(iv) The policy document, An addendum to the policy document, the National Senior Certificate: A qualification at Level 4 on the National Qualifications Framework (NQF), regarding learners with special needs, published in Government Gazette, No.29466 of 11 December 2006, is incorporated in the policy document, National policy pertaining to the programme and promotion requirements of the National Curriculum Statement Grades R-12; and

(v) The policy document, An addendum to the policy document, the National Senior Certificate: A qualification at Level 4 on the National Qualifications Framework (NQF), regarding the National Protocol for Assessment (Grades R-12), promulgated in Government Notice No.1267 in Government Gazette No. 29467 of 11 December 2006.

(d) The policy document, National policy pertaining to the programme and promotion requirements of the National Curriculum Statement Grades R-12, and the sections on the Curriculum and Assessment Policy as contemplated in Chapters 2, 3 and 4 of this document constitute the norms and standards of the National Curriculum Statement Grades R-12. It will therefore, in terms of section 6A of the South African Schools Act, 1996 (Act No. 84 of 1996,) form the basis for the Minister of Basic Education to determine minimum outcomes and standards, as well as the processes and procedures for the assessment of learner achievement to be applicable to public and independent schools.

1.3 General aims of the South African Curriculum

(a) The National Curriculum Statement Grades R-12 gives expression to the knowledge, skills and values worth learning in South African schools. This curriculum aims to ensure that children acquire and apply knowledge and skills in ways that are meaningful to their own lives. In this regard, the curriculum promotes knowledge in local contexts, while being sensitive to global imperatives.

(b) The National Curriculum Statement Grades R-12 serves the purposes of:

- equipping learners, irrespective of their socio-economic background, race, gender, physical ability or intellectual ability, with the knowledge, skills and values necessary for self-fulfilment, and meaningful participation in society as citizens of a free country;

- providing access to higher education;

- facilitating the transition of learners from education institutions to the workplace; and

- providing employers with a sufficient profile of a learner’s competences.

(c) The National Curriculum Statement Grades R-12 is based on the following principles:

- Social transformation: ensuring that the educational imbalances of the past are redressed, and that equal educational opportunities are provided for all sections of the population;

- Active and critical learning: encouraging an active and critical approach to learning, rather than rote and uncritical learning of given truths;

- High knowledge and high skills: the minimum standards of knowledge and skills to be achieved at each grade are specified and set high, achievable standards in all subjects;

- Progression: content and context of each grade shows progression from simple to complex;
• Human rights, inclusivity, environmental and social justice: infusing the principles and practices of social and environmental justice and human rights as defined in the Constitution of the Republic of South Africa. The National Curriculum Statement Grades R-12 is sensitive to issues of diversity such as poverty, inequality, race, gender, language, age, disability and other factors;

• Valuing indigenous knowledge systems: acknowledging the rich history and heritage of this country as important contributors to nurturing the values contained in the Constitution; and

• Credibility, quality and efficiency: providing an education that is comparable in quality, breadth and depth to those of other countries.

(d) The National Curriculum Statement Grades R-12 aims to produce learners that are able to:

• identify and solve problems and make decisions using critical and creative thinking;

• work effectively as individuals and with others as members of a team;

• organise and manage themselves and their activities responsibly and effectively;

• collect, analyse, organise and critically evaluate information;

• communicate effectively using visual, symbolic and/or language skills in various modes;

• use science and technology effectively and critically showing responsibility towards the environment and the health of others; and

• demonstrate an understanding of the world as a set of related systems by recognising that problem solving contexts do not exist in isolation.

(e) Inclusivity should become a central part of the organisation, planning and teaching at each school. This can only happen if all teachers have a sound understanding of how to recognise and address barriers to learning, and how to plan for diversity.

The key to managing inclusivity is ensuring that barriers are identified and addressed by all the relevant support structures within the school community, including teachers, District-Based Support Teams, Institutional-Level Support Teams, parents and Special Schools as Resource Centres. To address barriers in the classroom, teachers should use various curriculum differentiation strategies such as those included in the Department of Basic Education’s Guidelines for Inclusive Teaching and Learning (2010).
1.4 Time Allocation

1.4.1 Foundation Phase

(a) The instructional time in the Foundation Phase is as follows:

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>GRADE R (HOURS)</th>
<th>GRADES 1-2 (HOURS)</th>
<th>GRADE 3 (HOURS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Language</td>
<td>10</td>
<td>7/8</td>
<td>7/8</td>
</tr>
<tr>
<td>First Additional Language</td>
<td>2/3</td>
<td>3/4</td>
<td></td>
</tr>
<tr>
<td>Mathematics</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Life Skills</td>
<td>6</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Beginning Knowledge</td>
<td>(1)</td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Creative Arts</td>
<td>(2)</td>
<td>(2)</td>
<td>(2)</td>
</tr>
<tr>
<td>Physical Education</td>
<td>(2)</td>
<td>(2)</td>
<td>(2)</td>
</tr>
<tr>
<td>Personal and Social Well-being</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>23</strong></td>
<td><strong>23</strong></td>
<td><strong>25</strong></td>
</tr>
</tbody>
</table>

(b) Instructional time for Grades R, 1 and 2 is 23 hours and for Grade 3 is 25 hours.

(c) Ten hours are allocated for languages in Grades R-2 and 11 hours in Grade 3. A maximum of 8 hours and a minimum of 7 hours are allocated for Home Language and a minimum of 2 hours and a maximum of 3 hours for Additional Language in Grades 1-2. In Grade 3 a maximum of 8 hours and a minimum of 7 hours are allocated for Home Language and a minimum of 3 hours and a maximum of 4 hours for First Additional Language.

(d) In Life Skills Beginning Knowledge is allocated 1 hour in Grades R-2 and 2 hours as indicated by the hours in brackets for Grade 3.

1.4.2 Intermediate Phase

(a) The instructional time in the Intermediate Phase is as follows:

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>HOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Language</td>
<td>6</td>
</tr>
<tr>
<td>First Additional Language</td>
<td>5</td>
</tr>
<tr>
<td>Mathematics</td>
<td>6</td>
</tr>
<tr>
<td>Natural Science and Technology</td>
<td>3,5</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>Life Skills</td>
<td>4</td>
</tr>
<tr>
<td>Creative Arts</td>
<td>(1,5)</td>
</tr>
<tr>
<td>Physical Education</td>
<td>(1)</td>
</tr>
<tr>
<td>Personal and Social Well-being</td>
<td>(1,5)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>27,5</strong></td>
</tr>
</tbody>
</table>
1.4.3 Senior Phase

(a) The instructional time in the Senior Phase is as follows:

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>HOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Language</td>
<td>5</td>
</tr>
<tr>
<td>First Additional Language</td>
<td>4</td>
</tr>
<tr>
<td>Mathematics</td>
<td>4,5</td>
</tr>
<tr>
<td>Natural Science</td>
<td>3</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>Technology</td>
<td>2</td>
</tr>
<tr>
<td>Economic Management Sciences</td>
<td>2</td>
</tr>
<tr>
<td>Life Orientation</td>
<td>2</td>
</tr>
<tr>
<td>Creative Arts</td>
<td>2</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>27.5</strong></td>
</tr>
</tbody>
</table>

1.4.4 Grades 10-12

(a) The instructional time in Grades 10-12 is as follows:

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>TIME ALLOCATION PER WEEK (HOURS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Language</td>
<td>4.5</td>
</tr>
<tr>
<td>First Additional Language</td>
<td>4.5</td>
</tr>
<tr>
<td>Mathematics</td>
<td>4.5</td>
</tr>
<tr>
<td>Life Orientation</td>
<td>2</td>
</tr>
</tbody>
</table>

A minimum of any three subjects selected from **Group B Annexure B, Tables B1-B8** of the policy document, **National policy pertaining to the programme and promotion requirements of the National Curriculum Statement Grades R-12**, subject to the provisos stipulated in paragraph 28 of the said policy document.

| **TOTAL**                              | **27.5**                          |

The allocated time per week may be utilised only for the minimum required NCS subjects as specified above, and may not be used for any additional subjects added to the list of minimum subjects. Should a learner wish to offer additional subjects, additional time must be allocated for the offering of these subjects.
Information Technology

2.1 What is Information Technology?

Information Technology is the study of the various interrelated physical and non-physical technologies used for the capturing of data, the processing of data into useful information and the management, presentation and dissemination of data. Information Technology studies the activities that deal with the solution of problems through logical and computational thinking. It includes the physical and non-physical components for the electronic transmission, access, and manipulation of data and information.

The diagram below illustrates how the six main topic areas of the Information Technology curriculum support the teaching of digitally informed learners.
The table below provides the six topics and sub-topics to be covered in Information Technology in grades 10-12 and the resources required for teaching IT:

<table>
<thead>
<tr>
<th>Topic Area</th>
<th>Sub-Topics</th>
<th>Weighting (Content)</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication Technologies</td>
<td>Networks, E-communication</td>
<td>±7%</td>
<td></td>
</tr>
<tr>
<td>Systems Technologies</td>
<td>Introduction to Computers, Hardware, Software, Computer Management</td>
<td>±10%</td>
<td></td>
</tr>
<tr>
<td>Internet Technologies</td>
<td>Internet, World Wide Web, Internet Services</td>
<td>±8%</td>
<td></td>
</tr>
<tr>
<td>Data and Information Management</td>
<td>Data Representation, Database Management, Database Design</td>
<td>±10%</td>
<td></td>
</tr>
<tr>
<td>Social Implications</td>
<td>Legal Issues, Ethical Issues, Social Issues, Environmental Issues, Health Issues, Computers and Society</td>
<td>±5%</td>
<td></td>
</tr>
</tbody>
</table>

**Topic links and overlap**

It is important to note that there will always be a degree of overlap between topics. Solution development is enabled by systems technologies in the form of application software. Systems technologies allow for electronic communication. Electronic communication technologies enable the Internet, which is used for various applications that include information dissemination and electronic data interchange. Data and information management is a key concept and secondary activity overlapping concepts in many other areas such as solution development and Internet technologies. Data and information management is enabled by systems technologies. All ICT activities are primarily driven by human involvement, need and intervention, which in turn give rise to social and ethical issues.

For example, when teaching Communication Technologies, one could incorporate the social implications involved. This is also applicable to the Systems Technologies topic where the relevant social implications could be highlighted.

**Approach**

The curriculum is designed to introduce learners to the breadth of the field of Information Technology.
2.2 Specific aims of Information Technology

In Information Technology a learner will:

- use appropriate techniques and procedures to plan solutions and devise algorithms to solve problems using suitable techniques and tools’
- understand and use appropriate communication technologies for information dissemination;
- appreciate and comprehend the various systems technologies used in the developing of a computer-based system;
- understand that all ICT systems are built upon software engineering principles;
- understand and use Internet technologies for various tasks;
- comprehend and apply the concepts of data and information management to understand how a knowledge-driven society functions; and
- understand the social implications of ICTs and how to use ICT technologies responsibly.

2.3 Time allocation of Information Technology in the curriculum

In Grades 10 and 11 the time allocation for IT is 4 hours per week for 35 weeks. 5 weeks of the school year are taken up by examinations.

The Grade 12 time allocation is 4 hours per week for 28 weeks; 12 weeks of the school year are for examinations.

The table below provides suggestions for the approximate teaching time per topic:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Hours</th>
<th>Weeks</th>
<th>Hours</th>
<th>Weeks</th>
<th>Hours</th>
<th>Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solution Development</td>
<td>92</td>
<td>23</td>
<td>90</td>
<td>22.5</td>
<td>68</td>
<td>17</td>
</tr>
<tr>
<td>Communication Technologies</td>
<td>4</td>
<td>1</td>
<td>8</td>
<td>2</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Systems Technologies</td>
<td>16</td>
<td>4</td>
<td>10</td>
<td>2.5</td>
<td>10</td>
<td>2.5</td>
</tr>
<tr>
<td>Internet Technologies</td>
<td>14</td>
<td>3.5</td>
<td>6</td>
<td>1.5</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Data and Information Management</td>
<td>8</td>
<td>2</td>
<td>18</td>
<td>4.5</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Social Implications</td>
<td>6</td>
<td>1.5</td>
<td>8</td>
<td>2</td>
<td>6</td>
<td>1.5</td>
</tr>
<tr>
<td>Teaching Time: Total</td>
<td>140</td>
<td>35</td>
<td>140</td>
<td>35</td>
<td>100</td>
<td>25</td>
</tr>
<tr>
<td>Examinations</td>
<td>20</td>
<td>5</td>
<td>20</td>
<td>5</td>
<td>48</td>
<td>12</td>
</tr>
<tr>
<td>TOTAL:</td>
<td>160</td>
<td>40</td>
<td>160</td>
<td>40</td>
<td>148</td>
<td>37</td>
</tr>
</tbody>
</table>
2.4 Resources required for offering Information Technology

Infrastructure, equipment and finances for the subject are the responsibility of the school.

In Information Technology learners are required to work individually on a computer during contact time and need access to the Internet.

Schools should have a business plan for the subject that addresses the following:

- Initial capital layout for setting up a computer laboratory. The layout should provide for the following:
  - Entry-level computers (to ensure a lifespan of 4 - 5 years), networked
    - One computer per learner per period (during contact time)
    - Provision for sufficient computers to enable the practical examination to be completed in **two sittings**
  - One high-speed printer per computer room
  - Internet access
  - Data projector or demonstrating software
  - Software (operating system, Office suite, security software - antivirus, Internet security, software for solution development)
- Budget
  - Annual running costs
    - Software licensing (operating system, application software, security software, solution development software)
    - Cartridges, paper and storage media
    - Breakage and maintenance (regular service plan)
    - Insurance
    - Internet connectivity
  - Sustainability plan
    - To upgrade or replace software and equipment every 4 - 5 years.

**Requirements for high-level programming tool to be used for software development:**

High-level software development tool that includes an integrated development environment which:

- supports both structured and object oriented methodologies;
- uses a visual development environment with a graphical user interface builder; and
- allows for event-driven programming.

The GUI builder should allow for component based development with a WYSIWIG (what you see is what you get) editor utilising an event-driven architecture.

The development tool could also include software design utilities to facilitate the application of software engineering practices.
SECTION 3

CONTENT AND SCOPE PER TOPIC

3.1 Solution Development

Solution development is the development of software in a planned and structured process and is based on solving computational problems which include data-related problems through logical thinking. It involves the practices of algorithm development and creating a software solution according to a set of rules and/or requirements specified in the problem statement or by a client/business/individual. The software is developed using appropriate problem-solving techniques, tools and methodologies. Software solution development is achieved through computer programming which could be based on a single or combination of development paradigms such as event-driven programming, object-oriented programming and sequential programming.

Broad topic layout and progression

Note:

Basic programming principles and constructs are introduced in Grade 10 through an easy-to-learn, fun tool. An introductory graphical programming teaching tool such as Scratch/BYOB Scratch is used to introduce learners to important computational skills and concepts, algorithm development, problem solving and programming.

In Grade 11, learners build on the principles and concepts learned in Grade 10 using a high-level programming language that uses an integrated development environment with a GUI builder. Learners are introduced to controls and code and basic object oriented programming (OOP). Event handling principles are reinforced using the form class, attributes, methods and controls.

Skills to manipulate a database through code constructs are also introduced in Grade 11.

In Grade 12, the principles and constructs are further emphasised through more advanced concepts and problems and learners should be ready to engage with basic structured query language (SQL) code and manipulating a relational database.

The development of computational thinking practices of algorithm development, problem solving and programming underpin solution development and should be emphasised from Grade 10 to Grade 12.

Usability, HCI (human computer interaction) and software engineering principles should be reinforced as part of software development as well as when dealing with websites as part of the Internet Technologies topic.
Sub-topic layout and progression for Solution Development

Note:
Algorithmic problem solving in Grade 10 should be dealt with separately at first as an introduction to solution development to develop the learner’s computational thinking practices of algorithm development, problem solving and programming using everyday scenarios.

Learners should develop an understanding of the importance of order and precision when developing an algorithm as well as the place of algorithms in software solutions and computing science. Thereafter it should be reinforced, extended and integrated with solution development and programming.

Solution development includes computational thinking and the application of software engineering principles using event-driven programming within the object-oriented (OO) paradigm.

Learners should be able to use appropriate practices and tools to:

- solve computational problems through:
  - identifying and analysing requirements for a specific problem;
  - designing effective algorithms;
  - converting these to code; and
  - testing the solution to see if it meets the requirements.
- apply the principles of human computer interaction to design functional user interfaces.
3.2 Communication Technologies

Communication technologies include various network technologies to facilitate the management and dissemination of digital data from one point to another. Communication technologies also refer to the electronic systems used for electronic data interchange that facilitate, among others, communication and information dissemination between various individuals or groups at a single point or dispersed locations.

Broad topic layout and progression

Note:
Communication Technologies should teach learners to:
- understand the concepts of the various technologies, standards and protocols involved in the electronic transmission of data via a computer-based network;
- understand the concepts of the technologies and standards implemented to enable electronic communication;
- understand the purpose and uses of communication software;
- understand how communications technology can benefit specific scenarios;
- be aware of and manage security issues; and
- be aware of new trends and developments.
3.3 Systems Technologies

Systems technologies refer to the physical and non-physical components of a computer system. The components of the system are generally related but unconnected in their original form. The connected components which include hardware, peripherals and software components allow the computer to perform the basic functions of a computing system. The basic functions of a computing system include input, processing, output, storage, communication and transfer of data in an electronic format.

**Broad topic layout and progression**

![Diagram showing the layout and progression of systems technologies for Grades 10-12.]

**Note:**

Systems Technologies should teach learners to:

- understand the hardware and software concepts that make up a computer system;
- make informed purchase decisions and whether to upgrade or buy new equipment or software;
- select the most appropriate hardware and software for a given scenario;
- understand how technology can benefit the user in specific contexts;
- understand the operations involved in the management and optimal utilisation of a computer system;
- troubleshoot at an elementary level; and
- be aware of new trends and developments and how to integrate these with existing or new equipment.
### 3.4 Internet Technologies

Internet Technologies are related and interconnected technologies which enable the establishment of global networks, for various purposes such as collaboration, electronic data interchange, electronic commerce and social networking. Internet services technologies refer to a range of technologies and tools for the design, development and maintenance of websites. The field of Internet services technologies includes Internet programming as well as the roles and responsibilities of each of the individuals involved. Internet technologies include the WWW and all interrelated processes in the digital presentation of multimedia data on a web page.

**Broad topic layout and progression**

#### Grade 10
- Overview of the Internet and WWW
- Overview of browsers
- Overview of search engines
- Role and purpose of the World Wide Web Consortium
- Obtaining information
- General web applications
- Web site categories
- Evaluation of web sites

#### Grade 11
- Evolution of the Internet
- Multimedia as part of the Internet
- Media compression technologies

#### Grade 12
- Web 2.0 and Web 3.0
- Improved searching
- Emerging technologies

#### Internet Services Technologies
- What are Internet services technologies?
- Overview of Internet services technologies
- Logging onto a network
- Internet services technologies and overview of supporting technologies
- Internet related careers
- Online applications
  - Data storage
  - Running instructions
  - Formatting output
  - Emerging technologies

**Note:**

Internet Technologies should teach learners to:
- understand the role that the Internet and the WWW play as part of the global information super-highway and the contribution towards the digital age;
- understand the role of Internet services and supporting technologies;
- understand how Internet technology and services can benefit specific scenarios; and
- be aware of new trends and developments.
3.5 Data and Information Management

Data and information management refers to the techniques and technologies involved in the collection, storage, dissemination and processing of data into information that results in knowledge and leads to decision making. It includes database design principles with specific reference to data storage, retrieval and information presentation design.

Broad topic layout and progression

Note:
Learners need to develop an understanding of:

- data and information with regard to the representation and classification thereof;
- how business takes advantage of computer databases to store data and retrieve information that enables it to gain a competitive edge as well as the social, legal and ethical issues involved;
- database design for use as part of information-driven ICT systems and platforms; and
- DBMS software and its purpose and application in an information-driven society.

Database design, queries and reports should be linked to application development as described in the topic Solution Development.

This section also covers some practical aspects regarding learning about and working with databases.
3.6 Social Implications

Social implications in the IT curriculum refer to issues relating to the digital age, bridging the digital divide and the responsible use of ICTs.

Broad topic layout and progression

Note:
This topic should provide an overview and understanding of:
- social issues related to the use of computers and how ICTs affect modern life;
- risks and safety aspects that may be involved in the operation of computing equipment within a given context;
- risks and safety issues relevant to using the Internet; and
- principles for making informed decisions regarding the responsible use of ICTs.

Most of the content of Social Implications should be dealt with and integrated with other topics and should not be taught as a stand-alone topic. The time scheduled for this topic can therefore be added to other topics.