-SQA- SCOTTISH QUALIFICATIONS AUTHORITY

HIGHER NATIONAL UNIT SPECIFICATION

GENERAL INFORMATION

-Unit Number- **2430274**

-Superclass- : **VD**

-Title- **PRODUCTION PLANNING, CONTROL AND QUALITY ASSURANCE TECHNIQUES**

-DESCRIPTION-

GENERAL COMPETENCE FOR UNIT: Applying production planning, estimating and control techniques including quality assurance procedures.

OUTCOMES

1. plan and cost the manufacture of components with the aid of a computer-aided process planning system;

2. analyse a work situation and calculate standard time from the results of a time study exercise;

3. verify a bill of material with regard to material specifications and part drawings;

4. use and apply quality management techniques to assess the quality performance of a manufacturer.

CREDIT VALUE: 1 HN Credit

ACCESS STATEMENT: Access to this unit is at the discretion of the centre. However it would be beneficial if the candidate is competent in a broad range of manufacturing processes and is proficient in using menu operated software.

This may be evidenced by possession of NC Modules eg 74686 Costing and Estimating for Manufacture, 64714 Planning for Manufacture (x 1/2), 74680 Manufacturing Systems 1. 81161 Quality Awareness (x 1/2) or similar qualification or experience.

For further information contact: Committee and Administration Unit, SQA, Hanover House, 24 Douglas Street, Glasgow G2 7NQ.

Additional copies of this unit may be purchased from SQA (Publications Unit). At the time of publication, the cost is £1.50 (minimum order £5).

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STATEMENT OF STANDARDS

UNIT NUMBER: 2430274

UNIT TITLE: PRODUCTION PLANNING, CONTROL AND QUALITY ASSURANCE TECHNIQUES

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. PLAN AND COST THE MANUFACTURE OF COMPONENTS WITH THE AID OF A COMPUTER-AIDED PROCESS PLANNING SYSTEM

PERFORMANCE CRITERIA

(a) The three levels of production planning are correctly distinguished on a basis of layout and routing.
(b) Tooling requirements are correctly identified for a given operation.
(c) Drawings are correctly interpreted to select optimum process.
(d) The process plan and cost estimate for the manufacture of a component is extracted correctly using a computer-aided process planning and estimating system.

RANGE STATEMENT

Production planning: factory planning; process planning; operational planning.

Manufacturing resources: within the factory unit; external.

Computer-aided process planning system contains: schedules; part numbers; descriptions; stock; costs; quality requirements.

Tooling requirements: internal supply; external procurement.

Drawing interpretation: process, estimated times; quality requirements; tolerances; finishing; overall capacity.

Process plan and cost estimate: operational sequence; set-up times; operation times; overall cost.

EVIDENCE REQUIREMENTS

Written evidence including computer printouts confirming that the candidate can complete planning documents at factory, process and operational levels as detailed in the performance criteria.

OUTCOME

2. ANALYSE A WORK SITUATION AND CALCULATE STANDARD TIME FROM THE RESULTS OF A TIME STUDY EXERCISE

PERFORMANCE CRITERIA

(a) Analysis of a work situation using a process chart and a multiple activity chart is correct.
(b) Standard operation times are established correctly from the results of a time study exercise.
(c) Non-productive time is established correctly and appropriately incorporated in the process plan.

RANGE STATEMENT

Process/multiple activity chart contains: work elements, rating factor; average time study times; time allowances for routine factors eg tool replacement.

EVIDENCE REQUIREMENTS

Written evidence including process/multiple activity chart, standard time calculations from a time study exercise and non-productive time allocation made where appropriate are required for each candidate.

OUTCOME

3. VERIFY A BILL OF MATERIAL WITH REGARD TO MATERIAL SPECIFICATIONS AND PART DRAWINGS

PERFORMANCE CRITERIA

(a) Material specifications are correctly identified and cross-referenced against part drawings or other documents.
(b) Alternative materials are correctly identified and specified in place of non-standard requirements.
(c) Discrepancies are correctly identified in a given bill of material and listed.

RANGE STATEMENT

One page bill of material: part code number; description; quantity; material.

Part drawings: part code number; description; material specification.

EVIDENCE REQUIREMENTS

Written evidence to show that candidate can verify the accuracy of a single page bill of material with five parts and associated standard parts.

OUTCOME

4. USE AND APPLY QUALITY MANAGEMENT TECHNIQUES TO ASSESS THE QUALITY PERFORMANCE OF A MANUFACTURER

PERFORMANCE CRITERIA

(a) Assessment criteria is expressed quantitatively.
(b) The procedures to conduct an appropriate manufacturer audit is appropriately selected and correctly stated.
(c) A given rating system for alternative manufacturing plans is applied correctly.
(d) Quality related information is incorporated correctly where necessary in a given process plan.

RANGE STATEMENT

Manufacturer: internal manufacture; vendor supplied items.

Assessment criteria: cost, function; reliability.

Quality-related information: symbols; specifications; amendments.

EVIDENCE REQUIREMENTS

Written evidence that the candidate can compare the quality of a manufactured item which can be produced from two or more different sources.

MERIT Pass with merit may be awarded to a candidate who successfully completes all outcomes and in so doing has consistently demonstrated superior performance when for example:

(a) presentation of written and computer printouts is clear and concise;
(b) reliable assumptions and calculations are accurately performed;
(c) conclusions and analysis of work situations are systematically developed.

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 also be kept. These records will be required for external verification.

SPECIAL NEEDS

Proposals to modify outcomes, range statements or agreed assessment arrangements should be discussed in the first place with the external verifier.

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SUPPORT NOTES

UNIT NUMBER: 2430274

UNIT TITLE: PRODUCTION PLANNING, CONTROL AND QUALITY ASSURANCE TECHNIQUES

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 the 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 40 hours. The use of notional design length for programme design and timetabling is advisory only.

CONTENT/CONTEXT The candidate should achieve the level of competence required to analyse production plans and schedules, process plans and operational plans in order to detect and correct errors or inconsistencies. The inclusion of quality procedures in planning should be stressed throughout.

Corresponding to Outcomes 1-4:

1. The interactive nature of information from engineering drawings, manufacturing processes available, tooling requirements and the final process plan should be emphasised.

2. Attempting a work study or method study for the manufacture of a component is not required, only the charts and results are required as a starting point to establishing standard times.

3. A bill of material should be checked for accuracy and material specifications identified; alternative materials can be determined in a few cases only on the basis that the material specified cannot be reasonably procured.

4. Some thought should be given to incorporating quality techniques within Outcome 1 but it can be treated alone if desired.

APPROACHES TO GENERATING EVIDENCE Although some time must be spent using a computer-aided process planning system and delivering basic theory and procedures, a case study approach on an integrated basis for some or all outcomes or on an outcome-by-outcome basis may be a useful way of leading on to assessment evidence.

ASSESSMENT PROCEDURES Examples of Instruments of Assessment:

Outcome 1 A short structured question on the level of production planning.

Selection of tooling requirements from a given list of tools for a well defined operation and component incorporating information from the part drawing including size, tolerance and finish. A short exercise using a computer-aided process planning package to extract the process plan and cost estimate for a simple component.

Outcome 2 A short written exercise using a completed process chart to arrive at an optimum method can be used in conjunction with a time study to arrive at a standard time for an operation and non-productive time incorporated. Alternatively this outcome can be approached with separate tasks relating to each of the three performance criteria.

Outcome 3 A written exercise composed of short directed questions or structured long questions covering all the performance criteria can be based on a single page bill of material with associated part drawings.

Outcome 4 A written exercise composed of short directed questions on the criteria for cost function and reliability could be directed to some material already used in Outcomes 1, 2 and 3.

The other performance criteria could be assessed in much the same way.

REFERENCES

1. Guide to unit writing.
2. For a fuller discussion on assessment issues, please refer to SQA's Guide to Assessment.
3. Information for centres on SQA's operating procedures is contained in SQA's Guide to Procedures.
4. For details of other SQA publications, please consult SQA's publications list.