



**education**

Department:  
Education  
REPUBLIC OF SOUTH AFRICA

# **NATIONAL CERTIFICATES (VOCATIONAL)**

## **ASSESSMENT GUIDELINES**

### **SYSTEM ANALYSIS AND DESIGN**

#### **NQF Level 4**

September 2007



# **SYSTEMS ANALYSIS AND DESIGN– LEVEL 4**

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## SECTION A: PURPOSE OF THE SUBJECT ASSESSMENT GUIDELINES

This document provides the lecturer with guidelines to develop and implement a coherent, integrated assessment system for Systems Analysis and Design in the National Certificates (Vocational). It must be read with the *National Policy Regarding Further Education and Training Programmes: Approval of the Documents, Policy for the National Certificates (Vocational) Qualifications at Levels 2 to 4 on the National Qualifications Framework (NQF)*. This assessment guideline will be used for National Qualifications Framework Levels 2-4.

This document explains the requirements for the internal and external subject assessment. The lecturer must use this document with the *Subject Guidelines: Systems Analysis and Design* to prepare for and deliver Systems Analysis and Design. Lecturers should use a variety of resources and apply a range of assessment skills in the setting, marking and recording of assessment tasks.

## SECTION B: ASSESSMENT IN THE NATIONAL CERTIFICATES (VOCATIONAL)

### 1 ASSESSMENT IN THE NATIONAL CERTIFICATES (VOCATIONAL)

Assessment in the National Certificates (Vocational) is underpinned by the objectives of the National Qualifications Framework (NQF). These objectives are to:

- Create an integrated national framework for learning achievements.
- Facilitate access to and progression within education, training and career paths.
- Enhance the quality of education and training.
- Redress unfair discrimination and past imbalances and thereby accelerate employment opportunities.
- Contribute to the holistic development of the student by addressing:
  - social adjustment and responsibility;
  - moral accountability and ethical work orientation;
  - economic participation; and
  - nation-building.

The principles that drive these objectives are:

- **Integration**

To adopt a unified approach to education and training that will strengthen the human resources development capacity of the nation.

- **Relevance**

To be dynamic and responsive to national development needs.

- **Credibility**

To demonstrate national and international value and recognition of qualification and acquired competencies and skills.

- **Coherence**

To work within a consistent framework of principles and certification.

- **Flexibility**

To allow for creativity and resourcefulness when achieving Learning Outcomes, to cater for different learning styles and use a range of assessment methods, instruments and techniques.

- **Participation**

To enable stakeholders to participate in setting standards and co-ordinating the achievement of the qualification.

- **Access**

To address barriers to learning at each level to facilitate students' progress.

- **Progression**

To ensure that the qualification framework permits individuals to move through the levels of the national qualification via different, appropriate combinations of the components of the delivery system.

- **Portability**

To enable students to transfer credits of qualifications from one learning institution and/or employer to another institution or employer.

- **Articulation**

To allow for vertical and horizontal mobility in the education system when accredited pre-requisites have been successfully completed.

- **Recognition of Prior Learning**

To grant credits for a unit of learning following an assessment or if a student possesses the capabilities specified in the outcomes statement.

- **Validity of assessments**

To ensure assessment covers a broad range of knowledge, skills, values and attitudes (SKVAs) needed to demonstrate applied competency. This is achieved through:

- clearly stating the outcome to be assessed;
- selecting the appropriate or suitable evidence;
- matching the evidence with a compatible or appropriate method of assessment; and
- selecting and constructing an instrument(s) of assessment.

- **Reliability**

To assure assessment practices are consistent so that the same result or judgment is arrived at if the assessment is replicated in the same context. This demands consistency in the interpretation of evidence; therefore, careful monitoring of assessment is vital.

- **Fairness and transparency**

To verify that no assessment process or method(s) hinders or unfairly advantages any student. The following could constitute unfairness in assessment:

- Inequality of opportunities, resources or teaching and learning approaches
- Bias based on ethnicity, race, gender, age, disability or social class
- Lack of clarity regarding Learning Outcome being assessed
- Comparison of students' work with other students, based on learning styles and language

- **Practicability and cost-effectiveness**

To integrate assessment practices within an outcomes-based education and training system and strive for cost and time-effective assessment.

## 2 ASSESSMENT FRAMEWORK FOR VOCATIONAL QUALIFICATIONS

The assessment structure for the National Certificates (Vocational) qualification is as follows:

### 2.1 Internal continuous assessment (ICASS)

Knowledge, skills values, and attitudes (SKVAs) are assessed throughout the year using assessment instruments such as projects, tests, assignments, investigations, role-play and case studies. The internal continuous assessment (ICASS) practical component is undertaken in a real workplace, a workshop or a "Structured Environment". This component is moderated internally and externally quality assured by Umalusi. All internal continuous assessment (ICASS) evidence is kept in a Portfolio of Evidence (PoE) and must be readily available for monitoring, moderation and verification purposes.

### 2.2 External summative assessment (ESASS)

The external summative assessment is either a single or a set of written papers set to the requirements of the Subject Learning Outcomes. The Department of Education administers the theoretical component according to relevant assessment policies.

A compulsory component of external summative assessment (ESASS) is the **integrated summative assessment task (ISAT)**. This assessment task draws on the students' cumulative learning throughout the year. The task requires **integrated application of competence** and is executed under strict assessment conditions. The task should take place in a simulated or "Structured Environment". The integrated summative assessment task (ISAT) is the most significant test of students' ability to apply acquired knowledge.

The integrated assessment approach allows students to be assessed in more than one subject with the same integrated summative assessment task (ISAT).

External summative assessments will be conducted annually between October and December, with provision made for supplementary sittings.

### 3 MODERATION OF ASSESSMENT

#### 3.1 Internal moderation

Assessment must be moderated according to the internal moderation policy of the Further Education and Training (FET) college. Internal college moderation is a continuous process. The moderator's involvement starts with the planning of assessment methods and instruments and follows with continuous collaboration with and support to the assessors. Internal moderation creates common understanding of Assessment Standards and maintains these across vocational programmes.

#### 3.2 External moderation

External moderation is conducted by the Department of Education, Umalusi and, where relevant, an Education and Training Quality Assurance (ETQA) body according to South African Qualifications Authority (SAQA) and Umalusi standards and requirements.

The external moderator:

- monitors and evaluates the standard of all summative assessments;
- maintains standards by exercising appropriate influence and control over assessors;
- ensures proper procedures are followed;
- ensures summative integrated assessments are correctly administered;
- observes a minimum sample of ten (10) to twenty-five (25) percent of summative assessments;
- gives written feedback to the relevant quality assessor; and
- moderates in case of a dispute between an assessor and a student.

Policy on inclusive education requires that assessment procedures be customised for students who experience barriers to learning, and supported to enable these students to achieve their maximum potential.

### 4 PERIOD OF VALIDITY OF INTERNAL CONTINUOUS ASSESSMENT (ICASS)

The period of validity of the internal continuous assessment mark is determined by the *National Policy on the Conduct, Administration and Management of the Assessment of the National Certificates (Vocational)*.

The internal continuous assessment (ICASS) must be re-submitted with each examination enrolment for which it constitutes a component.

### 5 ASSESSOR REQUIREMENTS

Assessors must be subject specialists and should ideally be declared competent against the standards set by the ETDP SETA. If the lecturer conducting the assessments has not been declared a competent assessor, an assessor who has been declared competent may be appointed to oversee the assessment process to ensure the quality and integrity of assessments.

### 6 TYPES OF ASSESSMENT

Assessment benefits the student and the lecturer. It informs students about their progress and helps lecturers make informed decisions at different stages of the learning process. Depending on the intended purpose, different types of assessment can be used.

## 6.1 Baseline assessment

At the beginning of a level or learning experience, baseline assessment establishes the knowledge, skills, values and attitudes (SKVAs) that students bring to the classroom. This knowledge assists lecturers to plan learning programmes and learning activities.

## 6.2 Diagnostic assessment

This assessment diagnoses the nature and causes of learning barriers experienced by specific students. It is followed by guidance, appropriate support and intervention strategies. This type of assessment is useful to make referrals for students requiring specialist help.

## 6.3 Formative assessment

This assessment monitors and supports teaching and learning. It determines student strengths and weaknesses and provides feedback on progress. It determines if a student is ready for summative assessment.

## 6.4 Summative assessment

This type of assessment gives an overall picture of student progress at a given time. It determines whether the student is sufficiently competent to progress to the next level.

## 7 PLANNING ASSESSMENT

An assessment plan should cover three main processes:

### 7.1 Collecting evidence

The assessment plan indicates which Subject Outcomes and Assessment Standards will be assessed, what assessment method or activity will be used and when this assessment will be conducted.

### 7.2 Recording

Recording refers to the assessment instruments or tools with which the assessment will be captured or recorded. Therefore, appropriate assessment instruments must be developed or adapted.

### 7.3 Reporting

All the evidence is put together in a report to deliver a decision for the subject.

## 8 METHODS OF ASSESSMENT

Methods of assessment refer to who carries out the assessment and includes lecturer assessment, self-assessment, peer assessment and group assessment.

<b>LECTURER ASSESSMENT</b>	The lecturer assesses students' performance against given criteria in different contexts, such as individual work, group work, etc.
<b>SELF-ASSESSMENT</b>	Students assess their own performance against given criteria in different contexts, such as individual work, group work, etc.
<b>PEER ASSESSMENT</b>	Students assess another student's or group of students' performance against given criteria in different contexts, such as individual work, group work, etc.
<b>GROUP ASSESSMENT</b>	Students assess the individual performance of other students within a group or the overall performance of a group of students against given criteria.

## 9 INSTRUMENTS AND TOOLS FOR COLLECTING EVIDENCE

All evidence collected for assessment purposes is kept or recorded in the student's PoE.

The following table summarises a variety of methods and instruments for collecting evidence. A method and instrument is chosen to give students ample opportunity to demonstrate the Subject Outcome has been attained. This will only be possible if the chosen methods and instruments are appropriate for the target group and the Specific Outcome being assessed.

	METHODS FOR COLLECTING EVIDENCE		
	Observation-based (Less structured)	Task-based (Structured)	Test-based (More structured)
<b>Assessment instruments</b>	<ul style="list-style-type: none"> <li>• Observation</li> <li>• Class questions</li> <li>• Lecturer, student, parent discussions</li> </ul>	<ul style="list-style-type: none"> <li>• Assignments or tasks</li> <li>• Projects</li> <li>• Investigations or research</li> <li>• Case studies</li> <li>• Practical exercises</li> <li>• Demonstrations</li> <li>• Role-play</li> <li>• Interviews</li> </ul>	<ul style="list-style-type: none"> <li>• Examinations</li> <li>• Class tests</li> <li>• Practical examinations</li> <li>• Oral tests</li> <li>• Open-book tests</li> </ul>
<b>Assessment tools</b>	<ul style="list-style-type: none"> <li>• Observation sheets</li> <li>• Lecturer's notes</li> <li>• Comments</li> </ul>	<ul style="list-style-type: none"> <li>• Checklists</li> <li>• Rating scales</li> <li>• Rubrics</li> </ul>	<ul style="list-style-type: none"> <li>• Marks (e.g. %)</li> <li>• Rating scales (1-7)</li> </ul>
<b>Evidence</b>	<ul style="list-style-type: none"> <li>• Focus on individual students</li> <li>• Subjective evidence based on lecturer observations and impressions</li> </ul>	<p><b>Open middle:</b> Students produce the same evidence but in different ways.</p> <p><b>Open end:</b> Students use same process to achieve different results.</p>	Students answer the same questions in the same way, within the same time.

## 10 TOOLS FOR ASSESSING STUDENT PERFORMANCE

**Rating scales** are marking systems where a symbol (such as 1 to 7) or a mark (such as 5/10 or 50%) is defined in detail. The detail is as important as the coded score. Traditional marking, assessment and evaluation mostly used rating scales without details such as what was right or wrong, weak or strong, etc.

**Task lists** and **checklists** show the student what needs to be done. These consist of short statements describing the expected performance in a particular task. The statements on the checklist can be ticked off when the student has adequately achieved the criterion. Checklists and task lists are useful in peer or group assessment activities.

**Rubrics** are a hierarchy (graded levels) of criteria with benchmarks that describe the minimum level of acceptable performance or achievement for each criterion. Using rubrics is a different way of assessing and cannot be compared to tests. Each criterion described in the rubric must be assessed separately. Mainly two types of rubrics, namely holistic and analytical, are used.

## 11 SELECTING AND/OR DESIGNING RECORDING AND REPORTING SYSTEMS

The selection or design of recording and reporting systems depends on the purpose of recording and reporting student achievement. **Why** particular information is recorded and **how** it is recorded determine which instrument will be used.

Computer-based systems, for example spreadsheets, are cost and time effective. The recording system should be user-friendly and information should be easily accessed and retrieved.

## 12 COMPETENCE DESCRIPTIONS

All assessment should award marks to evaluate specific assessment tasks. However, marks should be awarded against rubrics and not be simply a total of ticks for right answers. Rubrics should explain the competence level descriptors for the skills, knowledge, values and attitudes (SKVAs) that a student must demonstrate to achieve each level of the rating scale.

When lecturers or assessors prepare an assessment task or question, they must ensure that the task or question addresses an aspect of a Subject Outcome. The relevant Assessment Standard must be used to create the rubric to assess the task or question. The descriptions must clearly indicate the minimum level of attainment for each category on the rating scale.

## 13 STRATEGIES FOR COLLECTING EVIDENCE

A number of different assessment instruments may be used to collect and record evidence. Examples of instruments that can be (adapted and) used in the classroom include:

### 13.1 Record sheets

The lecturer observes students working in a group. These observations are recorded in a summary table at the end of each project. The lecturer can design a record sheet to observe students' interactive and problem-solving skills, attitudes towards group work and involvement in a group activity.

### 13.2 Checklists

Checklists should have clear categories to ensure that the objectives are effectively met. The categories should describe how the activities are evaluated and against what criteria they are evaluated. Space for comments is essential.

## SECTION C: ASSESSMENT IN SYSTEMS ANALYSIS AND DESIGN

### 1 SCHEDULE OF ASSESSMENT

At NQF levels 2, 3 and 4, lecturers will conduct assessments as well as develop a schedule of formal assessments that will be undertaken in the year. All three levels also have an external examination that accounts for 50 percent of the total mark. The marks allocated to assessment tasks completed during the year, kept or recorded in a PoE account for the other 50 percent.

The PoE and the external assessment include practical and written components. The practical assessment in Systems Analysis and Design must, where necessary, be subjected to external moderation by Umalusi or an appropriate Education and Training Quality Assurance (ETQA) body, appointed by the Umalusi Council in terms of Section 28(2) of the *General and Further Education and Training Quality Assurance Act, 2001 (Act No. 58 of 2001)*.

### 2 RECORDING AND REPORTING

Systems Analysis and Design, as is the case for all the other Vocational subjects, is assessed according to five levels of competence. The level descriptions are explained in the following table.

#### *Scale of Achievement for the Vocational component*

RATING CODE	RATING	MARKS %
5	Outstanding	80-100
4	Highly Competent	70-79
3	Competent	50-69
2	Not yet competent	40-49
1	Not achieved	0-39

The programme of assessment should be recorded in the Lecturer's Portfolio of Assessment for each subject. The following at least should be included in the Lecturer's Assessment Portfolio:

- A contents page
- The formal schedule of assessment
- The requirements for each assessment task
- The tools used for each assessment task
- Recording instrument(s) for each assessment task
- A mark sheet and report for each assessment task

The college must standardise these documents.

The student's PoE must include at least:

- A contents page
- The assessment tasks according to the assessment schedule
- The assessment tools or instruments for the task
- A record of the marks (and comments) achieved for each task

Where a task cannot be contained as evidence in the PoE, its exact location must be recorded and it must be readily available for moderation purposes.

**ASSESSMENT OF SYSTEMS ANALYSIS AND DESIGN**  
**LEVEL 4**

### 3 INTERNAL ASSESSMENT OF SUBJECT OUTCOMES IN SYSTEMS ANALYSIS AND DESIGN - LEVEL 4

#### Topic 1: Ethics and professionalism for the computer industry in South Africa

SUBJECT OUTCOME	
<b>1.1 Describe professionalism for the computer industry in South Africa.</b>	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> <li>Acceptable and unacceptable professional practices found in the computer industry are discussed.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss acceptable and unacceptable professional practices found in the computer industry.</li> </ul>
<ul style="list-style-type: none"> <li>Known professional bodies available for the computer industry in South Africa are identified and briefly described.</li> </ul>	<ul style="list-style-type: none"> <li>Identify and briefly described known professional bodies available for the computer industry in South Africa.</li> </ul>
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> <li>Assignments/tasks.</li> <li>Investigations/research.</li> <li>Case studies.</li> </ul>	

SUBJECT OUTCOME	
<b>1.2 Describe the codes of practice for professionalism in the IT industry in South Africa</b>	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> <li>General codes of practice for the IT industry in South Africa are identified.</li> </ul>	<ul style="list-style-type: none"> <li>Identify general codes of practice for the IT industry in South Africa.</li> </ul>
<ul style="list-style-type: none"> <li>The identified codes of practice are discussed.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss the codes of practice identified.</li> </ul>
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> <li>Assignments/tasks.</li> <li>Investigations/research.</li> <li>Case studies.</li> </ul>	

SUBJECT OUTCOME	
<b>1.3 Describe the code of ethics of the computer industry in South Africa</b>	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> <li>The manner in which the computer industry supports the concept of equal opportunity is explained.</li> </ul>	<ul style="list-style-type: none"> <li>Explain how the computer industry supports the concept of equal opportunity.</li> </ul>
<ul style="list-style-type: none"> <li>The policy against computer software piracy is explained.</li> </ul>	<ul style="list-style-type: none"> <li>Explain the policy against computer software piracy.</li> </ul>
<ul style="list-style-type: none"> <li>Ways in which piracy is addressed in South Africa are identified.</li> </ul>	<ul style="list-style-type: none"> <li>Identify ways in which piracy is addressed in South Africa.</li> </ul>
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> <li>Assignments/tasks.</li> <li>Investigations/research.</li> <li>Case studies.</li> </ul>	

## Topic 2: ICT risks and threat management

SUBJECT OUTCOME	
2.1 Describe risk management.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> <li>The term risk assessment is described.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the term risk assessment.</li> </ul>
<ul style="list-style-type: none"> <li>The term risk management is explained.</li> </ul>	<ul style="list-style-type: none"> <li>Explain the term risk management.</li> </ul>
<ul style="list-style-type: none"> <li>The implications of risk and treats to IT project development are described.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the implications of risk and threats to IT project development.</li> </ul>
<ul style="list-style-type: none"> <li>Reasons for the failure of project(s) are identified.</li> </ul>	<ul style="list-style-type: none"> <li>Identify the reasons for the failure of project(s).</li> </ul>
<ul style="list-style-type: none"> <li>Major risk factors are identified.</li> </ul>	<ul style="list-style-type: none"> <li>Identify major risk factors.</li> </ul>
<ul style="list-style-type: none"> <li>The term contingency plan is defined.</li> </ul>	<ul style="list-style-type: none"> <li>Define the term contingency plan.</li> </ul>
<ul style="list-style-type: none"> <li>Possible actions that can be taken relevant to various risks and threats are listed.</li> </ul>	<ul style="list-style-type: none"> <li>List possible actions that can be taken, relevant to various risks and threats identified.</li> </ul>
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> <li>Assignments/tasks.</li> <li>Investigations/research.</li> <li>Case studies.</li> <li>Practical exercises.</li> </ul>	

SUBJECT OUTCOME	
2.2 Recommend simple security solutions	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> <li>The term computer security is defined.</li> </ul>	<ul style="list-style-type: none"> <li>Define the term computer security.</li> </ul>
<ul style="list-style-type: none"> <li>The purpose of security controls within software environments is explained.</li> </ul>	<ul style="list-style-type: none"> <li>Explain the purpose of security controls within software environments.</li> </ul>
<ul style="list-style-type: none"> <li>The main security control areas are described.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the main security control areas.</li> </ul>
<ul style="list-style-type: none"> <li>Hardware and software controls to enforce security controls are described and recommended.</li> </ul>	<ul style="list-style-type: none"> <li>Describe and recommend hardware and software controls to enforce security controls.</li> </ul>
<ul style="list-style-type: none"> <li>Security and usage policies and procedures are explained.</li> </ul>	<ul style="list-style-type: none"> <li>Explain security and usage policies and procedures.</li> </ul>
<ul style="list-style-type: none"> <li>Acceptable and unacceptable ICT usage is explained.</li> </ul>	<ul style="list-style-type: none"> <li>Explain acceptable and unacceptable ICT usage.</li> </ul>
<ul style="list-style-type: none"> <li>The penalties for unacceptable use of ICTs are explained.</li> </ul>	<ul style="list-style-type: none"> <li>Explain the penalties for unacceptable use of ICTs.</li> </ul>
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> <li>Assignments/tasks.</li> <li>Investigations/research.</li> <li>Case studies.</li> <li>Role-play.</li> </ul>	

**Topic 3: Information gathering techniques for computer systems development**

<b>SUBJECT OUTCOME</b>	
<b>3.1 Design and conduct an interview for gathering information for computer system development.</b>	
<b>ASSESSMENT STANDARD</b>	<b>LEARNING OUTCOME</b>
<ul style="list-style-type: none"> <li>• A section that explains the objectives of the interview to the interviewee is designed.</li> </ul>	<ul style="list-style-type: none"> <li>• Design a section that explains the objectives of the interview to the interviewee.</li> </ul>
<ul style="list-style-type: none"> <li>• The manner in which the interviewee's understanding of the interview questions is confirmed is explained and demonstrated.</li> </ul>	<ul style="list-style-type: none"> <li>• Explain and demonstrate how the interviewee's understanding of the interview questions will be confirmed.</li> </ul>
<ul style="list-style-type: none"> <li>• The manner in which to ensure that the interviewee's provision of answers will meet the interview objectives is explained and demonstrated.</li> </ul>	<ul style="list-style-type: none"> <li>• Explain and demonstrate how to ensure that the interviewee's provision of answers will meet the interview objectives.</li> </ul>
<ul style="list-style-type: none"> <li>• The manner in which to ensure that the presentation of the interview is appropriate for the interviewee is explained and demonstrated.</li> </ul>	<ul style="list-style-type: none"> <li>• Explain and demonstrate how to ensure that the presentation of the interview is appropriate for the interviewee.</li> </ul>
<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>• Assignments/tasks.</li> <li>• Case studies.</li> <li>• Practical exercises.</li> <li>• Interviews.</li> </ul>	

<b>SUBJECT OUTCOME</b>	
<b>3.2 Design and use a questionnaire for gathering information.</b>	
<b>ASSESSMENT STANDARD</b>	<b>LEARNING OUTCOME</b>
<ul style="list-style-type: none"> <li>• A section that explains the objectives of the questionnaire to respondents is designed.</li> </ul>	<ul style="list-style-type: none"> <li>• Design a section that explains the objectives of the questionnaire to respondents.</li> </ul>
<ul style="list-style-type: none"> <li>• The manner in which the respondents' understanding of the questionnaire will be confirmed is explained and demonstrated.</li> </ul>	<ul style="list-style-type: none"> <li>• Explain and demonstrate how the respondents' understanding of the questionnaire will be confirmed.</li> </ul>
<ul style="list-style-type: none"> <li>• The manner in which to ensure that the respondents' provision of answers will meet the questionnaire objectives is explained and demonstrated.</li> </ul>	<ul style="list-style-type: none"> <li>• Explain and demonstrate how to ensure that the respondents' provision of answers will meet the questionnaire objectives.</li> </ul>
<ul style="list-style-type: none"> <li>• The manner in which to summarise the questionnaire responses is explained and demonstrated.</li> </ul>	<ul style="list-style-type: none"> <li>• Explain and demonstrate how to summarise the questionnaire responses</li> </ul>
<ul style="list-style-type: none"> <li>• Actual questionnaire responses are compared to expected responses.</li> </ul>	<ul style="list-style-type: none"> <li>• Compare actual questionnaire responses to expected responses.</li> </ul>
<ul style="list-style-type: none"> <li>• Justifiable conclusions about the population sample are drawn.</li> </ul>	<ul style="list-style-type: none"> <li>• Draw justifiable conclusions about the population sample.</li> </ul>
<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>• Assignments/tasks.</li> <li>• Case studies.</li> <li>• Practical exercises using questionnaires.</li> </ul>	

<b>SUBJECT OUTCOME</b>	
<b>3.3 Gather data from documents for computer system development.</b>	
<b>ASSESSMENT STANDARD</b>	<b>LEARNING OUTCOME</b>
<ul style="list-style-type: none"> <li>Documents that meet the specified information requirements are identified using an industry recommended format.</li> </ul>	<ul style="list-style-type: none"> <li>Identify documents that meet the specified information requirements using an industry recommended format.</li> </ul>
<ul style="list-style-type: none"> <li>Documents that show characteristics of the data and the relationships between data items are identified.</li> </ul>	<ul style="list-style-type: none"> <li>Identify documents that show characteristics of the data and relationships between data items.</li> </ul>
<ul style="list-style-type: none"> <li>Documents that show data items and facilitate access to those data items are identified.</li> </ul>	<ul style="list-style-type: none"> <li>Identify documents that show data items and facilitate access to those data items.</li> </ul>
<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>Assignments/tasks.</li> <li>Investigations/research.</li> <li>Case studies.</li> </ul>	

<b>SUBJECT OUTCOME</b>	
<b>3.4 Observe personnel behaviour to gather information for computer system development.</b>	
<b>ASSESSMENT STANDARD</b>	<b>LEARNING OUTCOME</b>
<ul style="list-style-type: none"> <li>A record of behaviour events that meet the specified information requirements, and outlines those events is identified.</li> </ul>	<ul style="list-style-type: none"> <li>Identify a record of behaviour of events that meet the specified information requirements and outline those events.</li> </ul>
<ul style="list-style-type: none"> <li>A report on the observation is compiled.</li> </ul>	<ul style="list-style-type: none"> <li>Compile a report on the observation.</li> </ul>
<ul style="list-style-type: none"> <li>The outcome of the observation is compared with the original objectives.</li> </ul>	<ul style="list-style-type: none"> <li>Compare the outcome of the observation with original objectives.</li> </ul>
<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>Assignments/tasks.</li> <li>Investigations/research.</li> <li>Case studies.</li> <li>Practical exercises.</li> <li>Demonstrations.</li> </ul>	

<b>SUBJECT OUTCOME</b>	
<b>3.5 Consolidate the information gathered via different techniques.</b>	
<b>ASSESSMENT STANDARD</b>	<b>LEARNING OUTCOME</b>
<ul style="list-style-type: none"> <li>The comparison identifies similarities and differences between the information gathered through different techniques.</li> </ul>	<ul style="list-style-type: none"> <li>Compare information gathered through different techniques for similarities and differences.</li> </ul>
<ul style="list-style-type: none"> <li>Differences are resolved and justified by reviewing the information gathering techniques.</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate how the differences are resolved and justified by reviewing the information gathering techniques.</li> </ul>
<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>Assignments/tasks.</li> <li>Investigations/research.</li> <li>Case studies.</li> <li>Practical consolidation exercises.</li> </ul>	

#### Topic 4 Analysing information systems

SUBJECT OUTCOME	
4.1 Describe information systems analysis.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> <li>The description explains the purpose of information systems analysis. <i>Range: Analysis of current system, define user requirements, derive logical system.</i></li> </ul>	<ul style="list-style-type: none"> <li>Explain the purpose of information systems analysis.</li> </ul>
<ul style="list-style-type: none"> <li>The functions of the information systems analyst are outlined. <i>Range: Communication between user and management, generate structured specifications, estimate costs and benefits.</i></li> </ul>	<ul style="list-style-type: none"> <li>Outline the functions of the information systems analyst.</li> </ul>
<ul style="list-style-type: none"> <li>The purpose of joint application development (JAD) is defined and described.</li> </ul>	<ul style="list-style-type: none"> <li>Define and describe the purpose of joint application development (JAD).</li> </ul>
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> <li>Assignments/tasks.</li> <li>Investigations/research.</li> <li>Case studies.</li> </ul>	

SUBJECT OUTCOME	
4.2 Identify and explain different techniques and tools used for documenting system analysis.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> <li>Different techniques used for systems analysis in industry are identified and explained. <i>Range: Structured, object-oriented.</i></li> </ul>	<ul style="list-style-type: none"> <li>Identify and explain different techniques used for systems analysis in industry.</li> </ul>
<ul style="list-style-type: none"> <li>Different techniques used for describing data structures are identified and explained. <i>Range: Data models, object models, entity-relationship diagrams.</i></li> </ul>	<ul style="list-style-type: none"> <li>Identify and explain different techniques used for describing data structures.</li> </ul>
<ul style="list-style-type: none"> <li>Different techniques used for documenting business process flows are identified and explained. <i>Range: Process flow diagrams, use cases.</i></li> </ul>	<ul style="list-style-type: none"> <li>Identify and explain different techniques used for documenting business process flows.</li> </ul>
<ul style="list-style-type: none"> <li>Different techniques for documenting data flows are identified and explained. <i>Range: Data flow diagrams, object interaction diagrams, state diagrams.</i></li> </ul>	<ul style="list-style-type: none"> <li>Identify and explain different techniques used for documenting data flows.</li> </ul>
<ul style="list-style-type: none"> <li>Different analysis tools used to assist with documentation are identified and explained. <i>Range: Data dictionaries, CASE technology, Office applications.</i></li> </ul>	<ul style="list-style-type: none"> <li>Identify and explain different analysis tools used to assist with documentation.</li> </ul>
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> <li>Assignments/tasks.</li> <li>Practical exercises</li> <li>Case studies.</li> </ul>	

SUBJECT OUTCOME	
<b>4.3 Describe the purpose, deliverables from and contractual implications of the systems requirements document.</b>	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> <li>The purpose of the systems requirements document is described.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the purpose of the systems requirements document.</li> </ul>
<ul style="list-style-type: none"> <li>The deliverables are identified from the systems requirements document.</li> </ul>	<ul style="list-style-type: none"> <li>Identify the deliverables from the systems requirements document.</li> </ul>
<ul style="list-style-type: none"> <li>The elements of the systems requirements document that could have contractual implications are identified and explained.</li> </ul>	<ul style="list-style-type: none"> <li>Identify and explain the elements of the systems requirements document that could have contractual implications.</li> </ul>
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> <li>Assignments/tasks.</li> <li>Practical exercises</li> <li>Case studies.</li> </ul>	

### Topic 5: Principles of designing computer system inputs and outputs

SUBJECT OUTCOME	
<b>5.1 Explain the implications of input and output design principles.</b>	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> <li>Distinctions are made between the appearance and the underlying structure and processes.</li> </ul>	<ul style="list-style-type: none"> <li>Distinguish between the appearance and the underlying structure and processes.</li> </ul>
<ul style="list-style-type: none"> <li>The purpose of user involvement in creating designs is identified.</li> </ul>	<ul style="list-style-type: none"> <li>Identify the purpose of user involvement in creating designs.</li> </ul>
<ul style="list-style-type: none"> <li>The online computer functions are compared with manual forms and offline data entry.</li> </ul>	<ul style="list-style-type: none"> <li>Compare the online computer functions with manual forms and offline data entry.</li> </ul>
<ul style="list-style-type: none"> <li>Input and output are discussed.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss input and output.</li> </ul>
<ul style="list-style-type: none"> <li>Graphical input and output functions are compared with text based input and output functions.</li> </ul>	<ul style="list-style-type: none"> <li>Compare graphical input and output functions with text based input and output functions.</li> </ul>
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> <li>Assignments/tasks.</li> <li>Investigations/research.</li> <li>Case studies.</li> </ul>	

SUBJECT OUTCOME	
<b>5.2 Design input and output functions.</b>	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> <li>A design that meets the specification for the function is created. <i>Range: Error avoidance, workplace design, document design, equipment design, dialog design, job design.</i></li> </ul>	<ul style="list-style-type: none"> <li>Create a design that meets the specification for the function.</li> </ul>
<ul style="list-style-type: none"> <li>The design can be implemented in the specified computer environment. <i>Range: Workplace design.</i></li> </ul>	<ul style="list-style-type: none"> <li>Ensure that the design can be implemented in the specified computer environment.</li> </ul>
<ul style="list-style-type: none"> <li>The manner in which the design conforms to an industry recommended format for the function is explained. <i>Range: Simulation, documentation.</i></li> </ul>	<ul style="list-style-type: none"> <li>Explain how the design conforms to an industry recommended format for the function.</li> </ul>

<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>• Assignments/tasks.</li> <li>• Practical exercises</li> <li>• Case studies.</li> </ul>	
<b>SUBJECT OUTCOME</b>	
<b>5.3 Create system input and output functions.</b>	
<b>ASSESSMENT STANDARD</b>	<b>LEARNING OUTCOME</b>
<ul style="list-style-type: none"> <li>• The manner in which to ensure that the format of system input and output functions corresponds to the design is explained and demonstrated.</li> <li>• <i>Range: Uniqueness, Uniform size and format, Stability, Meaningfulness, Operability.</i></li> </ul>	<ul style="list-style-type: none"> <li>• Explain and demonstrate how to ensure that the format of system input and output functions corresponds to the design.</li> </ul>
<ul style="list-style-type: none"> <li>• The manner in which to ensure that the function behaviour corresponds to the design is explained and demonstrated.</li> </ul>	<ul style="list-style-type: none"> <li>• Explain and demonstrate how to ensure that the function behaviour corresponds to the design.</li> </ul>
<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>• Assignments/tasks.</li> <li>• Investigations/research.</li> <li>• Case studies.</li> <li>• Practical exercises.</li> </ul>	

### Topic 6 Implementing and maintaining an information system

<b>SUBJECT OUTCOME</b>	
<b>6.1 Describe systems testing, installation and changeover.</b>	
<b>ASSESSMENT STANDARD</b>	<b>LEARNING OUTCOME</b>
<ul style="list-style-type: none"> <li>• The types of systems, and the goal of each type, that should be concluded before a system is installed are described.</li> </ul>	<ul style="list-style-type: none"> <li>• Describe the types of testing, and the goal of each type, that should be concluded before a system is installed.</li> </ul>
<ul style="list-style-type: none"> <li>• Appropriate test data and test procedures that should be performed successfully before the user accepts a system are identified.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify appropriate test data and test procedures that should be performed successfully before the user accepts a system.</li> </ul>
<ul style="list-style-type: none"> <li>• The steps in installing information systems, and who is responsible for each step, are explained.</li> </ul>	<ul style="list-style-type: none"> <li>• Explain the steps in installing information systems and who is responsible for each step.</li> </ul>
<ul style="list-style-type: none"> <li>• The advantages and disadvantages of the types of systems conversion/methods of changeover are explained.</li> </ul>	<ul style="list-style-type: none"> <li>• Explain the advantages and disadvantages of the types of systems conversion/methods of changeover.</li> </ul>
<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>• Assignments/tasks.</li> <li>• Investigations/research.</li> <li>• Case studies.</li> <li>• Practical exercises.</li> </ul>	

<b>SUBJECT OUTCOME</b>	
<b>6.2 Describe post-implementation.</b>	
<b>ASSESSMENT STANDARD</b>	<b>LEARNING OUTCOME</b>
<ul style="list-style-type: none"> <li>• Appropriate time frames to follow different types of post implementation review procedures are determined and justified.</li> </ul>	<ul style="list-style-type: none"> <li>• Determine and justify appropriate time frames to follow different types of post implementation review procedures.</li> </ul>
<ul style="list-style-type: none"> <li>• The factors which must be considered during a post implementation review are explained.</li> </ul>	<ul style="list-style-type: none"> <li>• Explain the factors which must be considered during a post implementation review.</li> </ul>
<ul style="list-style-type: none"> <li>• The actual performance of all system components is compared with their expected performance</li> </ul>	<ul style="list-style-type: none"> <li>• Compare the actual performance of system components with their expected performance.</li> </ul>
<ul style="list-style-type: none"> <li>• The success of the system is measured.</li> </ul>	<ul style="list-style-type: none"> <li>• Measure the success of the system.</li> </ul>
<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>• Assignments/tasks.</li> <li>• Investigations/research.</li> <li>• Case studies.</li> <li>• Practical exercises.</li> </ul>	

<b>SUBJECT OUTCOME</b>	
<b>6.3 Describe system maintenance.</b>	
<b>ASSESSMENT STANDARD</b>	<b>LEARNING OUTCOME</b>
<ul style="list-style-type: none"> <li>• The causes of changes that may need to be made to installed systems are named.</li> </ul>	<ul style="list-style-type: none"> <li>• Name the causes of changes which may need to be made to installed systems.</li> </ul>
<ul style="list-style-type: none"> <li>• The types of maintenance, and when each type is appropriate are identified and described.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify and describe the types of maintenance and when each type is appropriate.</li> </ul>
<ul style="list-style-type: none"> <li>• The interrelationship between maintenance and design is explained.</li> </ul>	<ul style="list-style-type: none"> <li>• Explain the interrelation between maintenance and design.</li> </ul>
<ul style="list-style-type: none"> <li>• The financial implications of maintenance are described and determined.</li> </ul>	<ul style="list-style-type: none"> <li>• Describe and determine the financial implications of maintenance.</li> </ul>
<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>• Assignments/tasks.</li> <li>• Investigations/research.</li> <li>• Case studies.</li> <li>• Practical exercises.</li> </ul>	

### Topic 7: Concepts of artificial intelligence

<b>SUBJECT OUTCOME</b>	
<b>7.1 Define artificial intelligence and its uses.</b>	
<b>ASSESSMENT STANDARDS</b>	<b>LEARNING OUTCOMES</b>
<ul style="list-style-type: none"> <li>• The term artificial intelligence is defined.</li> </ul>	<ul style="list-style-type: none"> <li>• Define the term artificial intelligence.</li> </ul>
<ul style="list-style-type: none"> <li>• Artificial intelligence is defined in terms of its development of technology.</li> </ul>	<ul style="list-style-type: none"> <li>• Define artificial intelligence in terms of its development of technology.</li> </ul>
<ul style="list-style-type: none"> <li>• The uses of artificial intelligence in the business environment are listed.</li> </ul>	<ul style="list-style-type: none"> <li>• List the uses of artificial intelligence in the business environment.</li> </ul>

<b>SUBJECT OUTCOME</b>	
<b>7.2 Describe how robots are used.</b>	
<b>ASSESSMENT STANDARDS</b>	<b>LEARNING OUTCOMES</b>
<ul style="list-style-type: none"> <li>The term robot is described in simple terms.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the term robot in simple terms.</li> </ul>
<ul style="list-style-type: none"> <li>Robots are described in terms of past, present and future.</li> </ul>	<ul style="list-style-type: none"> <li>Describe robots in terms of the past, present and future.</li> </ul>
<ul style="list-style-type: none"> <li>Robots are described in detail in terms of perception systems.</li> </ul>	<ul style="list-style-type: none"> <li>Describe robots in detail in terms of perception systems.</li> </ul>
<ul style="list-style-type: none"> <li>The uses of robots are described.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the uses of robots.</li> </ul>
<ul style="list-style-type: none"> <li>Robots are described in terms of their impact on technology.</li> </ul>	<ul style="list-style-type: none"> <li>Explain the impact of robots on technology.</li> </ul>
<b>SUBJECT OUTCOME</b>	
<b>7.3 Explain fuzzy logic.</b>	
<b>ASSESSMENT STANDARDS</b>	<b>LEARNING OUTCOMES</b>
<ul style="list-style-type: none"> <li>The term fuzzy logic is defined.</li> </ul>	<ul style="list-style-type: none"> <li>Define the term fuzzy logic.</li> </ul>
<ul style="list-style-type: none"> <li>Fuzzy logic is defined in terms of its development.</li> </ul>	<ul style="list-style-type: none"> <li>Define fuzzy logic in terms of its development.</li> </ul>
<ul style="list-style-type: none"> <li>Fuzzy logic is explained in terms of advantages and disadvantages.</li> </ul>	<ul style="list-style-type: none"> <li>Explain the advantages and disadvantages of fuzzy logic.</li> </ul>
<b>SUBJECT OUTCOME</b>	
<b>7.4 Explain expert systems.</b>	
<b>ASSESSMENT STANDARDS</b>	<b>LEARNING OUTCOMES</b>
<ul style="list-style-type: none"> <li>Expert systems are defined.</li> </ul>	<ul style="list-style-type: none"> <li>Define expert systems.</li> </ul>
<ul style="list-style-type: none"> <li>The users of expert systems are listed.</li> </ul>	<ul style="list-style-type: none"> <li>List the users of expert systems.</li> </ul>
<ul style="list-style-type: none"> <li>The essential components of expert systems are described, outlining major program components.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the essential components of an expert system, outlining major program components.</li> </ul>
<ul style="list-style-type: none"> <li>The implications of using expert systems in businesses are outlined.</li> </ul>	<ul style="list-style-type: none"> <li>Outline the implications of using expert systems in businesses.</li> </ul>
<b>SUBJECT OUTCOME</b>	
<b>7.5 Explain neural networks.</b>	
<b>ASSESSMENT STANDARDS</b>	<b>LEARNING OUTCOMES</b>
<ul style="list-style-type: none"> <li>The term neural network is defined.</li> </ul>	<ul style="list-style-type: none"> <li>Define the term neural network.</li> </ul>
<ul style="list-style-type: none"> <li>Problems addressed by neural networks are explained.</li> </ul>	<ul style="list-style-type: none"> <li>Explain problems addressed by neural networks.</li> </ul>
<ul style="list-style-type: none"> <li>Categories of neural networks are explained.</li> </ul>	<ul style="list-style-type: none"> <li>Explain the categories of neural networks.</li> </ul>
<ul style="list-style-type: none"> <li>The main parts found in a neuron in neural networks are named and explained.</li> </ul>	<ul style="list-style-type: none"> <li>Name and explain the main parts found in a neuron in neural networks.</li> </ul>
<ul style="list-style-type: none"> <li>The term synapses is define.</li> </ul>	<ul style="list-style-type: none"> <li>Define the term synapses.</li> </ul>
<b>SUBJECT OUTCOME</b>	
<b>7.6 Explain virtual reality.</b>	
<b>ASSESSMENT STANDARDS</b>	<b>LEARNING OUTCOMES</b>
<ul style="list-style-type: none"> <li>The term virtual reality is defined.</li> </ul>	<ul style="list-style-type: none"> <li>Define virtual reality.</li> </ul>
<ul style="list-style-type: none"> <li>The explanation describes the applications of virtual reality.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the applications of virtual reality.</li> </ul>

**ASSESSMENT TASKS OR ACTIVITIES**

- Class tests.
- Discussions.
- Group work.
- Assignments.
- Research.
- Projects.

**4 SPECIFICATIONS FOR THE EXTERNAL ASSESSMENT IN SYSTEMS ANALYSIS AND DESIGN – LEVEL 4**

**4.1 Integrated summative assessment task (ISAT)**

A compulsory component of the external assessment (ESASS) is the **integrated summative assessment task (ISAT)**. The integrated summative assessment task (ISAT) draws on the students' cumulative learning achieved throughout the year. The task requires **integrated application of competence** and is executed and recorded in compliance with assessment conditions.

Two approaches to the integrated summative assessment task (ISAT) may be as follows:

The students are assigned a task at the beginning of the year which they will have to complete in phases during the year to obtain an assessment mark. A final assessment is made at the end of the year when the task is completed.

**OR**

Students achieve the competencies during the year but the competencies are assessed cumulatively in a single assessment or examination session at the end of the year.

The integrated summative assessment task (ISAT) is set by an externally appointed examiner and is conveyed to colleges in the first quarter of the year.

The integrated assessment approach enables students to be assessed in more than one subject with the same integrated summative assessment task (ISAT).

**4.2 National Examination**

A national examination is conducted annually in October or November by means of a paper(s) set and moderated externally. The following distribution of cognitive application is suggested.

LEVEL 4	KNOWLEDGE AND COMPREHENSION	APPLICATION	ANALYSIS, SYNTHESIS AND EVALUATION
	55%	30%	15%