education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL CURRICULUM STATEMENT GRADES 10-12 (GENERAL)

SUBJECT ASSESSMENT GUIDELINES

INFORMATION TECHNOLOGY

JANUARY 2008

PREFACE TO SUBJECT ASSESSMENT GUIDELINES

The Department of Education has developed and published Subject Assessment Guidelines for all 29 subjects of the National Curriculum Statement (NCS). These Assessment Guidelines should be read in conjunction with the relevant Subject Statements and Learning Programme Guidelines.

Writing Teams established from nominees of the nine provincial education departments and the teacher unions formulated the Subject Assessment Guidelines. The draft copies of the Subject Assessment Guidelines developed by the Writing Teams were sent to a wide range of readers, whose advice and suggestions were considered in refining these Guidelines. In addition, the Department of Education field-tested the Subject Assessment Guidelines in 2006 and asked for the comments and advice of teachers and subject specialists.

The Subject Assessment Guidelines are intended to provide clear guidance on assessment in Grades 10 to 12 from 2008.

The Department of Education wishes you success in the teaching of the National Curriculum Statement.

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1. PURPOSE OF THE SUBJECT ASSESSMENT GUIDELINES

This document provides guidelines for assessment in the National Curriculum Statement Grades 10 - 12 (General). The guidelines must be read in conjunction with *The National Senior Certificate: A Qualification at Level 4 on the National Qualifications Framework (NQF)* and the relevant Subject Statements. The Subject Assessment Guidelines will be applicable for Grades 10 to 12 from 2008.

The Department of Education encourages teachers to use these guidelines as they prepare to teach the National Curriculum Statement. Teachers should also use every available opportunity to hone their assessment skills. These skills relate both to the setting and marking of assessment tasks.

2. ASSESSMENT IN THE NATIONAL CURRICULUM STATEMENT

2.1 Introduction

Assessment in the National Curriculum Statement is an integral part of teaching and learning. For this reason, assessment should be part of every lesson and teachers should plan assessment activities to complement learning activities. In addition, teachers should plan a formal year-long Programme of Assessment. Together the informal daily assessment and the formal Programme of Assessment should be used to monitor learner progress through the school year.

Continuous assessment through informal daily assessment and the formal Programme of Assessment should be used to:

- develop learners' knowledge, skills and values
- assess learners' strengths and weaknesses
- provide additional support to learners
- revisit or revise certain sections of the curriculum and
- motivate and encourage learners.

In Grades 10 and 11 all assessment of the National Curriculum Statement is internal. In Grade 12 the formal Programme of Assessment which counts 25% is internally set and marked and externally moderated. The remaining 75% of the final mark for certification in Grade 12 is externally set, marked and moderated. In Life Orientation however, all assessment is internal and makes up 100% of the final mark for promotion and certification.

2.2 Continuous assessment

Continuous assessment involves assessment activities that are undertaken throughout the year, using various assessment forms, methods and tools. In Grades 10-12 continuous assessment comprises two different but related activities: informal daily assessment and a formal Programme of Assessment.

2.2.1 Daily assessment

The daily assessment tasks are the planned teaching and learning activities that take place in the subject classroom. Learner progress should be monitored during learning activities. This informal daily monitoring of progress can be done through question and answer sessions; short assessment tasks completed during the lesson by individuals, pairs or groups or homework exercises.

Individual learners, groups of learners or teachers can mark these assessment tasks. Self-assessment, peer assessment and group assessment actively involves learners in assessment. This is important as it allows learners to learn from and reflect on their own performance.

The results of the informal daily assessment tasks are not formally recorded unless the teacher wishes to do so. In such instances, a simple checklist may be used to record this assessment. However, teachers may use the learners' performance in these assessment tasks to provide verbal or written feedback to learners, the School Management Team and parents. This is particularly important if barriers to learning or poor levels of participation are encountered.

The results of these assessment tasks are not taken into account for promotion and certification purposes.

2.2.2 Programme of Assessment

In addition to daily assessment, teachers should develop a year-long formal Programme of Assessment for each subject and grade. In Grades 10 and 11 the Programme of Assessment consists of tasks undertaken during the school year and an end-of-year examination. The marks allocated to assessment tasks completed during the school year will be 25%, and the end-of-year examination mark will be 75% of the total mark. This excludes Life Orientation.

In Grade 12, the Programme of Assessment consists of tasks undertaken during the school year and counts 25% of the final Grade 12 mark. The other 75% is made up of externally set assessment tasks. This excludes Life Orientation where the internal assessment component counts 100% of the final assessment mark.

The marks achieved in each assessment task in the formal Programme of Assessment must be recorded and included in formal reports to parents and School Management Teams. These marks will determine if the learners in Grades 10 and 11 are promoted. In Grade 12, these marks will be submitted as the internal continuous assessment mark. Section 3 of this document provides details on the weighting of the tasks for promotion purposes.

2.2.2.1 Number and forms of assessment required for Programmes of Assessment in Grades 10 and 11

The requirements for the formal Programme of Assessment for Grades 10 and 11 are summarised in Table 2.1. The teacher must provide the Programme of Assessment to the subject head and School Management Team before the start of the school year. This will be used to draw up a school assessment plan for each of the subjects in each grade. The proposed school assessment plan should be provided to learners and parents in the first week of the first term.

Table 2.1: Number of assessment tasks which make up the Programme of Assessment by subject in Grades 10 and 11

SUBJECTS		TERM 1	TERM 2	TERM 3	TERM 4	TOTAL
Language 1: Home Language		4	4*	4	4*	16
Language 2: Choice of HL or FAL	HL	4	4*	4	4*	16
	FAL	4	4*	4	4*	16
Life Orientation		1	1*	1	2*	5
Mathematics or Maths Literacy		2	2*	2	2*	8
Subject choice 1**		2	2*	2	1*	7
Subject choice 2**		2	2*	2	1*	7
Subject choice 3		2	2*	2	1*	7

Note:

* One of these tasks must be an examination

** If one or two of the subjects chosen for subject choices 1, 2 or 3 include a Language, the number of tasks indicated for Languages 1 and 2 at Home Language (HL) and First Additional Language (FAL) are still applicable. Learners who opt for a Second Additional Language are required to complete 13 tasks in total: 4 tasks in term 1 and 3 tasks in each of terms 2, 3 and 4.

Two of the assessment tasks for each subject must be examinations. In Grades 10 and 11 these examinations should be administered in mid-year and November. These examinations should take account of the requirements set out in Section 3 of this document. They should be carefully designed and weighted to cover all the Learning Outcomes of the subject.

Two of the assessment tasks for all subjects, excluding Life Orientation, should be tests written under controlled conditions at a specified time. The tests should be written in the first and third terms of the year.

The remainder of the assessment tasks should not be tests or examinations. They should be carefully designed tasks, which give learners opportunities to research and explore the subject in exciting and varied ways. Examples of assessment forms are debates, presentations, projects, simulations, written reports, practical tasks, performances, exhibitions and research projects. The most appropriate forms of assessment for each subject are set out in Section 3. Care should be taken to ensure that learners cover a variety of assessment forms in the three grades.

The weighting of the tasks for each subject is set out in Section 3.

2.2.2.2 Number and forms of assessment required for Programme of Assessment in Grade 12

In Grade 12 all subjects include an internal assessment component, which is 25% of the final assessment mark. The requirements of the internal Programme of Assessment for Grade 12 are summarised in Table 2.2. The teacher must provide the Programme of Assessment to the subject head and School Management Team before the start of the school year. This will be used to draw up a school assessment plan for each of the subjects in each grade. The proposed school assessment plan should be provided to learners and parents in the first week of the first term.

Table 2.2: Number of assessment tasks which make up the Programme of Assessment by subject in Grade 12

SUBJECTS		*TERM 1*	TERM 2	TERM 3	TERM 4	TOTAL
Language 1: Home Language		5	5*	4*		14
Language 2: Choice of HL or FAL	HL	5	5*	4*		14
	FAL	5	5*	4*		14
Life Orientation		1	2*	2*		5
Mathematics or Maths Literacy		3	2*	2*		7
Subject choice 1**		2	2*	(2*) 3*		(6#) 7
Subject choice 2**		2	2*	(2*) 3*		(6#) 7
Subject choice 3		2	2*	(2*) 3*		(6#) 7

Note:

* One of these tasks in Term 2 and/or Term 3 must be an examination

** If one or two of the subjects chosen for subject choices 1, 2 or 3 include a Language, the number of tasks indicated for Languages 1 and 2 at Home Language (HL) and First Additional Language (FAL) are still applicable. Learners who opt for a Second Additional Language are required to complete 12 tasks in total: 5 tasks in term 1, 4 tasks in term 2 and 3 tasks in term 3.

The number of internal tasks per subject differs from 6 to 7 as specified in Section 3 of this document.

Schools can choose to write one or two internal examinations in Grade 12. Should a school choose to write only one internal examination in Grade 12, a scheduled test should be written at the end of the term to replace the other examination. Internal examinations should conform to the requirements set out in Section 3 of this document. They should be carefully designed and weighted to cover all the Learning Outcomes of the subject.

Two of the assessment tasks for all subjects, excluding Life Orientation, should be tests written under controlled conditions at a specified time.

The remainder of the assessment tasks should not be tests or examinations. They should be carefully designed tasks, which give learners opportunities to research and explore the subject in exciting and focused ways. Examples of assessment forms are debates, presentations, projects, simulations, assignments, case studies, essays, practical tasks, performances, exhibitions and research projects. The most appropriate forms of assessment for each subject are set out in Section 3.

2.3 External assessment in Grade 12

External assessment is only applicable to Grade 12 and applies to the final end-of-year examination. This makes up 75% of the final mark for Grade 12. This excludes Life Orientation which is not externally examined.

The external examinations are set externally, administered at schools under conditions specified in the *National policy on the conduct, administration and management of the assessment of the National Senior Certificate: A qualification at Level 4 on the National Qualifications Framework (NQF)* and marked externally.

In some subjects the external assessment includes practical or performance tasks that are externally set, internally assessed and externally moderated. These performance tasks account for one third of the end-of-year external examination mark in Grade 12 (that is 25% of the final mark). Details of these tasks are provided in Section 3.

Guidelines for the external examinations are provided in Section 3.

2.4 Recording and reporting on the Programme of Assessment

The Programme of Assessment should be recorded in the teacher's portfolio of assessment. The following should be included in the teacher's portfolio:

- a contents page;
- the formal Programme of Assessment;
- the requirements of each of the assessment tasks;
- the tools used for assessment for each task; and
- record sheets for each class.

Teachers must report regularly and timeously to learners and parents on the progress of learners. Schools will determine the reporting mechanism but it could include written reports, parent-teacher interviews and parents' days. Schools are required to provide written reports to parents once per term on the Programme of Assessment using a formal reporting tool. This report must indicate the percentage achieved per subject and include the following seven-point scale.

RATING CODE	RATING	MARKS %
7	Outstanding achievement	80 – 100
6	Meritorious achievement	70 –79
5	Substantial achievement	60 – 69
4	Adequate achievement	50 – 59
3	Moderate achievement	40 – 49
2	Elementary achievement	30 – 39
1	Not achieved	0 – 29

2.5 Moderation of the assessment tasks in the Programme of Assessment

Moderation of the assessment tasks should take place at three levels.

LEVEL	MODERATION REQUIREMENTS
School	The Programme of Assessment should be submitted to the subject head and School Management Team before the start of the academic year for moderation purposes. Each task which is to be used as part of the Programme of Assessment should be submitted to the subject head for moderation before learners attempt the task. Teacher portfolios and evidence of learner performance should be moderated twice a year by the head of the subject or her/his delegate.
Cluster/ district/ region	Teacher portfolios and a sample of evidence of learner performance must be moderated twice during the first three terms.
Provincial/ national	Teacher portfolios and a sample of evidence of learner performance must be moderated once a year.

3. ASSESSMENT OF INFORMATION TECHNOLOGY IN GRADES 10 - 12

3.1 Introduction

The purpose of assessment in Information Technology is to help learners master the skills, knowledge and values embedded in the four Learning Outcomes and to identify those aspects of the subject that need further attention.

The time spent on and the mark allocation for each Learning Outcome should be proportional to the weighting of the Learning Outcome. Table 3.1 provides an indication of the weighting for each of the Learning Outcomes.

Table 3.1: Weighting of Learning Outcomes

LEARNING OUTCOME	WEIGHTING
1	20%
2	10%
3	10%
4	60%

Information Technology is a practically orientated subject and to be able to fully assess all the knowledge, skills and values of the subject in an authentic manner, a Practical Assessment Task is necessary. The Practical Assessment Task should showcase the learners' broad range of knowledge, skills and values that they have acquired during the learning process.

3.2 Daily assessment in Grades 10, 11 and 12

Daily assessment is part of the process of learning that takes place in the classroom and should be taken into account when designing the Learning Programme. When learners are provided with an assessment sheet based on a list of criteria they can use the assessment task as a formative learning experience. Daily assessment tasks should be used to scaffold the attainment of Assessment Standards and should be the stepping-stones to the tasks in the Programme of Assessment.

Daily assessment should be reflected in the lesson planning and should not be seen as separate from the learning activities taking place in the classroom. The same criteria that are used to plan the Learning Programme should be used to assess learners every day. As learners measure their knowledge and skills against these criteria, their strengths and weaknesses are reflected and should be used to enhance the learning process.

As daily assessment occurs in every lesson it can take the form of assessment tasks at the beginning, during or at the end of the lesson. Look at the following example:

Scenario 1: A computer used in a small office or home office situation

DAY	LO	ACTIVITY	FORM OF ASSESSMENT	ASSESSMENT TOOL
1 - 6	LO1	Introduce scenario and discuss hardware and system software issues.	Assignment – collecting adverts of typical SOHO computer systems Q&A session	Observation sheets Checklist
7	LO1	Investigate and decide on hardware to be used.	Debate	Checklist
8 - 10	LO2	Discus issues relating to e-communication, specifically sending and receiving e-mails.	Debate Q&A session Assignment	Observation sheet Checklist
11	LO2	Link the computer to the Internet to send and receive e-mail.	Investigation and discussion Demonstration	Observation sheet Checklist
12 - 15	LO3	Discuss social and ethical issues of home computing.	Debate Q&A session Case study	Checklist Observation sheet Memo
16	LO3	Investigate and discuss the implications of spam.	Debate Case study	Checklist Memo
17 - 23	LO4	Learn to use a database in ten steps.	Demonstration Assignment	Observation sheet Checklist
26	LO4	Develop a database to contain names and addresses.	Assignment	Checklist Memo

Note: Group research and presentation

As part of daily assessment tasks, a group of two to three learners could research aspects of any or all Learning Outcomes and present their findings to their peers using appropriate presentation methods. An example could be 'The effects of e-commerce on the socio-economic aspects of South African life'. Learners could research all aspects that impact on this scenario, for example hardware, software, ethical issues and e-commerce considerations.

3.3 Assessment in Grades 10 and 11

3.3.1 Programme of Assessment for Grade 10 and 11

All assessment for Grades 10 and 11 is internal or school-based and collectively provides evidence of the learner's achievement of all the Learning Outcomes and Assessment Standards.

The Programme of Assessment for Information Technology in Grades 10 and 11 consists of 7 tasks which are all internally assessed. Of the 7 tasks, 6 tasks which are completed during the school year make up 25% of the total mark for Information Technology, while the end-of-year assessment is the 7th task and makes up the remaining 75%.

The Programme of Assessment in grades 10 and 11 comprises:

- Two tests (first and third term)
- Two exams (mid-year and end-of-year, where the end-of-year examination includes the Practical Assessment Task)
- Three other assessment tasks (one per term 1 – 3)

In Information Technology, the Practical Assessment Task (PAT) takes the form of a programming project which should be completed during terms three and

four for Grade 10 and Grade 11 according to scheduled due dates for the completion of each stage of the project.

Summary:

ASSESSMENT PROGRAMME			
ASSESSMENT TASKS	**END-OF-YEAR ASSESSMENT**		
25%	**75%**		
2 tests 1 exam (mid-year) 3 other assessment tasks	**PAT**	**END-OF-YEAR EXAM PAPERS 50%**	
	25%	**30%**	**20%**
	Programming project LO4	Written exam Covers LO1, LO2, LO3 and development aspects of LO4	Practical exam LO4

Example of an annual Programme of Assessment for Grade 10:

TERM	ITEM	ASSESSMENT ACTIVITY OUTLINE	LO	ASSESSMENT FORM	MARK ±	WEIGHT
1	1	Use the SOHO[1] environment as basis for a test on hardware, software and other related issues.	LO 1 - 3	Test	50	25%
	2	Develop a database according to given specifications.	LO4	Practical task	50	
2	3	Present social and ethical issues and how these are exacerbated through the use of the Internet to the class or a group.	LO2 & LO3	Assignment	50	
	4	Paper 1: 3 hour Practical paper Paper 2: 2 hour Written paper	LO4 LO 1 - 4	Exam (mid-year)	120 180	
3	5	Test ability to use spreadsheets.	LO4	Practical test	40	
	6	Develop a computerised solution to a given problem using the programming language studied.	LO4	Assignment	60	
3 - 4	PAT	Programming project	LO4	PAT	100	25%
4	7	Paper 1: 3 hour Practical paper Paper 2: 2 hour Written paper	LO4 LO 1 - 4	Exam (end-of-year)	120 180	50%

[1] Small Office/Home Office

Example of an annual Programme of Assessment for Grade 11:

TERM	ITEM	ASSESSMENT ACTIVITY OUTLINE	LO	ASSESSMENT FORM	MARK ±	WEIGHT
1	1	Develop a computerised solution to a given problem using the programming language studied.	LO4	Assignment	55	25%
	2	Test: Networks.	LO 1 - 3	Test	45	
2	3	Assignment: Spreadsheet	LO1	Practical task	30	
	4	Paper 1: 3 hour Practical Paper Paper 2: 3 hour Written Paper	LO4 LO 1 – 4	Exam (mid-year)	120 180	
3	5	Presentation on how computers have impacted on the workplace.	LO2, 3	Assignment	45	
	6	Complete practical test on database and programming language.	LO4	Practical test	55	
2 - 4	PAT	Programming project	LO4	PAT	100	25%
4	7	Paper 1: 3 hour Practical paper Paper 2: 3 hour Written paper	LO4 LO 1 - 4	Exam (end-of-year)	120 180	50%

As teachers work from different textbooks and from different Work Schedules, please note that these items are only examples and that teachers may change the order or the form of the task as well as the content it covers as long as the Programme of Assessment covers the Assessment Standards and adheres to the following:

First term: one test and one other assessment task
Second term: one examination and one other assessment task
Third term: one test and one other assessment task
Fourth term: one examination including the PAT

Further note that a task in the Programme of Assessment should not be made up of several smaller tasks. Each task should cover a substantial amount of content and tests should be set for 45 – 60 minutes each.

Assignments, practical tasks and projects should be done under controlled conditions, managed, facilitated and monitored by the teacher during class time. Certain aspects can be done at home e.g. sourcing and gathering information, planning, etc.

3.3.2 End-of-year examination in Grade 10 and 11

This will comprise of TWO papers.

Paper 1: One practical paper
This will be a practically oriented paper in which questions will only be asked on the programming language and database application.

To successfully complete this paper, each learner must have access to his or her own computer in the exam room. Provision will need to be made for sufficient computers to enable the examination to be completed in at most two sittings.

This paper will cover Learning Outcome 4.

Paper 2: One theory paper
This theory paper will be based on the relevant content in the subject. This paper will cover Learning Outcomes 1, 2 and 3 and elements of Learning Outcome 4 (e.g. algorithmic development, data structures, program design and general programming concepts as well as generic problem-solving questions).

It is suggested that the format of the paper be aligned to the format of the Grade 12 paper.

3.3.3 Practical Assessment Task (project) in Grades 10 and 11

The Practical Assessment Task (PAT) will count 25% of the total marks for the subject.

Information Technology is a practically oriented subject that focuses primarily on software development using appropriate development tools. Therefore, it lends itself to different types of practical assessment tasks. The Practical Assessment Task provides the ideal vehicle for this practical assessment. It comprises a practical task or project using the applicable developmental tools. The criteria and format for the Practical Assessment Task will be internally set, internally administered and marked and moderated. See **Annexure 1** for details.

While the Practical Assessment Task is part of the external assessment, it should be administered through terms three and four using set class time e.g. one or two periods per week or a continuous period of time in the third / fourth term e.g. the last 4 – 5 weeks (16 – 20 hours), according to set due dates for the completion of each stage of the project.

3.4 Assessment in Grade 12

In grade 12, assessment consists of two components: a Programme of Assessment which makes up 25% of the total mark for Information Technology and an external assessment which makes up the remaining 75% (including the Practical Assessment Task). The Programme of Assessment for Information Technology consists of 6 tasks which are all internally assessed. The external assessment is externally set and moderated. For more details on the Practical Assessment Task (PAT) see **Annexure 1**.

In Information Technology, the Practical Assessment Task takes the form of a project. This is externally set and the requirements and format will be provided to schools in January of the Grade 12 year. While the Practical Assessment Task is part of the external assessment, it should be developed on a continuing basis through terms two to four using scheduled class time e.g. one or two periods per week or a continuous period of time in the third / fourth term e.g. the last 4 – 5 weeks (16 – 20 hours) according to scheduled due dates for the completion of each stage of the project.

Summary:

<table>
<tr><td>PROGRAMME OF ASSESSMENT</td><td colspan="3" rowspan="2">EXTERNAL ASSESSMENT</td></tr>
<tr><td>ASSESSMENT TASKS</td></tr>
<tr><td>25%</td><td colspan="3">75%</td></tr>
<tr><td rowspan="4">2 tests
2 exams
2 other assessment tasks</td><td>PAT</td><td colspan="2">External Exam Papers</td></tr>
<tr><td>25%</td><td colspan="2">50%</td></tr>
<tr><td rowspan="2">Software development project
Research
LO4</td><td>30%</td><td>20%</td></tr>
<tr><td>Written exam
3 hour
(Covers LO1, LO2, LO3 and development aspects of LO4)</td><td>Practical exam
3 hour
(Covers LO4)</td></tr>
</table>

In Grade 12 one of the tasks in Term 2 and/or Term 3 must be an internal examination. In instances where only one of the two internal examinations is written in Grade 12, the other examination should be replaced by a test at the end of the term.

3.4.1 Programme of Assessment in Grade 12

Internal or school-based Programme of Assessment (25%)
This Programme of Assessment comprises six items:

- Two tests (first and third term)
- Two exams (second and third term)
- Two other assessment tasks (one per term 1 – 3)

3.4.2 Example of an assessment plan in Grade 12

The table below provides a detailed example of an assessment plan for Grade 12.

Example of annual assessment plan for Grade 12

TERM	FORMAT	DESCRIPTION	LO	MARK ±	TOTAL
1	Task	Survey: Ethical and social issues	LO 2, 3	60	
	Practical test	Complete practical test on database and programming language (inclusive of connectivity).	LO4	50	
2	Task	Produce a help system in terms of a tutorial or FAQ system	LO 1, 4	40	
	Exam	Practical exam 3 hours	LO4	120	25%
		Theory exam 3 hours	LO 1 – 4	180	
3	Practical test	Spreadsheets and Database test	LO4	50	
	Exam	Practical exam 3 hours	LO4	120	
		Theory exam 3 hours	LO 1 – 4	180	
	Practical Assessment Task	As specified in the PAT instructions for 2008	LO4	100	25%
4	External exam	External paper 1	LO4	120	50%
		External paper 2	LO 1 - 4	180	

Note 1: The internal practical examination in Mid-year and September should have the same format as the final external examination.

Note 2: Utility packages and operating environment
This section must cover practical assessment of the utility packages and operating system(s) used in the computer room. This could include the following:

- Utility packages: communications software, disk utilities, anti-virus utilities, web-based design, hardware troubleshooting and software installation (including device drivers)
- Operating systems: Windows 98/2000/NT/XP/Vista, Novell Netware, Linux, etc.

As teachers work from different textbooks and from different Work Schedules, please note that these items are only examples and that teachers may change the order or the form of the task as well as the content it covers as long as the Programme of Assessment covers the Assessment Standards and adheres to the following:

First term: one test and one other assessment task
Second term: one examination and one other assessment task
Third term: one test, one examination
Fourth term: External examination including the PAT

Further note that a task in the Programme of Assessment should not be made up of several smaller tasks. Each task should cover a substantial amount of content and tests should be set for 45 – 60 minutes each.

Assignments, practical tasks and projects should be done under controlled conditions, managed, facilitated and monitored by the teacher during class time. Certain aspects can be done at home e.g. sourcing and gathering information, planning, etc.

3.4.4 External Assessment in Grade 12

Paper 1: One three-hour practical paper (20% of the total marks for the subject)
This will be a practically oriented paper in which questions will only be asked on the programming language and database application.

To successfully complete this paper, each learner must have access to his or her own computer in the exam room. Provision will need to be made for sufficient computers to enable the examination to be completed in at most two sittings.

This paper will cover Learning Outcome 4.

This paper assesses the practical skills pertaining to Learning Outcome 4, i.e. the programming language studied as well as database application. These skills will be assessed in an integrated manner based on real-life scenarios.

Algorithmic development and problem-solving will form aspects of the assessment of the programming questions in this paper.

The learner will not be required to enter large amounts of data. The required data could be retrieved from the data disk or imported from documents such as a text file, word processing document, a database table or a spreadsheet.

Paper 2: One three-hour theory paper (30% of the total marks for the subject)
This theory paper will be based on the relevant content in the subject. This paper will cover Learning Outcomes 1, 2 and 3 and elements of Learning Outcome 4 (e.g. algorithmic development, data structures, program design and general programming concepts as well as generic problem-solving questions).

This three-hour theory paper will comprise the following sections:

SECTION	DESCRIPTION	MARKS
A	MULTIPLE-CHOICE QUESTIONS: A range of multiple-choice questions covering all Learning Outcomes	10
B	HARDWARE AND SYSTEM SOFTWARE: The questions in this section are linked to a scenario and the questions are, by and large, related to the scenario. Questions relating to computer architecture and hardware, operating systems and system software and data communication and networks are asked in this section.	60
C	APPLICATIONS AND IMPLICATIONS: This section is also scenario-based and is aligned to Learning Outcomes 2 and 3. The section contains a number of short questions on e-communications and social and ethical issues. The questions on e-communications concentrate on the uses of computer networks and not on the actual hardware configurations, etc., as these will have been covered in Section B.	20
D	PROGRAMMING AND SOFTWARE DEVELOPMENT: This section is scenario-based and is aligned to Learning Outcome 4. It evaluates the learner's understanding of the theoretical basis of programming, program design and algorithmic development. Questions relating to data structures and program development and testing are asked in this section.	40
E	INTEGRATED SCENARIO: This section is based on a single large-scale scenario and will be aligned to all the Learning Outcomes. It contains a number of shorter questions.	50

3.4.5 Practical Assessment Task (project) (25% of the total marks for the subject)

The PAT comprises of a practical task or project using the applicable developmental tools. The criteria for the Practical Assessment Task are externally set, internally administered and marked and externally moderated. See **Appendix 1** for details.

3.5 Content to be assessed

Assessment addresses the content (which is derived from the Learning Outcomes and Assessment Standards in the Subject Statements) as set out in the Content Framework. See Annexure 1 of the Information Technology Learning Programme Guidelines (January 2008) on the content to be covered in the teaching, learning and assessment of Information Technology.

Note that due to the conceptual progression of Assessment Standards across the grades, content and skills from Grade 10 – 12 will be assessed in the external papers at the end of Grade 12.

3.6 Administrative issues relating to School Based Assessment (SBA)

If a learner fails to present a component or components of the internal assessment, but a valid reason are provided (e.g. valid doctor's certificate), the learner should be allowed the opportunity to redo the task. Where it is not possible, the mark for that component of the internal assessment should not be

taken into consideration, and the maximum mark in this particular case must be re-calculated on the remaining number of tasks.

If a learner fails to present a component or components of the internal assessment, without a valid reason, the learner must be awarded a zero mark (0) for such a component or components.

See Annexure B par (1) of the *NATIONAL POLICY ON THE CONDUCT, ADMINISTRATION AND MANAGEMENT OF THE NATIONAL SENIOR CERTIFICATE: A QUALIFICATION AT LEVEL 4 ON THE NATIONAL QUALIFICATIONS FRAMEWORK (NQF)* for an example.

3.7 Recording and Reporting in Information Technology

In Grades 10 to 12 the teacher records in marks against the assessment tasks, using a record sheet and report in percentages against the subject using report cards.

See Annexure 2 for an example of a record sheet

3.8 Requirements for offering Information Technology

To meet the demands of teaching, learning and assessment in Information Technology schools should meet the following requirements:

- Each learner must have access to his/her own computer each period and for the full duration of the allocated time (i.e. 4 hours per week)
- Software requirements (latest version of software is recommended)
    - Operating system
    - Word Processing program
    - Spreadsheet program
    - Database program
    - Presentations or Web Authoring program
    - Programming language software: Java (including IDE – Turbo JBuilder / Netbeans and JDK 1.6) or Delphi / Turbo Delphi
- Hardware
    - PCs – networked
    - Printer (high speed)
    - Data Projector
    - Scanner
    - Specifications to meet the requirements of the software (minimum 1 GHz; 256 MB RAM – recommended 2.4 GHz; 512 MB RAM)
- Internet access

- Technical support for servicing and maintenance of computers so that the number of working computers is never lower than the number of learners per class

See Circular S7 of 2006

3.7 Promotion and certification

For promotion and certification purposes learners should achieve at least a level 2 rating (Elementary Achievement: 30-39%) in Information Technology.

The following represents a summary of the minimum skills, knowledge, values and attitudes that a learner should have developed by the end of Grades 10, 11 and 12.

3.7.1 Grade 10

A Grade 10 learner needs to demonstrate an understanding of the basics of stand-alone computer hardware and software (including the operating system) and how to responsibly use various Internet services, including e-mail and the World Wide Web. A learner is also expected to show insight into the broad economic reasons for using computers, their application in society as a whole and a general awareness of the positive and negative impact on health and environmental issues. In addition, a Grade 10 learner should have mastered basic programming techniques including sequence, selection and iteration. The learner should also be able to use spreadsheets and databases at a fairly elementary level.

3.7.2 Grade 11

A Grade 11 learner should have a thorough understanding of the essentials of networked environments and be skilled in more advanced uses of e-mail and group communications, effective web searches and the transfer of files across the Internet. The learner should show an awareness of careers in computers and general global technology trends and issues. From a software development point of view, the learner should be able to design and write programs that include advanced data structures and create and query multitable databases and use spreadsheets to produce mathematically based tables and charts.

3.7.3 Grade 12

A Grade 12 learner must be able to analyse and troubleshoot computer-based systems in terms of their performance and the needs of users. A learner should also be able to analyse web-based resources and show an understanding of securing access to electronic data and of ethical issues as well as issues of national and international importance relating to the use of computers. A Grade 12 learner should be able to design, debug and develop fairly large real-life computer-based systems by also using databases, spreadsheets and the World Wide Web.

ANNEXURE 1

PRACTICAL ASSESSMENT TASK IN IT

Practical Assessment Task (programming and software development project)

This Learning Outcome 4 will be the primary focus of the Practical Assessment Task in Grade 12. It also rounds off the learner's problem-solving skills, including competences in using classes, collections, user interfaces, help files, automatic test-generation and debugging, through software development.

The Practical Assessment Task uses the learner's frame of reference to interact with a real-life scenario. The only way the learner's skills can be authentically assessed in this respect, in both a formative and summative sense, is over an extended period in Grade 12.

The project must include the major development tools, in other words database design and programming. The other identified application packages should, where possible, be integrated with these development tools. This must be a single project on a topic with which the learner is familiar and which shows that the learner has mastered what has been taught in the software development classes. It must cover all the aspects covered in the programming classes, that is data structures, file and database manipulation, program structures, etc. ***Learners are expected to demonstrate connectivity between a database and the program developed in the project.***

As far as possible the project specification should be open-ended to encourage learners to explore different methods of solving problems using appropriate development tools. The programming project should be completed during the first three terms. Projects must go through a process of analysis and design and learners should be encouraged to plan their work and devise a time frame for completion of the projects in consultation with their teachers. Most of the development work requires feedback from teachers at many stages of the process. Learners' work should include evidence of significant developments that have been completed over the period. Their final product will be evaluated against their original analysis and design.

The learner must demonstrate knowledgeable use of the programming language to produce the application. It should be gradually completed over a period of months and provide evidence of planning. The final submission should visibly demonstrate the learner's problem-solving and programming ability. The project should be a single programming application based on a topic which has relevance for the learner and which shows that the learner has mastered the skills and knowledge which has been taught during the programming classes.

Aspects of the programming project that will be assessed include:

- Documentation
- Analysis
- Programming style
- Design and use of data structures
- Use of Human-Computer Interaction (HCI) principles

- Expertise required and functionality of the program
- Robustness of program including use of defensive programming techniques
- Whether the project matches its original aims and goals

Documentation

- Programmer – algorithms, database program listing, other pertinent comments, major data structure definitions, other programs that support this program. Other aspects that can be included are:
  - An explanation of the method of solution and a description of the algorithm used
  - Database design
  - Relationships between modules and programs
  - Description of data structures used and of any unusual functions used or written
  - Specification of test procedures and test results
  - Error recovery and troubleshooting
  - Sample runs with results
- Internal documentation within the program as needed
- System - the requirements to run the system
- User - how to use the program, including examples of its use with screenshots. This should also include a title sheet and table of contents, background to the project (personal motivation and choice), an Introduction to the project scope and limitations.

Learners must include all necessary references and acknowledgements in the documentation, especially if using add-ons, third-party software of any sort and code obtained from any other source.

Testing

Suitable test data must be carefully chosen so that each option in the program can be checked. Haphazard testing of the program should be discouraged. There should be evidence of exhaustive testing with realistic data, including 'invalid' data. The program should also include good defensive programming techniques that include input validation and exception handling.

Project control

The teacher should take precautionary measures to ensure that the task is the product of the learner's own explorations and labour during the development of a learner's portfolio of project work. Projects should be done under controlled conditions, managed, facilitated and monitored by the teacher during class time. Certain aspects can be done at home e.g. sourcing and gathering information, planning, etc. The project should be divided into phases/stages with specific tasks and due dates for each phase. The teacher must monitor the progress being made and beware of 'instant' projects. The teacher needs to be vigilant where learners have worked on similar projects.

HCI considerations

Attention should be given to the design of clean, user-friendly, intuitive, interactive user interfaces using commonly accepted principles of Human-Computer Interaction.

Example of the process and criteria for a programming project:

The programming project will be completed in 3 phases indicated in the following table.

Phase
Phase 1: Analysis and Design
Phase 2: Coding and Implementation
Phase 3: Documentation and general evaluation

Documentation / evidence of what the learner did during each phase of development must be submitted at specified intervals.

Deadlines for handing in the final product of each phase will be set by the teacher. The product of each phase will be assessed and the marks will be recorded.

In completing the project the learner will apply the following skills

- Analysis and design
- Software development
    - Programming skills using the programming language studied
    - Database development
    - Graphical User Interface (GUI) design

The learner will need the following resources to be able to complete the project:

- Access to a computer with the following programs:
    - Programming language: Java or Delphi
    - Word processor such as MS Word
    - Database software such as MS Access
- IDE (for Delphi it is part of the programming language but for Java you will need additional software such as JBuilder / Turbo JBuilder or Netbeans)

Requirements for the project

The learner needs to adhere to the following, minimum criteria:

Analysis & Design

- Description of the problem in his/her own words outlining the main aspects in one paragraph.
- Analysis of the problem – What are the requirements and what should the programming solution provide?
- Design a solution – how will the program / system meet the requirements? Provide a broad outline of the programming solution to the problem.

Coding and Implementation

- The project must include the major development tools, i.e. database design and programming in an integrated manner. (Other applications could be integrated with these development tools)
- Other aspects of the programming project that will be assessed include:
    - Programming style
    - Graphical User Interface (GUI)
    - Use of Human-Computer Interaction (HCI) principles
    - Expertise required and functionality of the program

- Robustness of the program including the use of defensive programming techniques
- Whether the project matches its original aims and goals

Documentation and general evaluation

- Document the solution, installation procedures and hardware and software requirements – Technical Manual
- Compile a user guide
- Demonstration and debriefing of the final product
- Evaluate the following:
  - Time management of the learner – Did he/she meet all the deadlines?
  - Appropriateness of the solution in the context of the scenario.

ANNEXURE 2

EXAMPLE OF A RECORD SHEET FOR GRADE 10 and 11

SUBJECT: Information Technology **GRADE: ____ CLASS: _____**

TERM			Term 1			Term 2				Term 3			Tasks during year	Term 4				Final Mark X + Y
NAME OF TASK					Total		Exam (mid-year)		Total			Total	Total A+B+C	Exam (end-of-year)			Total	
DATE OF ASSESSMENT																		
LEARNERS' NAMES		Task	Test1	Task1		Task2	P1	P2		Test2	Task3			PAT	P1	P2		
		TOTAL	Tot1	Tot2		Tot3	Tot P1	Tot P2		Tot4	Tot5			Tot PAT	Tot P1	Tot P2		
		Convert to			Test1 + Task1 (A)		120	180	Task2+300 (B)			Test2 + Task3 (C)	100 (X)	100	120	180	300 (Y)	100
1	Soap, Joe		15	28	43	43	104	158	305	28	38	66	79.6	78	85	136	225.3	
2																		
3																		
N																		