



The Ns and the Engineering NC(V)

***NC: N2-N3 Engineering Science/NC(V)
Engineering Systems L2, Materials
Technology L3 and Applied Engineering
Technology L4,***

NC(V) Seminar

19 March 2013



Subjects compared

NC: N2 – N3	NC(V)
Engineering Science N2	Engineering Systems Level 2
	Material Technology L3
	Applied Engineering Technology L4
Engineering Science N3	Engineering Systems Level 2
	Material Technology L3
	Applied Engineering Technology L4

Curriculum evaluation findings

- Skills focus
- Content overlap
- Strengths and gaps of the NC: N2 – N3 curriculum
- Strengths and gaps of the NC(V) curriculum
- Articulation options
- Access to an apprenticeship on completion of the NC(V)

Skills focus

NC: N2 – N3 Eng Science

- The focus is on the acquisition of theory that is based on the discipline of science and is generic but has reference to the different trades involved

NC(V): Eng Systems L2 , Mat Technology L3, App Eng Tech L4

- Engineering System L2—The focus is on various systems in a vehicle or machinery and is generic has reference to other subjects
- Material Technology L3--The focus is on materials commonly used for components in the mechanical engineering field.
- Applied Engineering Technology—Main focus is on evaluation and monitoring of components manufactured by modern technological equipment in the workplace

Content overlap

[Engineering Science.docx](#)

Strengths and Gaps of the NC: N2 – N3 Curriculum

Strengths of NC: N2 – N3 Eng Science	Gaps of NC: N2 – N3 Eng Science
• From page 40	• No practical exposure • Old syllabus • Covers topics superficially over short period (generalizes) • Content not conceptually demanding • No clear weighting and specifications

Strengths and gaps: NC(V) Engineering Science curriculum

Strengths of NC(V): Eng Systems L2, Mat Tech L3, App Eng Tech L4

- It is based on the latest trends and developments in the industry and commercial sectors, which broadens the knowledge of learners in the changing and challenging world of work.

Gaps of NC(V): Eng Systems L2, Mat Tech L3, App Eng Tech L4

- The curriculum *is currently too long (overloaded) and too demanding to teach and learn.*

Articulation options

- Due to the amount and depth of the content in the NC (V) and the practical component, it is not advisable for those learners who have successfully completed the NC: N2 to transfer to NC (V) Level 3 or for those learners who have successfully completed the NC: N3 to transfer to the NC (V) Level 4.
- Currently, an NC: N3 learner cannot articulate directly with higher education qualifications at NQF Level 5 and Level 6 irrespective of their performance at NC: N3 level. First, they have to go through NC: N4 and with a pass in Maths and Engineering Science at NC: N4 level, they can then gain access into a University of Technology.

Examination analysis findings

- Compliance with Assessment Guidelines
- The levels of difficulty and cognitive demands
- Comparability of the examination papers
- Papers as models for future examinations
- Standards and level of the paper with regards to language

Compliance with Assessment Guidelines

NC: N3 Eng Science	NC(V): Applied Eng Tech L4
• The spread of questions across the levels of cognitive demands shows that the NC: N3 papers did not comply with the requirements as prescribed in the NC: N3 syllabus for Engineering Science (DoE, 1994). • Scanning through the other previous question papers and even the 2010 August Engineering Science N3 revealed that most of them did not comply with this requirement.	• With regard to the 2009 NC (V) Applied Engineering Technology (AET) L4 exam paper, the paper did not comply with the distribution of cognitive demands as stated in the Assessment Guidelines of the Department of Education (2007:160).

The levels of difficulty and cognitive demands

Cognitive demands and levels of difficulty – Nov 2009 NC (V)
Applied Engineering Technology L4 and Aug 2010 N3
Engineering Science.

Levels of cognitive demand	AET L4	Engineering Science N3		Levels of difficulty	AET L4	Engineering Science N3
Conceptual knowledge	31%	17%		Easy	32%	51%
Comprehension	44%	1%		Moderate	62%	29%
Application	15%	10%		Difficult	6%	20%
Analysis & problem solving	6%	70%				
Evaluation & synthesis	4%	2%				

Table 46: NC(V)ISAT 2009 Cognitive demands and levels of difficulty

Levels of cognitive demand		Levels of difficulty	
Conceptual knowledge	0 %	Easy	9 %
Comprehension	24 %	Moderate	16 %
Application	40 %	Difficult	75 %
Analysis & problem solving	28 %		
Evaluation & synthesis	8 %		

Comparability of the exam papers

NC: N3 Eng Science	NC(V) Appl Eng Tech L4
• N3 has one paper. • The syllabus requires questions in a paper to cover 40% of the marks at the level of reproducing (i.e. conceptual knowledge and comprehension/recall), 25% of the marks at the level of application, 20% of the marks at the level of analysis and 15% of the marks at the level of evaluation. • The N3 paper leans towards application and problem solving , but neglected the other cognitive demands	• The NC (V) has two question papers, a theory and a practical paper • The practical paper (ISAT) leans towards application and problem-solving, while the theory paper leans towards knowledge and understanding. • The application level, which was supposed to have 50% of the marks, had only 15% of the marks allocated to application questions

Papers as models for future exams

NC: N3 Eng Science

- In terms of the weighted values of topics in the examination, they were not in accordance with what is specified in the syllabus.
- The question paper tested more analysis and problem- solving than other levels of cognitive demands such as conceptual knowledge, comprehension and evaluation and synthesis.
- It is not a well balance paper, hence is not a ideal future model for exams

NC(V): Appl Eng Tech L4

- Even though the examination paper complied with the Subject and Assessment Guidelines in terms of the weighted values of topics, it is *not a good model for future exams because of an unfair allocation of marks and time, which did not always match the amount of effort required from the learners in answering the question.*

Standards and level of the paper with regards to language

NC: N3 Eng Science

- The language level was appropriate and the subject terminology was correctly used. There is no grammatical confusion and sentences are well structured. The format of the question papers is user friendly and easy to read and comprehend.
- It is, however, worth noting that the standard, format and quality of all the question papers analysed, although acceptable, are not of good standard, as they do not comply with the guidelines.

NC(V) Applied Eng Tech L4

- The language level was appropriate and the subject terminology was correctly used. There is no grammatical confusion and sentences are well structured. The format of the question papers is user friendly and easy to read and comprehend.

Recommendations with regards to curriculum findings

- The three subjects that correspond to Engineering Science should be designed in such a manner that they become consistent in terms of sequencing and progression of content and skills in order to form a more unified, cohesive learning programme.
- The syllabuses of the NC: N2 and NC: N3 need to be more detailed because currently they do not provide sufficient guidance to the lecturers in terms of content depth and breadth or assessment.
- The syllabus only provides content in the form of topics. Therefore the syllabus needs to be better structured so that there are clear subject objectives that are achieved through clearly specified outcomes which will help to define the breadth and depth of the content to be covered.
- The much called-for re-curriculation of the N-course syllabi is needed not only to update the content of the courses, but also to provide specified objectives or outcomes for each curriculum to guide the teaching, learning and assessment.

Recommendations with regards to exam findings