

# Model Assignment

## Issued September 2008

OCR Level 2 Principal Learning in Engineering  
Unit F550: Engineering applications of computers

**Please note:**

This OCR model assignment may be used to provide evidence for the unit above. Alternatively, centres may 'tailor' the assignment within permitted parameters (see 'Notes for Tutors'). It is the centre's responsibility to ensure that any adaptations made to this assignment allow learners to meet all the assessment criteria and provide sufficient opportunity for learners to demonstrate achievement across the full range of marks.

**The scheme codes for these qualifications are:**

OCR Level 2 Principal Learning in Engineering                      500/2399/8

**The QCA Accreditation Number for this unit is:**

Unit F550: Engineering applications of computers    M/501/1885

This OCR model assignment remains live for the life of these qualifications.

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# Model Assignment: Learner Information

OCR Level 2 Principal Learning in Engineering

Unit F550: Engineering applications of computers

# Model Assignment

## Description of model assignment.

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For this task you will have the opportunity to investigate and experience the use of computers in a range of engineering applications. Working within the context of 'modern domestic products' you will develop your understanding of how computers have enabled advances in the way engineering manufacturing and maintenance tasks are performed.

You will learn about expert systems, which are computer programs that contain some of the subject-specific knowledge of one or more human experts. In addition, you will also develop an understanding of embedded systems and why they are used in modern domestic products.

You will also gain knowledge and understanding of the way computer based communication systems are used within engineering.

You will provide evidence of your experiences which will consist of a research report including screen shots, digital evidence, analysis and comments.

**Read through all of the following tasks carefully, so that you know what you will need to do to complete this assignment.**

# Tasks

## Task 1: Use of computers in engineering, manufacturing and process control

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### Assessment criteria 1.1 , 1.2, 1.3, 1.4

For a selected modern domestic product you will demonstrate your knowledge and understanding of the way computers are used in engineering, manufacturing and process control.

To do this you will need to explain using examples linked to the chosen modern domestic product how computers are used:

- to design new products
- during production and in process control
- for stock control
  - monitoring of material levels, bar code readers, resources, components (JIT) inputs, and outputs and order points
- for financial control

## Task 2: Simple control programmes

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### Assessment criteria 2.1, 2.2, 2.3, 2.4, 2.5

You will identify a simple control system used within your selected domestic product.

For your selected control system you will:

- provide an analysis of the control problem using systems terminology
- construct a simulation of the control system
  - use appropriate input switches and sensors
  - use appropriate output devices
  - develop a suitable control program
  - test the system and prove correct operation

### Task 3: Simple expert systems for problem solving and maintenance operations in engineering

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#### Assessment criteria 3.1, 3.2, 3.3, 3.4, 3.5

For your selected modern domestic product you should:

- identify where 'expert systems' may be used e.g. factory scheduling, maintenance, and electronic testing
- for **one** 'expert system' you should explain:
  - what the 'expert system' is and its function
  - how to input data into the system
  - select suitable parameters for operation of the system
  - interpret results obtained and use them to modify engineering features/operations
- explain how and why computers are used in maintenance operations

### Task 4: Computer based communication systems and data communication

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#### Assessment criterion 4.1

For your selected modern domestic product you will demonstrate your knowledge and understanding of computer based communication systems to communicate data.

**You will need to:**

- identify and explain giving specific examples, the use of computer based communication systems that exchange data during design, manufacture and maintenance of the modern domestic product.
- these may include:
  - use of laptop computers to access and communicate information
  - use of Personal Digital assistants (PDAs) to record digital images, annotations and dialogue in real time as it happens
  - use of third generation mobile phones to record information in real time as it happens
  - download and transfer information from communications devices in a form which is usable and accessible for engineering reports and portfolios (Bluetooth, SMS multi media messages)
  - email

#### Assessment Evidence

You should produce **one** research report with evidence for each of the four tasks. The report may include screen shots, digital evidence, analysis and comments.

# Model Assignment: Tutor Information

OCR Level 2 Principal Learning in Engineering  
Unit F550: Engineering applications of computers

# Guidance for Centres

## 1 General

1.1 OCR model assignments are issued free to participating centres and are also available to download from our website: [www.ocr.org.uk](http://www.ocr.org.uk).

1.2 Centres may choose to:

- use OCR model assignments for formal summative assessment of learners
- tailor OCR model assignments for formal summative assessment of learners

It is intended that this model assignment can be used by centres without modification. However, in order provide appropriate contextualisation, improve access or increase local relevance, centres may 'tailor' the model assignments within set parameters. Details of the scope of adaptation are provided in the 'Notes for Tutors' section of this document.

1.3 This assignment has been designed to meet the full assessment requirements of the unit. Learners will need to take part in a planned learning programme that covers the underpinning knowledge and skills of the unit.

## 2 Before carrying out the assignment

2.1 Learners should be provided with a copy of the *Learner Information* section of this assignment or the centre adapted model assignment.

2.2 Learners may carry out preparations prior to undertaking the tasks; there is no time limit for this.

## 3 When completing the assignment

3.1 All assessment evidence must be produced under **controlled conditions** so that the overall level of permit control secures validity and reliability, provides good manageability for all involved and allows teachers to authenticate the work confidently. Further guidance on **controlled conditions** is provided within the OCR Principal Learning Handbook.

3.2 Learners should be allowed 60 guided learning hour (glh) to complete all the tasks. The amount of time will vary slightly depending in the nature of the tasks and the ability of the individual learners. It is suggested that evidence is produced in several sessions.

3.3 Each learner must produce individual and authentic evidence for each task within the assignment.

3.4 Centre staff may give support and guidance to learners. This support and guidance should focus on checking that learners understand what is expected of them. It is not acceptable for tutors to provide model answers or to work through answers in detail.

3.5 Learners may use information from any relevant source to help them with producing evidence for the tasks.

#### **4 After completing the assignment**

4.1 Learners' evidence is assessed by the centre's assessor against the qualification specification contained in the Principal Learning Handbook. When marking learners work, centres **must** use the descriptors provided within the unit. For further information about assessment please refer to the section on Assessment and Moderation in the Principal Learning Handbook.

4.2 Assessors' decisions should be quality assured across the centre through internal moderation. For further information about internal moderation please refer to the section on Assessment and Moderation in the Principal Learning Handbook.

#### **5 Presentation of work**

5.1 Centres may wish to discourage learners from excessive use of plastic wallets for presentation of their evidence as this may hinder the assessment process. Instead centres may wish to encourage learners to present their work so that it is easily accessible, e.g. spiral bound, stapled booklet, CD-ROM.

#### **6 Acceptable evidence**

6.1 For guidance on generation and collection of evidence please refer to the section on Assessment and Moderation in the Principal Learning Handbook.

#### **7 Plagiarism and unauthorised collaboration**

7.1 Centres should have adequate procedures in place to ensure that plagiarism and unauthorised collaboration are identified and responded to.

7.2 When supervising tasks, tutors are expected to:

- offer learners advice about how best to approach such tasks
- inform learners of the ramifications of unfair practice
- exercise continuing supervision of work in order to monitor progress and to prevent plagiarism
- ensure all copied materials is suitably acknowledged
- ensure copied material is not given credit in the assessment process

7.3 As with all controlled assessments, the presenter must be satisfied that the work submitted for assessment is the learner's own work.

# Notes for Tutors

## Introduction to the Tasks

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The tasks have been designed to enable learners to demonstrate their knowledge and understanding of engineering applications of computers.

Learners must be provided with the opportunity to investigate and experience the use of computers in a range of engineering applications, including 'expert systems' for problem solving, diagnostics, maintenance operations, process control and manufacturing.

The unit also enables a learner to understand how computers have enabled advances in the way engineering tasks are performed.

Learners should also understand why embedded systems are used in modern domestic products, how computer systems are used in maintenance operations and have a knowledge and understanding of the way computer based communication systems are used to exchange data.

Learners are required to undertake an assignment in which they analyse a modern domestic product (which must contain an embedded computer system) in terms of the use made of computers in its design, process control, manufacturing and maintenance.

Learners will require guidance with the selection of the domestic product to ensure it has the scope to allow learners access to all aspects of the assessment criteria.

These could include such domestic products as:

- vacuum cleaners
- washing machines
- tumble dryers
- digital cameras
- digital radios
- DVD recorders/players
- games consoles

**These guidance notes should be used in conjunction with the unit specification and Principal Learning Handbook.**

## Scope of permitted Model Assignment modification

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The model assignment is self-contained in its present form. The set of tasks form a coherent whole addressing all the assessment criteria.

It is permissible to contextualise or carry out modification of this model assignment in order provide appropriate contextualisation, improve access or increase local relevance. However, centres must take great care when 'tailoring' tasks to ensure that modifications do not result in the over direction of learners, devalue the applied nature of the work or deny the learner the opportunity to generate evidence for all the assessment criteria at all levels of outcome.

No changes to the assessment criteria are allowed.

The model assignments can be changed in terms of the following:

- the materials and applications that are chosen for study
- the range of information/resources students have access to
- each specific task linked to a particular assessment criteria may be appropriately contextualised

When completing this model assignment it may be possible to generate evidence for completing a task in a variety of formats. This list is not exhaustive and will depend on the approach taken to complete the task or model assignment. In some cases the task or model assignment will require a specific format for the outcome and this will be clearly marked in the table.

Depending on the approach taken to the model assignments it may also be possible to demonstrate additional PLTS coverage and some additional opportunities have been listed below.

Task activity	Nature of evidence generated	Potential Assessment Criteria coverage
<p><b>Task 1</b></p> <p>Use of computers in engineering manufacturing and process control</p>	<p>Explanations of how computers are used:</p> <ul style="list-style-type: none"> <li>• to design new products</li> <li>• in production and process control</li> <li>• for stock control</li> </ul> <p>for financial control</p>	<p><b>Assessment Criteria</b></p> <ul style="list-style-type: none"> <li>• 1.1, 1.2, 1.3, 1.4</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• IE4</li> </ul>
<p><b>Task 2</b></p> <p>Simple control programmes</p>	<p>Provides evidence of:</p> <p>analysis of a problem in systems terminology</p> <p>recognition and use of input switches and sensors</p> <p>recognition and use of output devices</p> <p>use of linear, symbolic or flow-chart programming including conditional sequencing</p> <p>simulation of a control system</p>	<p><b>Assessment Criteria</b></p> <ul style="list-style-type: none"> <li>• 2.1,2.2, 2.3, 2.4 ,2.5</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• CT1</li> <li>• CT5</li> </ul>

<p><b>Task 3</b></p> <p>Simple expert systems for problem solving and maintenance operations in engineering</p>	<p>show understanding of what is meant by the term 'expert system'</p> <p>show understanding how to input data into an expert system</p> <p>select suitable parameters for problem solving.</p> <p>interpret results and use them to modify engineering features.</p> <p>explain how and why computers are used in maintenance operations</p>	<p><b>Assessment Criteria</b></p> <ul style="list-style-type: none"> <li>• 3.1, 3.2, 3.3, 3.4, 3.5</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• none</li> </ul>
<p><b>Task 4</b></p> <p>Computer based communication systems and data communication</p>	<p>Demonstrate understanding of the use of modern consumer products to communicate and exchange data during design, manufacture and maintenance</p>	<p><b>Assessment Criterion</b></p> <ul style="list-style-type: none"> <li>• 4.1</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• IE6</li> </ul>