

## National Unit Specification: general information

<b>UNIT</b>	Mechatronics Case Study (Higher)
<b>NUMBER</b>	D149 12
<b>COURSE</b>	Mechatronics (Higher)

### SUMMARY

The purpose of this unit is to develop the capability in applying knowledge and understanding encountered throughout the course to the solution of a technical problem. It will also develop skills in producing and presenting a technical report.

### OUTCOMES

- 1 Propose a solution to a mechatronics problem.
- 2 Produce a technical report.

### RECOMMENDED ENTRY

While entry is at the discretion of the centre, candidates would normally be expected to have attained the other units in Higher Mechatronics, ie:

- Programmable Control Systems (H)
- Mechatronic Systems: An Introduction (H)
- Robotic and Automated Systems (H).

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### Administrative Information

<b>Superclass:</b>	XL
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## **National Unit Specification: statement of standards**

### **UNIT        Mechatronics Case Study (Higher)**

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

#### **OUTCOME 1**

Propose a solution to a mechatronics problem.

##### **Performance criteria**

- (a) A given problem is correctly analysed in system terms.
- (b) Technical data is correctly used in the analysis of the problem.
- (c) Possible solutions are identified taking due account of appropriate safety considerations.
- (d) The final solution is evaluated and justified correctly with respect to the given problem.

##### **Evidence requirements**

Written and graphical evidence of the candidate's ability to evaluate and justify a solution to a mechatronics problem as specified in PCs (a) to (d).

#### **OUTCOME 2**

Produce a technical report.

##### **Performance criteria**

- (a) The report clearly identifies the given problem.
- (b) Evidence of the analysis is thorough.
- (c) The proposed solution is fully justified.
- (d) The effectiveness of the approach taken is critically reviewed.
- (e) The wider implications of the technical solution are given due consideration.
- (f) Conclusions drawn are soundly based and well argued.
- (g) The report is clear, concise, suitably structured and well presented.

##### **Evidence requirements**

Written and graphical evidence of the candidate's ability to produce and present a technical report, which may be hand-written or typed.

## **National Unit Specification: support notes**

### **UNIT        Mechatronics Case Study (Higher)**

This part of the unit specification is offered as guidance. The support notes are not mandatory.

It is recommended that you refer to the SQA Arrangements document for Higher Mechatronics before delivering this unit.

While the time allocated to this unit is at the discretion of the centre, the notional design length is 20 hours.

The purpose of this unit is to develop capability in applying knowledge and understanding to solving a practical problem and the ability to produce and present a technical report.

#### **GUIDANCE ON CONTENT AND CONTEXT FOR THIS UNIT**

It is envisaged that candidates will be provided with a problem-solving activity set in an industrial or commercial context. The problem will require candidates to carry out research and investigation into possible solutions and, based on results, justify the selection of a particular solution. A technical report will be produced by the candidate as evidence of the investigative work undertaken.

#### **GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT**

This unit is part of Higher Mechatronics and would be best delivered in an integrated manner in conjunction with the other units of the course. Outcomes 1 and 2 would be best undertaken in the context of an integrated project set in an industrial situation, in which candidates would be required to apply knowledge of a range of technical devices and systems and demonstrate practical capability in their use.

A typical case study would involve candidates in interpreting a given specification to analyse a problem in systems terms. Sub-systems would include those typically found in mechatronic systems. Candidates would be expected to research ideas for solutions to each sub-system using data which could be in the form of a resource file. The operation of a sub-system would be analysed and described, if appropriate. Results achieved would be recorded, along with the solution to the sub-system, in the case-study report. A critical evaluation of the effectiveness of the solution in meeting the specification would be produced.

## **National Unit Specification: support notes (cont)**

### **UNIT        Mechatronics Case Study (Higher)**

#### **GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT**

Examples of instruments of assessment which could be used for each outcome are given below.

##### ***Outcome 1***

The candidate could investigate practical systems which would model the operation of the identified solution.

##### ***Outcome 2***

The candidate would produce a case study report containing evidence of the work undertaken in meeting the outcome.

The teacher or lecturer would be expected to keep an observation checklist to verify work undertaken by the candidate at each stage of the case study. A candidate-centred, resource-based approach to problem solving should be adopted in which candidates are encouraged to work in an independent manner.

The candidate would be given a practical problem to solve, the solution to which would be based on work previously undertaken in Higher Mechatronics.

Guidance would be given to candidates on the approach to be taken in generating a solution to the problem in the form of a case study report booklet. The booklet would indicate to candidates the research work to be undertaken at each stage and the depth of treatment to be given in recording evidence. Candidates would be required to access information, including technical data, from resource files whilst investigating a solution.

The solution should demonstrate capability in applying concepts developed on the course in an integrated manner.

#### **SPECIAL NEEDS**

This unit specification is intended to ensure that there are no artificial barriers to learning or assessment. Special needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering alternative outcomes for units. For information on these, please refer to the SQA document *Guidance on Special Assessment and Certification Arrangements for Candidates with Special Needs/Candidates whose First Language is not English* (SQA, 1998).