

# Model Assignment

## Issued September 2008

OCR Level 3 Principal Learning in Engineering

Unit F561: Production and manufacturing

**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 objectives and provide sufficient opportunity for learners to demonstrate achievement across the full range of marks.**

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

OCR Level 3 Principal Learning in Engineering                      500/2400/0

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

Unit F561: Production and manufacturing                      H/501/1902

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

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# Model Assignment: Learner Information

OCR Level 3 Principal Learning in Engineering

Unit F561: Production and manufacturing

# Model Assignment

## Description of Model Assignment.

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OCR Engineering Ltd. is a specialist engineering company that produces high quality engineered products and components for its customers. The company has been asked to manufacture an aluminium stand for an LCD flat screen monitor.

The company have asked you, as a production engineer, to produce a production plan and project plan for the manufacture of the aluminium monitor stand.

### **You will need to research:**

- the different types of manufacturing processes and systems available
- possible application for CAE, CAM and CNC
- assembly systems and techniques, quality control, quality assurance requirements and statistical process control.

The evidence should be presented in the form of a report which must include a production and project plan.

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

# Tasks

## Task 1: Manufacturing processes, systems, assembly systems and applications of CAE, CAM and CNC

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### Assessment Criteria 1.1, 2.1, 3.1

OCR Engineering Ltd. is a specialist engineering company that produces high quality engineering products and components for its customers. The company are intending to start manufacturing an aluminium stand for an LCD flat screen monitor. An initial production run of 1000 units is planned.

The company have asked you, as the production engineer, to produce a production plan and project plan for the manufacture of the aluminium stand. In order to produce the plans you need to carry out research into:

- the different types of manufacturing processes and systems available
- possible application for CAE, CAM and CNC
- assembly systems and techniques, quality control, quality assurance requirements and statistical process control

### Your task is to:

- research and investigate different types of manufacturing processes and systems in a realistic, work-focused environment:
  - one-off and batch
  - mass production
  - lean manufacturing
  - flexible manufacturing
  - just in time (JIT) systems
- identify and explain the advantages and disadvantages of each type of manufacturing process and system
- identify the application of CAE, CAM and CNC within a manufacturing system
- consider the characteristics of scales of manufacture and the influence this will have on selection of manufacturing systems, identifying their advantages and disadvantages
- investigate and research assembly systems and techniques, quality control, quality assurance requirements and statistical process control

## Task 2: Production plans

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### Assessment Criterion 4.1

#### Your task is to:

- produce a production plan from a given set of engineering drawings for the manufacture of the aluminium stand considering:
  - scale of manufacture
  - opportunities for use of CAE, CAM and CNC
  - assembly systems and techniques,
  - quality control
  - quality assurance requirements
  - statistical process control

## Task 3: Computer generated project plan and schedule

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### Assessment Criterion 5.1

#### Your task is to:

- use appropriate software to produce a coherent project plan and schedule for the production of the aluminium monitor stand

## Presentation of Work

Your work for this unit should be presented as a report. The report should cover the following aspects:

- research and investigation of different types of manufacturing processes and systems
- identification of the application of CAE, CAM and CNC within a manufacturing system
- investigate and research of assembly systems and techniques, quality control and quality assurance requirements and statistical process control
- a production plan
- a project plan

# Model Assignment: Tutor Information

OCR Level 3 Principal Learning in Engineering

Unit F561: Production and manufacturing

# 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 to 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 20 guided learning hours (glh) to complete all of the tasks. The amount of time may vary depending on the nature of the tasks and the ability of 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 presenters 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.
- 3.6 Learners must be guided on the use of information from other sources to ensure that confidentiality is maintained at all times.

#### **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 wishing to submit digital evidence in the form of an e-portfolio should refer to the appropriate separate OCR document on e-assessment.
- 5.2 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, treasury tag.

#### **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, teachers 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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This form of assessment has been adopted as a large proportion of the learning outcomes relate to practical abilities. The context of the work requires the learner to experience real events and work alongside people in a 'sector' context. Learners will also need access to specialist equipment to demonstrate their skills and extended periods of time to apply their knowledge. The learner must be provided with a set of engineering drawings appropriate to the product.

The tasks have been designed to enable learners to demonstrate their knowledge and understanding of different types of manufacturing processes, assembly systems and finishing techniques.

These will include for example, one-off, batch, mass production, lean manufacturing, flexible manufacturing and just in time (JIT) systems.

Learners will also be able to demonstrate their understanding and use of computer applications to produce a detailed production plan and schedule of manufacture.

The model assignment has been designed so that all of the assessment criteria in Unit F561 are addressed.

Care should be exercised in the selection of an appropriate manufacturing system based on the centre's locality or learners' ease of access to enable them to make a detailed study in an actual learning environment of the:

- assembly system and its component elements
- assembly techniques involved
- quality control check used
- quality assurance procedures
- statistical process control employed

Examples of suitable products might be:

- |                          |                              |                                |
|--------------------------|------------------------------|--------------------------------|
| • A central heating pump | • A car starter motor        | • A manual wheelchair          |
| • An electrical fire     | • A pneumatic door closer    | • An "up and over" garage door |
| • A electric hand drill  | • uPVC tilt and turn windows | • A wooden staircase           |
| • A laser printer        | • A child's booster seat     | • An telescope                 |

Some suggested supporting software for this unit is listed below but is not prescriptive:

### **CAM:**

Boxford: 3D GeoCam, CAD/CAM Design Tools (Mill router or lathe versions)

Denford: QuickCAM Pro, VR CNC Milling, VR CNC Turning.

Delcam: Power Mill

Licom: AlphaCam

Techsoft: Visual Toolpath

Unimatic: eduMaker

WELSoft: WELmill and WELturn.

## **Planning:**

GanttProject (OSS)

Additionally, appropriate access to suitable ICT applications to complete Task 3 is essential.

**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 very self-contained in its present form. The set of tasks form a coherent whole addressing all the assessment criteria. No changes to the assessment criteria are permitted.

The model assignments can be changed in terms of:

- an alternative product to the aluminium stand

**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>Manufacturing processes, systems, assembly systems and applications of CAE, CAM and CNC.</p> | <p>Descriptions may include:</p> <ul style="list-style-type: none"> <li>• one-off, batch,</li> <li>• mass production</li> <li>• lean manufacturing,</li> <li>• flexible manufacturing and</li> <li>• just in time (JIT) systems</li> </ul> <p>Detailed descriptions in learner's own words will include, for example:</p> <ul style="list-style-type: none"> <li>• description of different types of manufacturing processes and systems</li> </ul> <p>Record of investigation and research of assembly systems and techniques, quality control and quality assurance requirements and statistical process control.</p> | <p><b>Assessment Criterion</b></p> <ul style="list-style-type: none"> <li>• 1.1</li> <li>• 2.1</li> <li>• 3.1</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• IE2</li> <li>• IE3</li> </ul> |
| <p><b>Task 2</b></p> <p>Production plans.</p>  | <p>Production of a detailed and comprehensive production plan for an engineered product incorporating the learnt elements of Task 1 of this unit.</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>• EP3</li> </ul>   |
| <p><b>Task 3</b></p> <p>Computer generated project plan and schedule</p> | <p>Use of appropriate software for the production of a coherent project plan and schedule for the production of a specified engineered product.</p> | <p><b>Assessment Criterion</b></p> <ul style="list-style-type: none"> <li>• 5.1</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• EP3</li> </ul> |