) Engineering Science N2 (Itemoheleng) Industrial Electronics N3 (Belhar) Industrial Electronics N2 (Gugulethu) Waste-water Treatment Practice N3 (Majuba)
	The sites listed received the textbooks/training material at the beginning of the trimester.	Building Science N3 (Denver) Diesel Trade Theory N2 (Benoni) Electro-Technology N3 (Evander) Engineering Science N2 (Itemoheleng) Industrial Electronics N3 (Belhar) Industrial Electronics N2 (Gugulethu) Motor Trade Theory N3 (Kempton) Waste-water Treatment Practice N3 (Majuba)
	No additional training material was available at the listed sites.	Building Drawing N2 (Jouberton) Industrial Electronics N2 (Gugulethu) Motor Trade Theory N3 (Kempton)

Aspects	Findings and challenges	Site/Subject concerned
PHYSICAL RESOURCES AND LEARNING MATERIAL	There were computers and printers for the students to complete assignments/case studies and to do research at the sites listed.	Building Drawing N2 (Jouberton) Building Science N3 (Denver) Electro-Technology N3 (Evander) Engineering Science N2 (Itemoheleng) Industrial Electronics N3 (Belhar) Industrial Electronics N2 (Gugulethu) Motor Trade Theory N3 (Kempton)
HUMAN RESOURCES Training of lecturers	50% of the sites visited had a process in place for the identification of lecturers' training needs.	Building Drawing N2 (Jouberton) Building Science N3 (Denver) Engineering Science N2 (Itemoheleng) Motor Trade Theory N3 (Kempton) Waste-water Treatment Practice N3 (Majuba)
	The colleges listed had a training plan for staff development.	Building Drawing N2 (Jouberton) Building Science N3 (Denver) Industrial Electronics N3 (Belhar) Motor Trade Theory N3 (Kempton) Waste-water Treatment Practice N3 (Majuba)
	At one site, there was evidence that the training plan as mentioned above was not implemented.	Building Drawing N2 (Jouberton)
	At sites at which information was obtained, there were areas in which the educators felt that they needed further training.	
	At only 40% of the monitored sites, educators were exposed to the relevant industry.	Building Science N3 (Denver) Electro-Technology N3 (Evander) Industrial Electronics N3 (Belhar) Industrial Electronics N2 (Gugulethu)
ASSESSMENT POLICY AND SYSTEMS	All sections of the policy were included, such as: monitoring and moderation, appeal procedures, absenteeism, late or non-submission of tasks, provision for learners with barriers to learning, conditions for re-assessment and irregularities at the sites listed.	Diesel Trade Theory N2 (Benoni) Electro-Technology N3 (Evander) Motor Trade Theory N3 (Kempton)
	No policies were available at the site listed.	Engineering Science N2 (Itemoheleng)
	At the listed site, an HR policy was presented as the assessment policy.	Engineering Science N3 (Ressuct)
	80% of the sites had an assessment policy on site, although it should be noted that at some of these sites, policies lacked some important information.	Building Drawing N2 (Jouberton) Building Science N3 (Denver) Diesel Trade Theory N2 (Benoni) Electro-Technology N3 (Evander) Industrial Electronics N3 (Belhar) Industrial Electronics N2 (Gugulethu) Motor Trade Theory N3 (Kempton) Waste-water Treatment Practice N3 (Majuba)

Aspects	Findings and challenges	Site/Subject concerned
MONITORING POLICY	90% of the sites had a monitoring plan in place.	Building Drawing N2 (Jouberton) Building Science N3 (Denver) Diesel Trade Theory N2 (Benoni) Electro-Technology N3 (Evander) Engineering Science N2 (Itemoheleng) Industrial Electronics N3 (Belhar) Industrial Electronics N2 (Gugulethu) Motor Trade Theory N3 (Kempton) Waste-water Treatment Practice N3 (Majuba)
	Three sites could not supply evidence that the monitoring plan had actually been implemented.	Engineering Science N2 (Itemoheleng) Industrial Electronics N3 (Belhar) Industrial Electronics N2 (Gugulethu)
INTERNAL ASSESSMENT TASK DEVELOPMENT PLAN	80% of the sites visited had a plan in place. At the remaining 20% of the sites as listed, there was no plan in place.	Engineering Science N2 (Itemoheleng) Engineering Science N3 (Ressuct)
IRREGULARITY REGISTERS The use of irregularity registers.	60% of the sites had irregularity registers in place.	Building Drawing N2 (Jouberton) Building Science N3 (Denver) Diesel Trade Theory N2 (Benoni) Electro-Technology N3 (Evander) Motor Trade Theory N3 (Kempton) Waste-water Treatment Practice N3 (Majuba)
	There were internal assessments recorded in the irregularity registers at the sites listed.	Building Science N3 (Denver) Diesel Trade Theory N2 (Benoni) Electro-Technology N3 (Evander) Motor Trade Theory N3 (Kempton) Waste-water Treatment Practice N3 (Majuba)
	Four sites did not have or did not present irregularities registers.	Engineering Science N2 (Itemoheleng) Engineering Science N3 (Ressuct) Industrial Electronics N3 (Belhar) Industrial Electronics N2 (Gugulethu)
LECTURER FILES The content of the lecturers' files	Five sites visited complied to all requirements of the lecturer file, as stipulated in the ICASS Guidelines.	Building Drawing N2 (Jouberton) Building Science N3 (Denver) Electro-Technology N3 (Evander) Industrial Electronics N2 (Gugulethu) Motor Trade Theory N3 (Kempton)
	At one site, there was limited compliance for the lecturer files in terms of the specifications as per the ICASS Guidelines.	Engineering Science N2 (Itemoheleng)
ASSESSMENT SCHEDULES AND SCORES Adherence to the ICASS Guidelines and the recording of the scores.	At 90% of the sites (as listed), assessment schedules were available.	Building Drawing N2 (Jouberton) Building Science N3 (Denver) Diesel Trade Theory N2 (Benoni) Electro-Technology N3 (Evander) Engineering Science N2 (Itemoheleng) Industrial Electronics N3 (Belhar) Industrial Electronics N2 (Gugulethu) Motor Trade Theory N3 (Kempton) Waste-water Treatment Practice N3 (Majuba)

Aspects	Findings and challenges	Site/Subject concerned
ASSESSMENT SCHEDULES AND SCORES	At 70% of the sites, there was evidence that the syllabus and the ICASS Guidelines had been used.	Building Drawing N2 (Jouberton) Building Science N3 (Denver) Diesel Trade Theory N2 (Benoni) Industrial Electronics N3 (Belhar) Industrial Electronics N2 (Gugulethu) Motor Trade Theory N3 (Kempton) Waste-water Treatment Practice N3 (Majuba)
	At the sites listed, there was no evidence that the syllabus and/or ICASS Guidelines were used.	Electro-Technology N3 (Evander) Engineering Science N2 (Itemoheleng) Engineering Science N3 (Ressuct)
CONTENT COVERAGE	90% of the sites made the required number of two tasks according to the ICASS Guidelines available for moderation.	Building Drawing N2 (Jouberton) Building Science N3 (Denver) Diesel Trade Theory N2 (Benoni) Electro-Technology N3 (Evander) Engineering Science N2 (Itemoheleng) Industrial Electronics N3 (Belhar) Industrial Electronics N2 (Gugulethu) Motor Trade Theory N3 (Kempton) Waste-water Treatment Practice N3 (Majuba)
	There was no evidence of any internal assessment at the site listed.	Engineering Science N3 (Ressuct)
	77% of the sites ensured that a substantial amount of work had been covered and that the weighting and spread was appropriate. Please note that the tasks of Building Drawing N2 at Jouberton were not evaluated.	Building Science N3 (Denver) Diesel Trade Theory N2 (Benoni) Electro-Technology N3 (Evander) Engineering Science N2 (Itemoheleng) Industrial Electronics N3 (Belhar) Industrial Electronics N2 (Gugulethu) Waste-water Treatment Practice N3 (Majuba)
COGNITIVE DEMAND AND DIFFICULTY LEVELS	The sites listed had pitched the tasks at the right level. Please note that the tasks of Building Drawing N2 at Jouberton were not evaluated.	Building Science N3 (Denver) Diesel Trade Theory N2 (Benoni) Electro-Technology N3 (Evander) Engineering Science N2 (Itemoheleng) Industrial Electronics N3 (Belhar) Industrial Electronics N2 (Gugulethu) Motor Trade Theory N3 (Kempton) Waste-water Treatment Practice N3 (Majuba)
	At the sites listed, tests were not representative of the latest developments in the teaching, learning and assessment of the applicable subject.	Electro-Technology N3 (Evander) Industrial Electronics N3 (Belhar) Industrial Electronics N2 (Gugulethu)
	There was no evidence of any internal assessment at the site listed.	Engineering Science N3 (Ressuct)

4.5 Areas of Good Practice

The following areas of good practice were identified:

- At the Evander campus, teaching and learning are taking place in a conducive environment;
- The Gugulethu Campus has met the ICASS requirements to a large extent, despite the lecturer involved in the subject being newly appointed. This reflects positively on the culture of support and compliance within the campus, and perhaps the college;
- The lecturer at Kempton Campus uses models and components in the classroom to enable the learners to visualise the different components. Sectional components of transmissions and models of the steering systems, automatic transmissions and brake systems are available for demonstrations and inspections during lessons. The assessment tools and marking guidelines are on a good standard and cover the outcomes as required in the syllabus. The recordkeeping, marking and moderation process of the assessments are clearly documented, with records of learner performance, attendance and progress clearly recorded. Feedback to learners has been indicated and recorded. Subject meetings are conducted regularly, as is evident from the records, including minutes and agendas;
- The discipline and governance at the Majuba Technology Centre is evident and the institution should be commended on the evidence to be observed. Files are neatly prepared and evidence is easy to access; and
- The principles of assessment and internal moderation are applied. Good internal moderation resulted in good assessment practice.

4.6 Areas of Concern

The following areas of concern have been identified:

- At Ressuct Centre for Skills, the discrepancies around candidate enrolments, internal assessments and students sitting for the examination and the conflicting information around the accreditation are reasons for concern;
- The late arrival of textbooks is a challenge for the lecturing of subjects at colleges;
- The lack of exposure of lecturing staff to the industry (historical and current) creates challenges in terms of the teaching of newly developed technologies and trends in the specific subject field;
- The lack of identifying and addressing the training needs of staff members at colleges pose a problem in terms of skills development of the lecturers and effective teaching and learning;
- The outdated syllabi of some subjects do not cater for new developments in technology;
- Feedback to the candidates on their performance is lacking at many institutions, which is an important aspect of the learners' understanding the subject;
- Although not a requirement in the implementation of the NATED Report 190/191: Engineering Studies programmes, the lack of practical demonstrations during the teaching and learning processes creates barriers in the understanding of the subjects; and
- The use of previous question papers in teaching and assessment is a practice at some colleges.

4.7 Directives for Compliance/Improvement

The following directives are recommended:

- The training of staff members to keep abreast with the developments in the industry needs to be prioritised at all institutions;
- The irregularities register needs to include the irregularities of internal assessments; and
- It is recommended that students be taken on site visits (Waste-water Treatment Practice) for exposure to the operation of the relevant facilities.

5 MONITORING THE CONDUCT OF EXAMINATIONS

5.1 Introduction and Background

Credible examinations are, inter alia, dependent on the safe and secure production and distribution of question papers to the examination centres. Over the past few years, the DHET has experienced serious challenges with question paper leakages. In order to curb this problem, a series of measures has been put in place over a period of time.

Question papers are currently distributed to nodal points the day before the examination date, from where they are collected by colleges on the day of examination. Answer scripts must be returned to the nodal points or to the marking centre within 90 minutes after the conclusion of the examination. Each examination centre has to appoint a person to collect the question papers and return the answer scripts.

Umalusi used a two-sided approach in the monitoring of the writing phase. Firstly, Umalusi staff monitored the distribution of question papers from two nodal points to examination centres and the return of answer scripts to the nodal point/marketing centre. Secondly, Umalusi deployed a team to monitor the writing of examinations across the nine provinces. The data used to compile this section was collected through interviews and observations.

5.2 Scope and Approach

Umalusi staff members monitored the distribution of question papers from the DHET to colleges in and around Pretoria and the return of the answer scripts to the N3 marking centre at Pretoria West Campus, as well as the distribution from Ellis Park Campus to colleges in and around Johannesburg and the return of the answer scripts to the distribution point. In addition, two staff members briefly monitored the writing of the examinations at colleges in the vicinity of the nodal points. The following colleges were visited: Denver College, Tshwane College of Commerce and Computer Studies, Gauteng Central College, Academy of Computer and Business Studies.

Umalusi deployed monitors and its office-based staff to monitor twenty (20) examination centres nationwide, as illustrated in Table 9. The selection of the sample of examination centres was mainly guided by the number of candidates registered per subject and centres at which irregularities had been experienced during the previous examinations.

Table 9: Examination Centres monitored for the writing of examinations

	Province	Centre	Date	Subject	Candidates
1	Eastern Cape	King Hintsa TVET College: Teko Campus	01/04/2016	Building Science N2	80
		Lovedale TVET College: Zwelitsha Campus	01/04/2016	Mathematics N3	50
		Brooklyn City College: East London	01/04/2016	Engineering Science N2	01
				Mathematics N3	09

	Province	Centre	Date	Subject	Candidates
2	Free State	Motheo TVET College: Hillside View Campus	01/04/2016	Engineering Science N2	385
		Flavius Mareka TVET College: Sasolburg Campus	01/04/2016	Mathematics N3	133
3	Gauteng	Denver College: Pretoria	01/04/2016	Mathematics N3	286
		Central Johannesburg TVET College: Ellis Park Campus	31/03/2016	Industrial Electronics N3	202
		Tshwane South TVET College: Pretoria West Campus	01/04/2016	Engineering Science N2	148
		Tshwane Institute of Technology	08/04/2016	Supervision in Industry N3	00
4	KwaZulu-Natal	Tisand Technical College	01/04/2016	Engineering Science N2	89
		Elangeni TVET College: Ntuzuma Campus	01/04/2016	Engineering Science N2	07
				Mathematics N3	49
				Mathematics N1	122
		Elangeni TVET College: Inanda Campus	05/04/2016	Industrial Electronics N1	51
Electro-Technology N3	28				
5	Limpopo	Lephalale TVET College: Modimolle Campus	04/04/2016	Electrical Trade Theory N2	21
		Tlharihani Training Centre	06/04/2016	Engineering Science N1	30
		Brooklyn City College: Polokwane	30/03/2016	Engineering Science N3	17
				Building Science N3	03
6	Northern Cape	Northern Cape Rural TVET College Namaqualand Campus	04/04/2016	Electrical Trade Theory N2	37
7	North West	Rock of Springs College: Brits	23/03/2016	Engineering Drawing N2	23
		Brooklyn City College: Rustenburg	01/04/2016	Mathematics N3	11
				Engineering Science N2	02
8	Western Cape	Northlink TVET-College: Wingfield Campus	01/04/2016	Mathematics N1	172
				Engineering Science N2	93
				Mathematics N3	203
		Kingsway College	06/04/2016	Mathematics N2	06
				Engineering Science N1	09

5.3 Findings

5.3.1 Observations at the Distribution Points

The two distribution points were well organised with reliable systems for safekeeping and recordkeeping in place, for example:

- Filed copies of the identity documents of the appointed staff responsible for the collection of the question papers;
- Daily registers for the dispatch of examination question papers;

- At the DHET official counter, recipients of the examination material had to show their identity documents on receipt of the parcels, fill in contact details and sign for the number of boxes/envelopes and plastic bags for scripts collected;
- Security guards were on duty at the dispatch points; and
- Access was controlled and the question papers were safely stored in strong rooms.

Larger numbers of question papers were sealed in barcoded boxes that could not be opened without tearing the box. Smaller numbers of question papers were placed in sealed envelopes.

Although most colleges collected the question papers timeously, there were some of the question papers that were collected rather late, for example: Sandton College (Johannesburg) only collected papers at 8:20 and Dam Technical College only collected question papers at 8:45 – for an examination that had to start at 9:00.

A number of colleges did not collect question papers from the DHET, e.g. on 1 April 2016, Centre number 899990896 (Rostec College – Johannesburg) did not collect their packs and Varsity of Science and Technology, Centre number 899992833, did not collect their examination packs on 5 April 2016.

Table 10 below indicates the name of centres and the subjects for which question papers were not collected.

Table 10: Names of centres and subjects not collected

Examination centre	Subjects
Norah Nursing Academy	Mathematics N3, Engineering Science N2, Building Science N2
Odi Skills Development	Engineering Science N2, Building Science N2, Mathematics N3
Ressuct Centre for Skills	Engineering Science N2
Odi Campus	Engineering Science N2
Soshanguve Campus	Mathematics N3

5.3.2 Observations at the Return of the Answer Scripts

The scripts with the original mark sheets (yellow), attendance register and absenteeism forms were submitted in sealed plastic bags. A large number of mark sheets and scripts were handled on a daily basis at the nodal points and marking centres. For example, on the date of the visit, 289 mark sheets (including 14 different subjects) were expected at Pretoria West marking centre. Examination assistants were responsible for the checking of the answer scripts against the mark sheets. The procedure for checking was effectively implemented. Most of the centres complied with the stipulations laid down, although some discrepancies were observed, e.g. a candidate marked absent with an answer script available and no absenteeism forms inserted. Some of the centres did not submit the scripts within 90 minutes of the conclusion of the examination. At Ellis Park, only half of the colleges had submitted their scripts (20 of 41 centres) within 90 minutes of conclusion of the examination.

Evidence of late submission of answer scripts revealed the following:

- Repeated late submission by the same college (Roseville); and
- Scripts submitted a day after the examination was written/on the following Monday.

Other reasons for late submission of scripts were:

- Subject clashes;
- Car breakdown;
- Accident;
- Traffic;
- Late start of examination; and
- Marking centre already closed.

The findings on the monitoring of the writing of examinations are presented in terms of the eight-point criteria prescribed for monitoring phase of the examinations instrument. These findings are based on the sample of centres that were monitored by Umalusi.

Table 11 indicates the deviations from policy as per the criteria and directives pertaining to the conduct, administration and management of the examinations.

Table 11: Concerns raised in relation to criteria

Criteria	Nature of non-compliance	Centres concerned
STORAGE OF EXAMINATION MATERIAL	Strong rooms used for other purposes than just the storage of examination material. (5%)	Northern Cape Rural TVET College: Namaqualand Campus
PREPARATIONS FOR WRITING AND THE EXAMINATION VENUES	No signs indicating directions to examination venues and examination venues not properly marked. (10%)	Denver College Elangeni TVET College: Inanda Campus
	Invigilators without name tags. (10%)	Northlink TVET College: Wingfield Campus Tshwane Institute of Technology
	Candidates allowed into examination venue before checking their identity documents and examination permits. (15%)	Northlink TVET: Wingfield Campus Rock of Springs Technical College (Brits) Brooklyn City College (Polokwane)
TIME MANAGEMENT	Examinations started later than the scheduled time. (20%)	Tisand Technical College Elangeni TVET: Inanda Campus Central Johannesburg TVET College: Ellis Park Campus Kingsway College
	Question papers not checked for technical accuracy. (25%)	Denver College Tisand Technical College Lovedale TVET College - Zwelitsha Campus Elangeni TVET College – Inanda Campus Kingsway College

Criteria	Nature of non-compliance	Centres concerned
TIME MANAGEMENT	Reading time not allowed at seven centres.	
	Immediate environment not checked for material that could unduly assist students in the examinations (55% of the sites).	
ACTIVITIES DURING WRITING	Candidates allowed to leave examination room during the last 15 minutes (5%)	Lovedale TVET College: Zwelitsha Campus
	Irregularity experienced.	Tshwane South TVET College: Pretoria West Campus
MONITORING BY THE ASSESSMENT BODY	None of the sampled sites were monitored by the assessment body during the April 2016 NATED Report 190/191: Engineering Studie examinations.	All the sites included in the sample

5.3.3 Delivery and Storage of Examination Material

Generally, a high rate of compliance was observed in terms of the delivery and storage of examination material.

It was noted that the delivery and the storage of examination material was handled in a safe manner that is consistent with the prescripts of the policy and it was reported that all examination material was received in sealed plastic bags, checked and signed for by the chief invigilators or officials delegated the responsibility. Subsequent to the receipt, the materials were locked in either a strong room or a safe at all the centres and chief invigilators kept the keys to the safe or the strong room. However, there were pockets of evidence of some of the strong rooms being used for other purposes than storing examination material.

5.3.4 The Invigilators and their Training

The majority of the monitored examination centres were found to have appointed college lecturers as invigilators, except at three centres (Denver College, Northlink TVET College: Wingfield Campus and Tshwane South TVET College: Pretoria West Campus), where members of the community were appointed (in addition to staff members serving as invigilators). At most of the centres visited, the invigilators were appointed appropriately and were in possession of duly signed appointment letters.

Training was not conducted in preparation for this examination, because the personnel appointed were said to have undergone training when they were prepared for the final examinations of 2015. The chief invigilators trained their own invigilators.

5.3.5 Preparations for Writing and the Examination Venues

Generally, it was reported that the venues utilised for the writing of examinations were favourable and conducive, invigilators arrived timeously and attendance registers were kept, despite the following:

- Some of the centres not displaying directions to the examinations venues;
- Candidates being allowed entrance into the examination centres without verification, only to be verified when examination was in progress;
- Examination centres not having relevant seating plans, in which cases candidates were allowed to sit randomly, with an attendance register being circulated for them to sign their presence; and
- Invigilators at two centres not having name tags.

5.3.6 Time Management

Generally, it was reported that invigilators arrived on time and examination sessions started on the scheduled time, with the exception of three centres, where the examination started four minutes, ten minutes and sixteen minutes late respectively.

It was also determined that the inspection of critical activities, which was supposed to be conducted before the examination commenced, was not carried-out at many centres with the following being compromised:

- At seven centres, ten minutes reading time before the writing was not allowed;
- At six centres, question papers were not checked for technical accuracy with the candidates before writing, which was a serious oversight that might have resulted in candidates writing a wrong paper or a paper containing some missing questions; and
- At five centres, cases of candidates arriving late were reported.

5.3.7 Checking the Immediate Environment

The reports indicated that only 45% of the centres checked the immediate environment to ensure that there were no material or writings on the walls or in the ablution facilities that could unfairly advantage candidates during the writing of the examination.

5.3.8 Activities During Writing

- Invigilators at all centres were found to be vigilant, attentive and moved around in the examination rooms;
- Candidates completed the attendance registers after commencement of the examinations, while, at other centres candidates were allowed to sign the registers during the collection of their answer scripts when they had finished writing;
- At one examination centre, candidates were allowed to leave the examination room during the last 15 minutes of the examination session; and
- At one examination centre, candidates were allowed to visit the toilets unaccompanied.

In general, many centres complied with or met most of the elements involved in this criterion.

5.3.9 Packaging and Transmission of Answer Scripts

Generally, this criterion was well-managed across the centres that Umalusi monitored. The following practices were common across the centres:

- Centres counted and packaged the answer books in the examination venues at the end of the writing sessions, after the candidates had left the examination room. The counting was carried-out by the chief invigilators in the presence of other invigilators, who were on duty;
- Answer scripts were packaged by using the sequence in the mark sheet and checked that candidates marked present corresponded to the mark sheet;
- After packaging, the scripts were sealed in the plastic bags supplied by the assessment body. However, one centre did not have the plastic bag supplied by the assessment body and, therefore, used a brown carton to seal the scripts; and
- Most of the centres had their consignments delivered and collected by the courier services. Those that were marked internally were locked in strong rooms.

5.3.10 Monitoring by the Assessment Body

In this examination, only four out of 20 centres were monitored by the assessment body. However, the reports that were left at these centres did not raise any issues pertinent to the conduct of the examination, thereby not requiring any areas or obligations for improvement.

Monitoring has been and remains an area that is neglected by the assessment body.

5.3.11 Irregularities and Malpractices

Non-compliance with examination policies and directives was reported during the monitoring visits. However, these malpractices were mainly technical in nature and could not have compromised the credibility of the examinations. The Umalusi monitors identified the following malpractices in the writing phase:

- The arrival of candidates at examination centres after the official starting time but within the first hour after the start of the examination;
- Question papers were not checked with candidates for technical accuracy and candidates were not given ten minutes reading time before the start of examination;
- At three centres, the examinations started later than the scheduled time; and
- Candidates were allowed to leave the examination room to visit the ablution facilities unaccompanied by invigilators.

5.4 Areas of Good Practice

The following areas of good practice were identified:

- There was a marked improvement in the safe and secure storage of examination materials;
- At almost all centres, the examination venues were conducive for the writing of examinations; and
- Packaging of examination scripts was, to a large extent, done in compliance with policy.

5.5 Areas of Concern

The following areas of concern were noted during monitoring visits:

- At one of the centres, the strong room was not only used for storage of examination materials, thereby creating a security risk in that material could be accessed by unauthorised persons;
- The monitoring of examination centres by the assessment body did not appear to be a priority;
- Candidates were allowed into examination rooms without verifying their identity; and
- Poor time management during the critical activities before the start of the writing of the examination.

5.6 Directives for Compliance/Improvement

The following directives or compliance/improvement have been identified:

- All examination centres must have a designated area with limited access and reliable security features for storage of examination material;
- Invigilators must verify the identity of candidates on admission into the examination rooms; and
- Invigilators must manage time well before the writing of the examination and ensure that all critical activities are carried out before the writing of the examination.

6 MONITORING THE APPOINTMENT OF MARKING PERSONNEL

6.1 Introduction and Background

The effective recruitment, appointment and training of marking staff are essential steps to ensure the implementation of a credible marking process. In the past, Umalusi monitored the process for the recruitment and appointment of marking personnel for the provincial and national marking centres and briefly reported on the process. However, at a meeting held in February 2016, the Portfolio Committee of Higher Education and Training proposed the process being monitored more closely.

The DHET distributed an invitation (Memorandum 04 of 2016 dated 21 January 2016) to apply for the marking of all the 2016 examinations to all colleges and campuses with the request that it be made available to all lecturers qualifying for appointments as markers. All duly completed, signed and recommended (by HOD, Campus Manager and Deputy Principal Academic) applications had to be accompanied by certified copies of the applicant's identity document, highest qualification, academic record for the subject applied for and SACE registration certificate. Non-South Africans also had to submit copies of their work permits, passports and proof of residence. A schedule of applications (list of all applicants) had to be submitted per qualification (NATED or NC (V)) per college.

6.2 Scope and Approach

An Umalusi staff member monitored the evaluation of applications for the NATED Report 190/191: Engineering Studies (all three examinations of 2016) marking process at the DHET on 12 and 13 March. In addition, the data of applicants and appointed marking staff were evaluated.

6.3 Findings

Memorandum 04 of 2016 clearly stipulates the procedures involved in the application process. The previous application form was reviewed and the following additional information was included:

- Deputy Principal Academic must approve applications; and
- Information on the performance/results of the applicant's students in the 2014 and 2015 examinations.

The marking centre managers and deputy marking centre managers of the national and the provincial marking centres participated in the evaluation of applications on 12 and 13 March 2016. The meeting was led by DHET officials and attended by a representative of the Free State Regional office, as well as an observer of SADTU. An evaluation checklist, which had to be checked and completed for each applicant, included the following information:

- Number of years teaching (lecturing) in the subject at the level applied for;
- Year in which the subject was last taught at the level applied for;
- Application signed by applicant;
- Application endorsed and signed by immediate supervisor/HOD;

- Application endorsed and signed by Campus Manager;
- Application endorsed and signed by the Deputy Principal: Academic;
- A certified copy of the identification document available;
- Does the applicant have a relevant qualification for the subject applied for;
- Recommendation by DHET selection panel and the position (marker, chief marker, internal moderator, reserve list or not eligible – with a reason if not eligible); and
- Surname, initials and signature of the evaluator.

The requirements of the Personnel Administrative Measures (PAM) document (Government Gazette No. 19767 of 18 February 1999) are open for different interpretations, e.g. the stipulation “a three year post school qualification ...or other recognised post school qualification” – does not make it clear what are considered as other recognised post school qualifications. It is also not clear if applicants with an N6 and no industry experience are eligible to be appointed as markers. Furthermore, it is not stipulated that the applicant must have a teacher's qualification. Memorandum 4 of 2016 indicates that an applicant must have taught the subject within the last year at the level applied for. A consequence of the implementation of this requirement is that many experienced markers could not apply or be considered for appointment for example:

- Experienced staff members who are currently teaching the subject at a higher level (e.g. N6);
- Staff who has been promoted (e.g. to a subject head); and
- Staff who are currently teaching related subjects of other qualifications or programmes.

Many applicants submitted applications for more than one subject at more than one level. In this way, a particular candidate could go through the initial screening process and be recommended for appointment for a number of subjects, which, among others factors, complicated the appointment process. This way also one of the contributing factors to the shortage of markers.

All appointed markers had to submit a response form (acceptance of appointment form). In addition, they received the Conditions of Appointment, Duties of Marking Officials and House Rules. Each marker also had to sign a personal declaration and submit a release for marking duties form, signed by his/her manager.

Engineering Science N3, Mathematics N3, Industrial Electronics N3 and Electro-Technology N3 had been identified as subjects that had posed difficulties in terms of recruiting enough markers in the past. The intention was to mark these four N3 subjects at the provincial marking centres, instead of only at the national marking centre. Unfortunately, not enough applications were received and only one of the four subjects – Mathematics N3 – could be marked at five of the nine intended marking centres.

The following N3 subjects were moved from Pretoria West marking centre to other marking centres, due to a lack of applications/expertise:

- Motor Trade Theory N3 was moved to Struandale (Eastern Cape N2 marking centre);
- Industrial Organisation and Planning N3, Supervision in Industry N3 and Industrial Orientation N3 were moved to Centurion (Gauteng N2 marking centre); and
- Waste-water Treatment Practice N2 and Welder's Theory N2 were moved from Centurion (Gauteng N2 marking centre) to Seshego (Limpopo N2 marking centre).

Where shortfalls in the marking personnel of particular subjects occurred, the recruitment was done by the marking centre. Substantial numbers of additional marking staff had to be recruited, e.g. at Centurion marking centre an additional 63 markers/chief markers/internal moderators were appointed for N2 and N3 subjects. The prescribed process was followed for the appointment of these personnel – i.e. completion of application forms, personal declarations, personal declaration and forms to release staff for marking. However, the evaluation of the appointments of these marking staff members revealed the following:

- With the exception of one, all the marking staff responsible for the marking of certain subjects was recruited from one college;
- There were appointments of markers/chief markers/internal moderators that did not meet some of the criteria;
- Appointment of one person for the marking of numerous subjects;
- Appointment of one person as marker for a subject(s), as a chief marker for another and internal moderator for yet another subject.

6.4 Areas of Good Practice

The following areas of good practices were identified:

- There were detailed processes in place for the recruitment, selection and appointment of marking personnel;
- The application forms for marking staff had been improved; and
- Appointed marking personnel received detailed information as to what was expected of them.

6.5 Areas of Concern

The following areas of concern occurred:

- The exclusion of experienced markers due to the implementation of the requirement that the applicant must have taught the subject at the particular level during the past two years;
- Limited number of marker applications received and subsequent large number of marking staff appointed at the marking centres that did not always meet all the criteria; and
- Lack of capacity to mark certain subjects.

6.6 Directives for Compliance/Improvement

The criteria for the appointment of marking personnel must be revised.

Viable solutions must be found for subjects that repeatedly pose challenges in terms of the recruitment and appointment of enough suitably qualified and experienced markers/chief markers/internal moderators.

7 MARKING GUIDELINE DISCUSSIONS AND VERIFICATION OF MARKING

7.1 Introduction

The moderation of marking is of vital importance, because it is mainly by means of the moderation process that the standard and quality of marking is verified.

It is crucial for Umalusi moderators to attend the marking guideline discussions to:

- Report on the standard of the meetings and the preparedness of the markers;
- Confirm the accuracy of the marking guidelines; and
- Observe and report on the sample marking.

Verifying the standard of marking to assure the quality of marking for consistency and accuracy evaluation is equally important. External verification of marking by Umalusi serves to monitor that marking is conducted according to agreed and established practices and standards.

Marking of N2 examination scripts is conducted at various decentralised provincial marking centres. The marking of most of the N3 scripts took place at the Pretoria West Campus of Tshwane South College.

Umalusi attended selected marking guideline discussions and verified the marking of a sample of N2 and N3 scripts from a range of examination centres and provinces.

7.2 Purpose

The purpose of this section is to report on:

- The standard of the marking guidelines and the marking guideline discussions;
- The standard and quality of the marking and internal moderation;
- The performance of students in specific examination papers;
- The reliability and viability of the systems, processes and procedures as planned and implemented at the marking centres;
- Identification of good practices as well as areas for improvement; and
- To make recommendations for improvement based on the findings.

7.3 Scope and Approach

Umalusi deployed seven moderators to attend a sample of the N3 (5) and N2 (2) marking guideline discussions (as listed below) on 2, 9 and 16 April 2016 at the Centurion and Pretoria West marking centres.

Table 12: Marking guideline discussions attended

No	Subject	Date	Marking centre
1.	Building Drawing N2	2 April 2016	Centurion
2.	Building Drawing N3	2 April 2016	
3.	Engineering Drawing N2	2 April 2016	
4.	Engineering Science N3	2 April 2016	
5.	Electro-Technology N3	9 April 2016	
6.	Mathematics N3	9 April 2016	
7.	Plant Operation Theory N3	16 April 2016	Pretoria West

Seven moderators were deployed to verify the marking of a sample of N3 scripts in eight subjects at the Pretoria West and Seshego Marking Centres respectively.

The Mathematics N3 scripts of five provinces were marked at four provincial marking centres, namely at Mpondozankomo (Mpumalanga), Thornton (Western Cape), Hillside View (Free State and Northern Cape) and Seshego (Limpopo).

The Mathematics N3 scripts of the other four provinces were marked at Pretoria West. The marking of the sampled scripts in Mathematics N3 was verified centrally, in order to determine the consistency of marking across the five marking centres. The Umalusi moderator for this subject analysed the consistency of implementation of the marking guidelines and marking for Mathematics N3 across the provincial and national marking centres.

Four moderators were deployed to verify the marking of a sample of N2 scripts in four subjects at the Centurion, Pretoria West, Seshego and Thornton Marking Centres.

Verification of marking was conducted for the following subjects (Table 13):

Table 13: Verification of marking conducted

No	Subject	Date	Marking centre
1.	Building and Civil Technology N3	23 April 2016	Pretoria West
2.	Building Science N2	19 April 2016	Thornton
3.	Electrical Trade Theory N3	24 April 2016	Pretoria West
4.	Engineering Science N2	22 April 2016	Seshego
5.	Fitting and Machining Theory N2	21 April 2016	Centurion
6.	Industrial Electronics N3	21 April 2016	Pretoria West
7.	Industrial Orientation N3	20 April 2016	Centurion
8.	Mathematics N3	25 and 26 April 2016	Pretoria West Centralised
9.	Mechanotechnology N3	23 April 2016	Pretoria West

No	Subject	Date	Marking centre
10.	Radio and Television Theory N3	23 April 2016	Pretoria West
11.	Refrigeration Trade Theory N2	17 April 2016	Centurion
12.	Supervision in Industry N3	22 April 2016	Centurion
13.	Waste-water Treatment Practice N3	17 April 2016	Seshego

Each moderator had to sample scripts from across the provinces marked at the specific marking centre. Table 14 indicates the number of scripts sampled and the provinces included in the sample per subject. It must be noted that not all subjects are offered or marked in all provinces.

Table 14: Verification of marking N3 and N2: subjects, number of provinces and number of sites per province

Subjects	Number of provinces	Western Cape	Northern Cape	Free State	Eastern Cape	KwaZulu - Natal	Mpumalanga	Limpopo	Gauteng	North West	Province 10*
Building and Civil Technology N3	9	1	0	1	1	1	1	1	1	1	1
Building Science N2	1	7	0	0	0	0	0	0	0	0	0
Electrical Trade Theory N3	8	2	0	0	1	2	3	3	4	2	2
Engineering Science N2	1	0	0	0	0	0	0	15	0	0	0
Fitting and Machining Theory N2	5	0	1	2	0	0	0	0	10	4	1
Industrial Electronics N3	7	2	0	0	0	3	3	3	3	3	2
Industrial Orientation N3	6	0	0	3	0	2	5	3	5	2	0
Mathematics N3	5	10	0	6	0	0	4	7	10	0	0
Mechanotechnology N3	10	2	1	2	2	2	2	1	2	2	2
Radio and Television Theory N3	3	2	0	0	0	0	0	2	3	0	0
Refrigeration Trade Theory N2	3	2	0	0	0	0	0	0	1	0	4
Supervision in Industry N3	8	1	1	1	0	1	2	3	5	3	0
Waste-water Treatment Practice N3	6	2	0	0	3	3	2	3	5	0	0

10* other e.g. foreign countries

7.4 Findings

Tables 15 and 16 reflect the findings during the N3 and N2 marking process of the subjects included in the sample.

Table 15: Findings: Marking guideline discussions N2 and N3

Criteria	Findings and challenges	Subjects concerned
APPOINTMENT OF AND ATTENDANCE OF MARKERS, CHIEF MARKERS AND INTERNAL MODERATORS AT THE MARKING GUIDELINE DISCUSSION MEETING	Chief markers/internal moderators were appointed by DHET before the marking guideline discussions in all the subjects.	All subjects
	43% of the chief markers/internal moderators received their appointment letters before the marking guideline discussions.	Electro-Technology N3 Mathematics N3 Plant Operation Theory N3
	57% of the chief markers/internal moderators received confirmation of their appointment telephonically or via SMS before the marking guideline discussions.	Building Drawing N2 and N3 Engineering Drawing N2 Engineering Science N3
	86% of the appointed chief markers/ internal moderators had adequate experience (\pm two years) in teaching and/or marking of the subject.	Building Drawing N3 Engineering Drawing N2 Engineering Science N3 Electro-Technology N3 Mathematics N3 Plant Operation Theory N3
	There was a newly appointed chief marker/internal moderator for one subject.	Building Drawing N2
	In only 29% of the subjects, both the chief marker and the internal moderator were present at the marking guideline discussions.	Engineering Science N3 Plant Operation Theory N3
	In 71% of the subjects, the chief marker/internal moderator attended the marking guideline discussion.	Building Drawing N2 and N3 Electro-Technology N3 Engineering Drawing N2 Mathematics N3
RECOMMENDED CHANGES TO THE QUESTION PAPER AND MARKING GUIDELINES DURING EXTERNAL MODERATION EFFECTED	All changes recommended by the external moderators were effected on all question papers and marking guidelines.	All sampled subjects
PREPAREDNESS OF THE CHIEF MARKERS AND INTERNAL MODERATORS FOR THE MARKING GUIDELINES DISCUSSION	Only 42% of chief markers/internal moderators/markers came prepared with their own compiled marking guidelines.	Building Drawing N2 Electro-Technology N3 Engineering Science N3
	58% of the chief markers/internal moderators/markers did not prepare their own marking guidelines for the listed subjects.	Building Drawing N3 Engineering Drawing N2 Mathematics N3 Plant Operation Theory N3

Criteria	Findings and challenges	Subjects concerned
COORDINATION OF THE MARKING GUIDELINE DISCUSSIONS	In 58% of the subjects, the chief marker chaired the marking guidelines discussion.	Engineering Drawing N2 Engineering Science N3 Mathematics N3 Plant Operation Theory N3
	In 14% of the subjects, the internal moderator chaired the discussion.	Electro-Technology N3
	In 28% of the subjects, the external moderator chaired the discussion.	Building Drawing N2 and N3
SAMPLE MARKING	All the chief marker/internal moderator/markers (100%) marked a sample of scripts.	All subjects
	In 86% of the subjects, the performance of marking staff was rated as good/excellent for sample marking.	Building Drawing N3 Electro-Technology N3 Engineering Drawing N2 Engineering Science N3 Mathematics N3 Plant Operation Theory N3
	The performance of the chief marker/s could not be rated, as all chief marker/s were absent.	Building Drawing N2
	In 86% of the subjects, the standard of internal moderation for the sample marking was rated as good/excellent.	Building Drawing N2 and N3 Electro-Technology N3 Engineering Drawing N2 Engineering Science N3 Plant Operation Theory N3
	In one subject, the standard of internal moderation for sample marking was rated as average/poor.	Mathematics N3
ADJUSTMENT OF MARKING GUIDELINES DURING THE DISCUSSIONS	In 71% of the subjects, justified changes/adjustments were made to the marking guidelines during the discussions.	Building Drawing N2 and N3 Electro-Technology N3 Engineering Science N3 Plant Operation Theory N3
ADJUSTMENT OF MARKING GUIDELINES AFTER SAMPLE MARKING	In all the subjects (100%), no adjustments/changes were made to the marking guidelines after sample marking.	All subjects
SIGNED OFF MARKING GUIDELINES	In all the subjects (100%), the external moderator signed off the marking guidelines.	All subjects
TRANSLATED MARKING GUIDELINES	In 86% of the subjects, translated versions of the marking guidelines were not available.	Building Drawing N3 Electro-Technology N3 Engineering Drawing N2 Engineering Science N3 Mathematics N3 Plant Operation Theory N3

Criteria	Findings and challenges	Subjects concerned
TRANSLATED MARKING GUIDELINES	Translated versions of the marking guidelines were available for one subject only.	Building Drawing N2
COPY OF THE ADJUSTED MARKING GUIDELINES AND MINUTES OF MEETING SUBMITTED TO MARKING CENTRE MANAGER	Minutes of the marking guideline discussions were submitted or were in the process of being prepared to be submitted to the marking centre manager for all subjects.	All subjects
THE OVERALL BEHAVIOUR OF THE MARKING STAFF DURING THE MARKING GUIDELINES DISCUSSIONS	No problems were experienced with the marking staff during the marking guideline discussions for all subjects.	All subjects

Table16: Findings: Verification of marking N2 and N3

Criteria	Findings and challenges	Subjects concerned
AVAILABILITY OF SCRIPTS FOR MARKING AND MODERATION	In 92% of the subjects, all the scripts to be marked and moderated were available.	Building and Civil Technology N3 Building Science N2 Electrical Trade Theory N3 Engineering Science N2 Fitting and Machining Theory N2 Industrial Orientation N3 Mechanotechnology N3 Radio and Television Theory N3 Refrigeration Trade Theory N2 Supervision in Industry N3 Waste-water Treatment Practice N3
	In one subject at Pretoria West, not all scripts to be marked and moderated were received on time.	Industrial Electronics N3
QUALITY OF MARKING GUIDELINES	In the listed subjects (33%), no changes were effected to the marking guidelines at the marking guideline discussion held at the marking centre.	Engineering Science N2 Industrial Orientation N3 Refrigeration Trade Theory N2 Supervision in Industry N3
	In the listed subjects (67%), changes were effected to marking guideline at the marking guideline discussion held at the marking centre.	Building and Civil Technology N3 Building Science N2 Electrical Trade Theory N3 Fitting and Machining Theory N2 Industrial Electronics N3 Mechanotechnology N3 Radio and Television Theory N3 Waste-water Treatment Practice N3

Criteria	Findings and challenges	Subjects concerned
QUALITY OF MARKING GUIDELINES	In 86% of the subjects, there were no further additions made during the marking process.	Building and Civil Technology N3 Building Science N2 Electrical Trade Theory N3 Engineering Science N2 Fitting and Machining Theory N2 Industrial Orientation N3 Mechanotechnology N3 Radio and Television Theory N3 Refrigeration Trade Theory N2 Waste-water Treatment Practice N3
	In the two listed subjects, additions were made during the marking process.	Industrial Electronics N3 Supervision in Industry N3
TRAINING FOR MARKING	The marking staff received training for all the subjects.	All subjects
MARKING PROCEDURE	In 83% of the subjects, question-wise marking was utilised, with each marker assigned specific question/s for marking.	Building and Civil Technology N3 Building Science N2 Electrical Trade Theory N3 Engineering Science N2 Fitting and Machining Theory N2 Industrial Electronics N3 Industrial Orientation N3 Mechanotechnology N3 Supervision in Industry N3 Waste-water Treatment Practice N3
ADHERENCE TO MARKING GUIDELINES	In 83% of the subjects, good adherence to the marking guidelines was evident.	Building and Civil Technology N3 Building Science N2 Electrical Trade Theory N3 Engineering Science N2 Fitting and Machining Theory N2 Industrial Electronics N3 Industrial Orientation N3 Mechanotechnology N3 Radio and Television Theory N3 Waste-water Treatment Practice N3
	Poor adherence to the marking guidelines was evident for the listed subject only.	Refrigeration Trade Theory N2
	Average adherence to marking guidelines was observed in one subject.	Supervision in Industry N3
STANDARD OF MARKING/ PERFORMANCE OF MARKERS	In 75% of the subjects, the standard of marking was rated as good.	Building and Civil Technology N3 Electrical Trade Theory N3 Engineering Science N2 Industrial Electronics N3 Industrial Orientation N3 Mechanotechnology N3 Radio and Television Theory N3 Supervision in Industry N3 Waste-water Treatment Practice N3

Criteria	Findings and challenges	Subjects concerned
STANDARD OF MARKING/ PERFORMANCE OF MARKERS	The standard of marking was rated as average for the two listed subjects.	Building Science N2 Fitting and Machining Theory N2
	The standard of marking was rated as poor for the listed subject. There was no consistency in the marking and the mark allocation.	Refrigeration Trade Theory N2
ADMINISTRATION	The prescribed procedure for allocation of marks was followed. Marks were clearly indicated per question, mistakes clearly indicated and marks transferred correctly to the cover page. Marks were correctly transferred to the mark sheet, where this could be verified for 83% of the subjects.	Building Science N2 Electrical Trade Theory N3 Engineering Science N2 Industrial Electronics N3 Industrial Orientation N3 Mechanotechnology N3 Radio and Television Theory N3 Refrigeration Trade Theory N2 Supervision in Industry N3 Waste-water Treatment Practice N3
	For the two listed subjects, the prescribed procedure for administration was followed, except that mistakes were not clearly indicated or mark sheets were not completed correctly.	Building and Civil Technology N3 Fitting and Machining Theory N2
	In 50% of the subjects, there was evidence that notes were kept throughout the marking period to facilitate report writing.	Building and Civil Technology N3 Building Science N2 Engineering Science N2 Industrial Orientation N3 Radio and Television Theory N3 Supervision in Industry N3
	In 50% of the subjects, no notes were kept or it could not be determined during the external moderator's visit.	Electrical Trade Theory N3 Fitting and Machining Theory N2 Industrial Electronics N3 Mechanotechnology N3 Refrigeration Trade Theory N2 Waste-water Treatment Practice N3
CONTROL	In 83% of the subjects, the name of the marker/code was clearly indicated in red ink on the cover page of the script and the name of the internal marker was clearly indicated on the scripts.	Building and Civil Technology N3 Building Science N2 Electrical Trade Theory N3 Engineering Science N2 Fitting and Machining Theory N2 Industrial Electronics N3 Mechanotechnology N3 Radio and Television Theory N3 Supervision in Industry N3 Waste-water Treatment Practice N3

Criteria	Findings and challenges	Subjects concerned
CONTROL	In one subject, the name of the marker/code was clearly indicated in red ink on the cover page of the script, but the name of the internal marker was not clearly indicated on the scripts.	Industrial Orientation N3
	The name/code of the marker and internal moderator was not clearly indicated on the script for one subject.	Refrigeration Trade Theory N2
INTERNAL MODERATION	In 92% of the subjects, there was evidence of internal moderation of scripts throughout the marking process.	Building and Civil Technology N3 Building Science N2 Electrical Trade Theory N3 Engineering Science N2 Fitting and Machining Theory N2 Industrial Electronics N3 Industrial Orientation N3 Mechanotechnology N3 Radio and Television Theory N3 Supervision in Industry N3 Waste-water Treatment Practice N3
	There was no evidence of moderation or no internal moderator appointed for the listed subject.	Refrigeration Trade Theory N2
	In 75% of the subjects, scripts from the majority of marking centres were moderated or were in the process of being moderated.	Building and Civil Technology N3 Building Science N2 Electrical Trade Theory N3 Engineering Science N2 Fitting and Machining Theory N2 Industrial Electronics N3 Industrial Orientation N3 Mechanotechnology N3 Supervision in Industry N3
	In the two listed subject, scripts from some marking centres were not moderated.	Radio and Television Theory N3 Waste-water Treatment Practice N3
	In 92% of the subjects, whole script moderation was conducted by the chief marker/ the internal moderator.	Building and Civil Technology N3 Building Science N2 Electrical Trade Theory N3 Engineering Science N2 Fitting and Machining Theory N2 Industrial Electronics N3 Industrial Orientation N3 Mechanotechnology N3 Radio and Television Theory N3 Supervision in Industry N3 Waste-water Treatment Practice N3

Criteria	Findings and challenges	Subjects concerned
INTERNAL MODERATION	The standard of moderation was average for the listed subjects.	Building Science N2 Fitting and Machining Theory N2
	In 83% of the subjects, the standard of moderation was good.	Building and Civil Technology N3 Engineering Science N2 Electrical Trade Theory N3 Industrial Electronics N3 Industrial Orientation N3 Mechanotechnology N3 Radio and Television Theory N3 Refrigeration Trade Theory N2 Supervision in Industry N3 Waste-water Treatment Practice N3
	In 83% of the subjects, the prescribed percentage of scripts was internally moderated by either the chief marker or the internal moderator.	Building and Civil Technology N3 Building Science N2 Engineering Science N2 Fitting and Machining Theory N2 Industrial Orientation N3 Mechanotechnology N3 Radio and Television Theory N3 Refrigeration Trade Theory N2 Supervision in Industry N3 Waste-water Treatment Practice N3
	It could not be ascertained if the required percentage of scripts was internally moderated for the two subjects listed.	Electrical Trade Theory N3 Industrial Electronics N3
RESPONSE TO THE EXAMINATION QUESTION PAPER	In 83% of the subjects, the students' performance was in line with the predicted expectations and the paper was regarded as fair for candidates.	Building and Civil Technology N3 Electrical Trade Theory N3 Engineering Science N2 Fitting and Machining Theory N2 Industrial Electronics N3 Industrial Orientation N3 Mechanotechnology N3 Radio and Television Theory N3 Refrigeration Trade Theory N2 Waste-water Treatment Practice N3
PREVENTION AND HANDLING OF IRREGULARITIES	In 58% of the subjects, there were irregularities reported, ranging from crib notes, irregular invigilation, student copying from another student and student with two examination numbers.	Building and Civil Technology N3 Fitting and Machining Theory N2 Industrial Electronics N3 Industrial Orientation N3 Mechanotechnology N3 Refrigeration Trade Theory N2 Waste-water Treatment Practice N3
	In 42% of the subjects, no evidence of irregularities were reported.	Building Science N2 Electrical Trade Theory N3 Engineering Science N2 Radio and Television Theory N3 Supervision in Industry N3

Criteria	Findings and challenges	Subjects concerned
PERFORMANCE OF CANDIDATES	In 83% of the subjects, valuable information with regard to the performance of different centres and for different sections of the work was supplied by the internal moderator/chief marker.	Building and Civil Technology N3 Building Science N2 Engineering Science N2 Fitting and Machining Theory N2 Industrial Electronics N3 Industrial Orientation N3 Mechanotechnology N3 Refrigeration Trade Theory N2 Radio and Television Theory N3 Supervision in Industry N3
	No evidence was available at the time of writing the external moderator report for the two listed subjects.	Electrical Trade Theory N3 Waste-water Treatment Practice N3
PREPARATION OF MARKER AND INTERNAL MODERATOR REPORTS	In 75% of the subjects, the qualitative reports were prepared to be submitted to centre management after the marking process.	Building and Civil Technology N3 Building Science N2 Electrical Trade Theory N3 Engineering Science N2 Fitting and Machining Theory N2 Industrial Orientation N3 Mechanotechnology N3 Radio and Television Theory N3 Supervision in Industry N3
	No qualitative reports were prepared at the time of the external moderator's visit as marking was still in progress for the listed subjects.	Industrial Electronics N3 Refrigeration Trade Theory N2 Waste-water Treatment Practice N3
RECOMMENDATIONS TO IMPROVE MARKING AND THE PROCESS OF MARKING	<p>Moderators mentioned the following:</p> <ul style="list-style-type: none"> • Internal moderators should not be allowed to mark scripts, but should concentrate on moderation; • Intensive and continual training of new markers are required; • Moderators should write their moderated mark in the correct column of the script; • Language barriers need to be looked at during marking; • Communication between the marking centres should continue until after sample marking to finalise the marking guidelines; and • The making of notes during marking must be compulsory. 	

7.4.1 Verification of Mathematics N3 Across the Marking Centres

Based on the information in the reports, the marking process could be regarded as fair. A system of marking per question was used at most of the marking centres. By applying question-wise marking, subjectivity – where a marker needed to make a judgement call whether or not to award a mark for a specific answer – was minimised. It also consequently improved consistency overall.

Only two provincial marking centres (Western Cape and Gauteng) submitted the marking guidelines that they had used. During the investigation, it became evident that some of the marking centres did not mark the alternative/extended answers (indicated in red on the amended marking guidelines), as prescribed by the standard marking guidelines.

The marking of Mathematics N3 for April 2016 cycle was analysed in detail to show the nature and frequency of common marking errors made during marking, with reference to the relationship between the nature of the question (higher order questions, calculations, etc.) and the type of error.

Questions that required analysis and synthesis could be solved by applying more than one method. During the standardisation of marking guidelines and sample marking, the team tried to enrich the marking guideline with all possible alternatives.

The postponement of the second phase of dummy marking (where batches from different marking centres were marked) to the day before marking would commence, left a gap and had an effect on the quality of the final marking guidelines.

Markers from all the centres found it difficult to recognise and credit the alternatives. It was evident that some of the markers did not have the ability to interpret the response correctly.

7.4.1.1 Consistent Implementation of the Marking Guidelines Across Different Marking Centres

All the alternative answers added to the marking guidelines were accepted by all provinces, with the exception of one, which was only accepted by Western Cape. It is evident that there is a need for better co-ordination regarding the implementation and utilisation of the final marking guidelines.

7.4.1.2 Consistency of Marking Across Marking Centres

Discrepancies mostly appeared with the awarding of marks for alternative solutions. The 'carry forward' of a careless mistake was not always treated consistently.

7.5 Areas of Good Practice

7.5.1 Marking Guideline Discussions

All the question papers and marking guidelines were correct and changes suggested during the external moderation were effected. After the first marking guideline discussion, sample marking was conducted for all subjects. In 86% of the subjects, the performance of chief markers and internal moderators were regarded as good or excellent after the sample marking.

7.5.2 Verification of Marking

In 92% of the subjects, all scripts were received on time. All marking staff received training before the marking commenced. Discipline at all marking centres was considered commendable. The markers signed the registers daily and stayed at marking centres for the duration of the marking.

In 83% of the subjects, question-wise marking was utilised to improve consistency of marking. According to reports, marking staff adhered to the marking guidelines in 83% of the subjects and the standard of marking was rated as good in 75% of the subjects.

Some chief markers and internal moderators exceeded their expected percentage of scripts to be moderated. The qualitative reports that were available by the time of external moderation were of an acceptable standard.

7.6 Areas of Concern

7.6.1 Marking Guideline Discussions

N2 panels, not consisting of the agreed-upon three chief markers and an internal moderator to finalise the marking guidelines, forfeit the purpose of constituting a panel to finalise marking guidelines before it is distributed to provincial marking centres. For example, on the date of the marking guideline discussion of Building Drawing N2, only the internal moderator was present.

7.6.2 Verification of Marking

The significant difference in marks between the external moderator and the marker for Refrigeration Trade Theory needs further investigation. The external moderator recommended remarking for the subject.

The number of irregularities reported continues to be high. The possible leakage of the Mechanotechnology N3 question paper needs to be investigated – The crib notes found with students had answers that matched those in the marking guidelines in terms of numbering.

7.7 Directives for Compliance/Improvement

Applications of markers should be screened to identify markers who apply for more than one subject before the actual evaluation process.

Markers should be appointed well in advance to avoid delays in marking and this being used as an excuse for not coming prepared to the marking centre. Appropriate action must be taken, if markers do not come prepared, as it is clearly stipulated in the contract that they must come prepared. There must be enough markers from the start of the process.

A sample of scripts for all subjects across all examination centres should be moderated by the internal moderator.

The process for the finalisation of N2 marking guidelines must be improved to ensure that justice is done. It is of utmost importance that the finalisation of marking guidelines is a dedicated process in which justice is done to the preparation, discussions, as well as the dummy and sample marking to ensure high quality final marking guidelines and a clear understanding of all markers on the implementation of the marking guidelines.

8 STANDARDISATION AND RESULTING

8.1 Introduction and Purpose

Standardisation is a statistical moderation process that is used to mitigate the effects of factors other than learners' ability and knowledge on performance. The standardisation of examination results is necessary to reduce the variability of marks from one examination to the next. The sources of variability may include the standard of question papers, as well as the quality of marking. In this way, standardisation ensures that a relatively constant product is delivered to the market.

Section 17A (4) of the GENFETQA Act of 2001, as amended in 2008, states:

The Council may adjust raw marks during the standardisation process. It is thus part of Umalusi's mandate. The process involves various procedures to ensure that the standardisation process is conducted accurately. This includes:

- The verification of subject structures, capturing of marks and the computer system of the assessment body;
- The development and verification of norms; and
- The verification of standardisation data booklets.

The process is concluded with the approval of mark adjustments (where required) per subject.

During the statistical moderation process, qualitative reports from external moderators, internal moderators, monitoring of marking reports, as well as the principles of standardisation are taken into consideration to carry out the statistical moderation process.

8.2 Scope and Approach

8.2.1 Developing Historical Averages

The subject structures submitted by the DHET were verified and approved. The historical norm was calculated from the previous examination sittings. Outliers were identified and the principle of exclusion was applied on the subjects with outliers.

8.2.2 Capturing of Marks

Umalusi did not manage to conduct the verification of the capturing of marks at any of the DHET marking centres.

8.2.3 Verifying Data Sets and Standardisation Booklets

The data sets were verified before the printing of the final standardisation booklets. The number of candidates processed, the calculation of the norms, the adjusted mark, raw mark and the graphs were verified and approved after a number of rectifications had been made.

8.2.4 Pre-Standardisation and Standardisation

The qualitative input reports, historical averages, pairs analysis, as well as the standardisation principles were scrutinised to determine the adjustments required (where necessary) per subject.

8.2.5 Post Standardisation

The assessment body was required to submit the adjusted data sets as per the agreed standardisation decisions. These were verified after one moderation and adjustments were approved after the rectification of the differences.

8.3 Findings and Decisions

8.3.1 Developing Historical Averages

The historical norm for the NATED Report 190/191: Engineering Studies was submitted, verified and approved in time. A small problem was encountered in the capturing of the norms, but it was rectified.

8.3.2 Verifying Data Sets and Standardisation Booklets

The DHET systems were verified, until the statistical moderation before the April 2016 examinations. Data sets were verified and approved after several moderations.

8.3.3 Standardisation Decisions

The DHET presented a total of 51 instructional offerings for the standardisation, statistical moderation and resulting of the NATED Report 190/191: Engineering Studies N2 and N3 programme. A total of 46 subjects were standardised – Two of which were provisionally standardised, one pending 95% capture rate and one pending confirmation of an alleged irregularity. Five subjects were not standardised, four of which due to a low capture rate of 70%–80% and one that had to be remarked due to poor marking.

Table 17: Standardisation decisions NATED Report 190/191 Part 1: Engineering Studies

Description		Total
Number of instructional offerings presented		46
Raw marks accepted		18
Adjusted mainly upwards		26
Adjusted mainly downwards		none
Provisionally standardised		2
Pending an achievement of 95% capture rate – raw marks accepted	1	
Pending investigation outcome	1	

Description		Total
Not standardised		5
Due to extremely low capture rate	4	
Due to inconsistent marking	1	
Number of instructional offerings standardised		51

8.4 Areas of Good Practice

The following areas of good practice were identified:

- Norms were approved at the first phase of moderation;
- DHET submitted datasets and booklets within specified timeframes; and
- DHET presented booklets with no mistakes, aligning Book 1 pages with Book 2, the pairs analysis table arranged in chronological order.

8.5 Areas of Concern

The following areas of concern were identified:

- The subjects not standardised due to low capture rate; and
- The high number of candidates absent for examinations.

8.6 Directives for Compliance/Improvement

The DHET must ensure that the capturing rate complies with policy by the time of standardisation.

9 CONCLUSION

The NATED Report 190/191: Engineering Studies programmes remain a popular “qualification” that is offered at several private and public colleges. It is the responsibility of the implementers of these programmes to prepare students for the world-of-work. Although many institutions are in a trap of training as only a money-making business, there are institutions that support the students to the best of their abilities.

It is the responsibility of all TVET colleges to advocate the mission of the DHET to develop capable, well-educated and skilled citizens, who are able to compete in a sustainable way.

The improved secured packaging and nodal points used as distribution points are initiatives that immensely reduce the possibility of serious irregularities, such as paper leakages. Continuous monitoring and reviewing of the processes will be highly beneficial upholding the integrity of the examinations.

This report presented pockets of evidence that point to incidents of negligence and non-compliance, of varying magnitude, that occurred in various centres. However, none of the incidents reported compromised the credibility and integrity of this examination.

The issue of appointing marking staff remains a challenge that requires immediate intervention. The following concerns require particular attention:

- Late recruitment and appointment of additional markers;
- Failure to attend marking guideline discussion meetings; and
- Markers failing to report for duty on time and not being prepared for the marking process.

It is imperative for marking personnel to be appointed well in advance, that they honour their appointments, prepare in advance for the marking guidelines discussions, as well as for the marking process. Appointment letters should be sent out well in advance and, if electronic communication is used, then all colleges should be informed accordingly.

Although a number of improvements was identified during the marking guidelines discussions and verification of marking for April 2016 NATED Report 190/191: Engineering Studies, the high rate of reported irregularities reported at the marking centres and private colleges that are repeatedly implicated are matters that need to be attended to urgently.

The process of assessment of the April 2016 NATED Report 190/191: Engineering Studies can be described as generally valid and reliable. Most question papers appeared to be fair to the candidates and the performance of most candidates was in keeping with expectations. There was also a generally acceptable standard of marking and moderation in the majority of subjects.

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