

NATIONAL CERTIFICATE MODULE: UNIT SPECIFICATION**STATEMENT OF STANDARDS****UNIT NUMBER:** 3151024**UNIT TITLE:** SIMPLE CONTROL SYSTEMS

Acceptable performance in this unit will be the satisfactory achievement of the standards set out in this part of the specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

OUTCOME

1. OUTLINE A CONTROL SYSTEM IN TERMS OF INPUT PROCESS AND OUTPUT

PERFORMANCE CRITERIA

- (a) The production of a schematic and block diagram is correct.
- (b) The production of a block diagram for each sub-system of the control system is correct.
- (c) The identification of input and output signal ranges is correct.

RANGE STATEMENT

The range statement for this outcome is specified within the performance criteria.

EVIDENCE REQUIREMENTS

Written evidence of the ability to produce a schematic and block diagram, produce a diagram for each sub-system and identify input and output signal ranges. The system should include at least 2 sub-systems.

OUTCOME

2. OUTLINE THE FUNCTIONS OF COMPONENTS OF A TYPICAL CONTROL SYSTEM

PERFORMANCE CRITERIA

- (a) The identification of the function of each element in the system is correct.
- (b) The indication of the outlines of the operation of the detecting, comparing and regulating elements is correct.

RANGE STATEMENT

The range statement for this outcome is specified within the performance criteria.

EVIDENCE REQUIREMENTS

Written evidence of the ability to identify the function of each element in one system and outline the operation of the detecting, comparing and regulating elements.

OUTCOME

- 3. OUTLINE THE OPERATION OF A CONTROL SYSTEM

PERFORMANCE CRITERIA

- (a) The recorded readings of input and output over a period of time are correct.
- (b) The outline of the operation of control is correct.

RANGE STATEMENT

The range statement for this outcome is specified within the performance criteria.

EVIDENCE REQUIREMENTS

Written evidence of the ability to record measured value (output) to a step change in set value (input). Written evidence of the ability to record measured value (output) and to step change in disturbance.

ASSESSMENT

In order to achieve this unit, candidates are required to present sufficient evidence that they have met all the performance criteria for each outcome within the range specified. Details of these requirements are given for each outcome. The assessment instruments used should follow the general guidance offered by the SQA assessment model and an integrative approach to assessment is encouraged. (See references at the end of support notes).

Accurate records should be made of the assessment instruments used showing how evidence is generated for each outcome and giving marking schemes and/or checklists, etc. Records of candidates' achievements should be kept. These records will be available for external verification.

SPECIAL NEEDS

In certain cases, modified outcomes and range statements can be proposed for certification. See references at end of support notes.

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NATIONAL CERTIFICATE MODULE: UNIT SPECIFICATION**SUPPORT NOTES**

UNIT NUMBER: 3151024

UNIT TITLE: SIMPLE CONTROL SYSTEMS

SUPPORT NOTES: This part of the unit specification is offered as guidance. None of the sections of the support notes is mandatory.

NOTIONAL DESIGN LENGTH: SQA allocates a notional design length to a unit on the basis of time estimated for achievement of the stated standards by a candidate whose starting point is as described in the access statement. The notional design length for this unit is 20 hours. The use of notional design length for programme design and timetabling is advisory only.

PURPOSE This module introduce the concept of a simple control system together with its function and the functions of its individual components. It will be of interest to candidates who intend to follow a career in any branch of engineering.

SQA publishes summaries of NC units for easy reference, publicity purposes, centre handbooks, etc. The summary statement for this unit is as follows:

This module will provide you with a knowledge of the component parts and operation of a system.

CONTENT/CONTEXT Safety regulations and safe working practices and procedures should be observed at all times.

British Standard terminology should be used in all relevant parts of the module.

Corresponding to Outcomes 1-3:

1. The meaning of and need for control, the black box concept, representation by block diagrams. Identification of inputs, processes and outputs.
2. The purpose of typical control systems and identification of their components. Operation of measuring, signal conditioning, comparing, control, motor and correcting elements. Manual and automatic control, direct and indirect control.
3. Types of system: open and closed loop. Types of control action: on/off, continuous and sequential. Concept of system response.

APPROACHES TO GENERATING EVIDENCE

The meaning of and need for control can be established by group discussion or examples services of everyday control systems.

Terminology should be presented in context gradually throughout the module to British Standard specifications. Involved mathematical and electrical/electronic explanations are to be avoided.

The operation and construction of the system elements should be supported by examples of each item, diagrams, models and technical literature.

The establishment heating, ventilation, water level control systems, alarm systems, etc, could be used to supplement laboratory equipment. A visit to a process plant or a power station could be arranged.

Students could be given an assignment which includes a comprehensive description of a control system and an analysis of its performance over a period of time.

ASSESSMENT PROCEDURES Centres may use Instruments of Assessments which tutors/trainers find appropriate. Examples of Instruments of Assessment are as follows:

Outcomes 1-3 It is recommended that structured questions are set here to assess each of the outcomes.

PROGRESSION The candidate could progress onto further modules.

RECOGNITION Many SQA NC units are recognised for entry/recruitment purposes. For up-to-date information see the SQA guide 'Recognised and Recommended Groupings'.

REFERENCES

1. Guide to unit writing.
2. For a fuller discussion on assessment issues, please refer to SQA's Guide to Assessment.
3. Procedures for special needs statements are set out in SQA's guide 'Students with Special Needs'.
4. Information for centres on SQA's operating procedures is contained in SQA's Guide to Procedures.
5. For details of other SQA publications, please consult SQA's publications list.

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