



Accredited

OCR LEVEL 3 CAMBRIDGE TECHNICAL CERTIFICATE/DIPLOMA IN IT

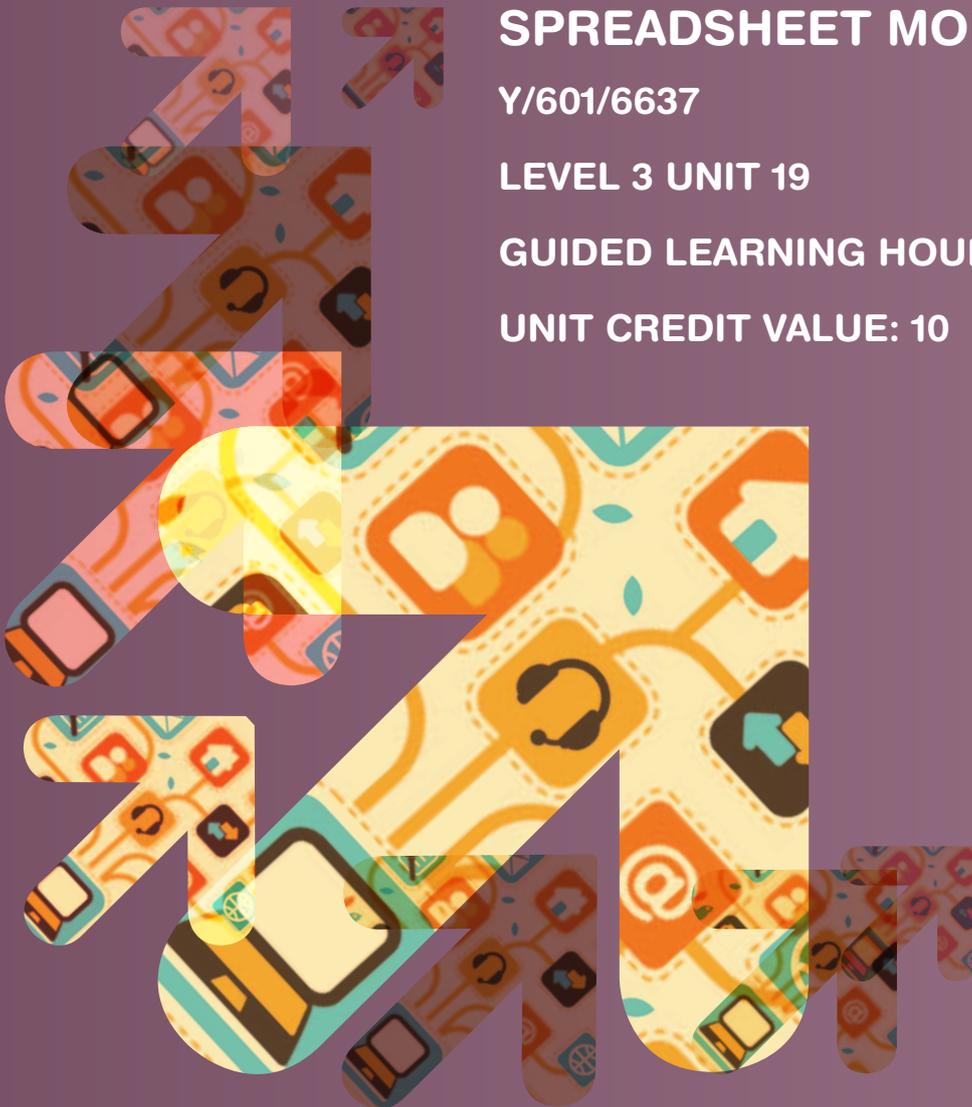
SPREADSHEET MODELLING

Y/601/6637

LEVEL 3 UNIT 19

GUIDED LEARNING HOURS: 60

UNIT CREDIT VALUE: 10



SPREADSHEET MODELLING

Y/601/6637

LEVEL 3 UNIT 19

AIM OF THE UNIT

The success of a business relies on its methods of recording business transactions. With the use of complex spreadsheets this task is made relatively easy for businesses. A business therefore requires employees to have knowledge of how to create a spreadsheet and how to use formulae and functions effectively. This unit will provide the learner with the skills to enable them to create and use a complex spreadsheet model.

The aim of this unit is to help the learner understand how spreadsheets can be used to solve complex problems. Learners will learn how to create a complex spreadsheet model and to use a range of formulae and functions. Learners will also learn how to automate and customise their spreadsheet models. Finally learners will learn how to test and create user and technical documentation.

ASSESSMENT AND GRADING CRITERIA

Learning Outcome (LO) The learner will:	Pass The assessment criteria are the pass requirements for this unit. The learner can:	Merit To achieve a merit the evidence must show that, in addition to the pass criteria, the learner is able to:	Distinction To achieve a distinction the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
1 Understand how spreadsheets can be used to solve complex problems	P1 explain how spreadsheets can be used to solve complex problems		
2 Be able to develop complex spreadsheet models	P2 develop a complex spreadsheet model to meet particular needs	M1 use formatting to enhance the complex spreadsheet model	
	P3 use formulae, features and functions to process information	M2 use advanced formulaic functions to process information	
	P4 use appropriate tools to present data		
3 Be able to automate and customise spreadsheet models	P5 customise the spreadsheet model to meet a given requirement	M3 use summarising tools to provide results for a given requirement	
	P6 use automated features in the spreadsheet model to meet a given requirement		
4 Be able to test and document spreadsheet models	P7 test a spreadsheet model to ensure that it is fit for purpose	M4 improve spreadsheet model as a result of testing	D1 evaluate the spreadsheet model suggesting improvements
	P8 export the contents of the spreadsheet model to an alternative format		
	P9 produce user documentation for a spreadsheet model		D2 summarise how the spreadsheet model can resolve the complex problem

TEACHING CONTENT

The unit content describes what has to be taught to ensure that learners are able to access the highest grade.

Anything which follows an i.e. details what must be taught as part of that area of content.

Anything which follows an e.g. is illustrative, it should be noted that where e.g. is used, learners must know and be able to apply relevant examples to their work though these do not need to be the same ones specified in the unit content.

LO1 Understand how spreadsheets can be used to solve complex problems

Use of spreadsheets

- business uses (e.g. cash flow forecasting, budget control, sales forecasting, payroll, stock control)
- personal uses (e.g. budgeting, tracking finances)
- problem solving (e.g. trend analysis, comparing data, predictions)
- decision making (e.g. analysis of data, goal seek, scenarios).

LO2 Be able to develop complex spreadsheet models

Complex model

- linked cells, worksheets (minimum three), workbooks
- complex formulae
- data validation
- worksheet protection and security options
- navigation links between sheets.

Formulae, Functions and Features

- relative and absolute cell references
- mathematical operators (e.g. +, -, /, *)
- simple functions (e.g. SUM, AVERAGE, COUNT, MIN, MAX)
- logical functions (e.g. IF, nested IF, AND, OR, NOT, SUMIF)
- financial functions (e.g. ISPMT, PMT, PV)
- text functions (e.g. UPPER, LOWER, CONCATENATE)
- date and time functions (e.g. TODAY, DAY, HOUR)
- lookup and reference functions (e.g. LOOKUP, VLOOKUP, HLOOKUP)
- math & trig functions (e.g. ROUND, CEILING, RAND)
- data ranges.

Presenting data

- user interface
- formatted charts and graphs
- forms and reports.

Formatting

- fonts
- page orientation

- header and footer
- colour
- conditional formatting
- formatting of cells (e.g. integer, date, currency, text)
- charts and graphs (e.g. labels, axes, scales and colour)
- text styles (e.g. bold, italics, underline)
- borders and shading
- column alignment.

LO3 Be able to automate and customise spreadsheet models

Customisation

- toolbars
- menus
- hiding rows/columns
- set print area
- error messages
- shortcuts
- start-up
- validation
- protection and security.

Automation

- macros
- activeX controls
- control Toolbox
- visual basic.

Summary tools

- sub-totals
- filtering
- sorting and multiple sorts
- pivot tables.

LO4 Be able to test and document spreadsheet models

Testing

- create test table/plans
- against clients requirements
- formulae and functions

- data validation
- error messages
- automation
- layout.

Export formats

- exporting data in different formats (e.g. xls, csv, txt, xms, xml, html).

User documentation

- purpose and target audience
- hardware and software requirements
- instructions on use
- formulae and functions used
- data validation and error messages
- fault log.

User feedback

- questionnaire, interview
- make improvements.

Analysing and describing results

- trends/patterns in data
- what graphs/charts show
- analyse results
- conclusions.

Evaluation

- identified solution against requirements
- feedback from users
- layout
- formulae/functions used
- automation features
- meeting the customer's needs
- strengths of spreadsheet model
- improvements that could be made.

DELIVERY GUIDANCE

Understand how spreadsheets can be used to solve complex problems

Initially learners should be taught how to use spreadsheet applications. This should be tutor led and should introduce and reinforce the key concepts of spreadsheets and functions/formulae. Demonstrations and practice activities to create basic spreadsheets using the full range of operators (e.g. add, subtract, divide, multiply) and a selection of basic functions (e.g. sum, average, min, max, count, countif, date) would need to be covered. Learners could discuss as a group the uses and purposes for the spreadsheets that they have been creating.

The functionality of spreadsheets should be extended to introduce the functions identified in the learning outcomes and can be delivered around scenarios which the group can discuss and suggest manual solutions which can be overcome with functions within the spreadsheet software. This helps learners put the ideas and solutions into context. A selection of spreadsheets could be provided to demonstrate cashflow forecast, budget control, sales forecasting, payroll, stock control etc and what these would look like. The learners could be asked to complete a quiz to find information from these spreadsheets to help them understand what they show and how to interpret the data e.g. trends, comparisons.

Be able to develop complex spreadsheet models

Learners should be expected to use a range of formatting on their spreadsheets including font, page orientation, headers and footers, colour, conditional formatting, cell formatting to ensure the data is shown appropriately, styles, borders, shading and column alignment. This could again be included in the practical spreadsheet activities that the learners carry out, and should again reinforce the use of basic tools learned.

Learners should have the concept of absolute and relative cell referencing introduced, using demonstrations and practice activities to learn the different uses of the two. Learners also need to understand how to use a range of more advanced functions such as logical (as well as nested ifs), financial, text, date and time, lookup and reference, math and trig. Once all of these have been covered and understood as to their purpose a quiz on which function to use may be appropriate to test that the learner understands the purpose of each.

Learners are required to learn how to create graphs and charts from spreadsheet data. Demonstration and practice activities could be given where learners are required to select the most appropriate graph/chart type and then to create them including titles and labels. Learners should also be made aware of how graph/chart types may misrepresent the data to an audience. A demonstration on how to format a chart should be given and learners should be able to practice these skills.

Further extension of spreadsheet usage should fully prepare the learners for creating their own spreadsheet models. The tutor should use demonstrations and practice activities to teach learners how to create multiple worksheets, to link them together using formulae, within a sheet, across sheets and potentially across workbooks. The learners should be introduced to complex formulae (which are classed as containing a number of stages) and to use brackets appropriately. The awareness of the priorities given to mathematical operators is essential to learning spreadsheets and should be reinforced to support the use of brackets within formulae. Learners should also be taught to add data validation to a spreadsheet to support users and identify problems. This could be taught alongside protection where learners should learn to add passwords to protect worksheets as well as protecting or unlocking specific cells in a worksheet so that they understand how passwords and security settings work. They should be shown the potential uses and benefits of these spreadsheet models and should discuss the options as a group to demonstrate their understanding of the areas covered.

Be able to automate and customise spreadsheet models

Learners should then spend time working with data lists to identify how the data can be manipulated to suit a client requirements. They should be introduced to the range of sort options, then filtering to present data to match specific criteria. A number of exercises can be carried out on the same data range to test the criteria and options entered by learners. Learners can then use the data lists to further extend the analysis and should be taught all aspects of pivot tables from the use, options available and purpose to include the creation and customisation of graphs and charts again reinforcing their earlier learning.

Learners should then discuss how all the functionality they have learned and practiced can be simplified for users by customisation. They should be taught a range of customisation activities such as how to customise toolbars and menus, how to hide rows and columns, set print areas, create error messages and shortcuts. Further discussion against scenarios will assist them in identifying which customisation options could be used for different purposes.

Learners should then be taught how to automate their spreadsheets. Demonstrations on how to create macros and how to view and edit the code in Visual Basic as well as how to use the control toolbox should be given. Learners could then practice these skills using one of their previously created spreadsheets for a number of identified purposes. Group discussions would complete their learning and enable them to objectively review problems and to identify solutions and models with customisation and automation that could be created. This should be discussed by the wider group and then implemented across a number of scenarios.

Be able to test and document spreadsheet models

Learners should be shown how to create and complete a test table/plan, giving examples of the range of tests that could be carried out. A testing plan/table should be considered and completed for one of the practice spreadsheet activities completed earlier. Discussions on actual tests and outcomes will improve learner appreciation of the importance of testing.

Appropriate methods of gaining feedback can be researched. Time should be spent on deciding how to ask questions that will provide the most useful feedback. Group research and feedback on different styles of seeking feedback would help widen the options available. Discussions within the wider group could take place on how improvements could be made to a spreadsheet once feedback has been received. Learners should learn how to create a questionnaire to obtain some feedback and then identify and implement changes to their spreadsheet based on the feedback received. Learners should also review the spreadsheets created by other learners to provide feedback that can then be reviewed.

Learners should be taught the purpose of spreadsheet information that is stored in different formats for different uses. Learners could be shown a set of examples of spreadsheets saved in different file formats and as a group

they could be encouraged to identify what they could be used for and why the correct format has been selected. Learners should be shown how to save a spreadsheet and export data in the different file formats for the identified purposes.

Learners should be encouraged to discuss the information that a user may want to find within a spreadsheet support document. Learners could look at some user manuals in order to see how processes are explained and should discuss whether they think they are easy to follow, understand and identify any areas that are unclear. Learners should then be encouraged to identify the information that would go in a user guide based on the scope of the spreadsheet model they have created, the user level and need. They should as small or large groups evaluate existing spreadsheet models to identify improvements and additions and appreciate how adjustments/improvements made would also need to be added/updated within documentation to support a user/developer.

SUGGESTED ASSESSMENT SCENARIOS AND TASK PLUS GUIDANCE ON ASSESSING THE SUGGESTED TASKS

Assessment Criterion P1

The assessment criterion P1 could be evidenced by the use of a report or presentation supported by tutor observation and/or recorded evidence. The learner is required to show an understanding of what a spreadsheet can be used for and explain how it can be used to solve complex problems. The learner is required to identify some business and personal uses for spreadsheets, example images or screen captures may be used to support the evidence. The learner is also required to explain how spreadsheets can be used to solve complex problems and to help decision making.

Assessment Criteria P2, P3, P4, M1, M2

These assessment criteria could be evidenced by the learner developing a complex spreadsheet model that meets the particular needs of the user. A detailed scenario could be provided. The scenario provided must allow the learner to use a range of tools in their spreadsheet model to give them the opportunity to achieve higher grades. The evidence could be in the form of annotated screen prints to show where they have used the tools or they could produce a list of worksheet names and cell references so that the assessor can find the tools used easily.

For assessment criterion P2 the learner needs to demonstrate that they have developed at least three worksheets linked by formulae on at least one occasion. They must have also evidence the use of at least four features from the complex model list in the teaching content. This could be evidenced by annotated screen captures.

For merit criterion M1, the learner must have used formatting and styling tools appropriately to enhance a complex spreadsheet. The learner also needs to have ensured that each worksheet contains appropriate header and footer information and appropriate page orientation used. Visible cells must be formatted correctly. The spreadsheet would need to contain minimal errors in the data and demonstrate a level of creativity to meet the needs of the user.

For assessment criterion P3 the learner is required to demonstrate that they have used a range of formulae, functions and features to process information in their complex spreadsheet model. The learner should use at least three different functions and at least one logical function. They should demonstrate correct use of mathematical operators and

one complex formulae, in addition to using named ranges and creating a user interface. This could be evidenced with a report or presentation using screen captures to support the evidence.

For merit criterion M2, the learner is required to use advanced formulaic functions to process information. This should be at least one nested IF function and five different functions (financial, text, date and time, lookup and reference, math and trig functions). They should evidence the use of two complex formulae and one complex function appropriately used.

For assessment criterion P4 the learner is required to demonstrate that they have used appropriate tools to present the data within their complex spreadsheet model. This could be through the creation of a range of graphs/charts, for which the learner is required to create three different graphs/charts, including one comparative graph/chart. All graphs/charts must be formatted appropriately to include titles and axis labels and each graph/chart must have a defined purpose.

Assessment Criteria P5, M3

For assessment criterion P5 the learner is required to demonstrate that they have customised their spreadsheet to meet the specified user requirements provided. This evidence could be in the form of a report or presentation supported by screen prints and annotations to explain how they have made the customisations and why. Learners are required to make two customisations from the customisation list in the unit content.

For merit criterion M3 the learner will need to use a range of sorting and summarising tools in order to provide results for a given requirement. This evidence could be in the form of a report or presentation supported by screen prints and annotations to explain what sorting and summarising tools they have used and how they provide the results required.

Assessment Criterion P6

For assessment criterion P6 the learner is required to demonstrate that they have added automated features to their spreadsheet model. The learner must use at least two different methods to automate their spreadsheet. One could take the form of the macro code. If a macro is created then it should be clearly labelled to say what the macro is for. The use of screen captures and before and after screen shots may also be useful to evidence automation.

Assessment Criterion P7

For assessment criterion P7 learners should evidence this by creating and completing a test table/plan to show that they have checked their spreadsheet model to ensure it is fit for purpose. The plan must show that they have checked all of their worksheets and that they have tested all of the items listed in the teaching content.

Assessment Criterion M4

For merit criterion M4 learners could create feedback sheets, questionnaires or carry out interviews with the user(s). The questions must provide useful feedback and enable possible improvements to be identified. The learner is then required to make two improvements to their spreadsheet model. Along with the feedback evidence, before and after screen prints could be used to evidence the changes and annotations should be added to explain what the learner has done and why this improves the spreadsheet. This evidence could be presented as a report or presentation.

Assessment Criterion D1

The learner is required for distinction criterion D1 to evaluate the spreadsheet model. They must include comments from the feedback previously received for assessment criterion M4 as well as evaluate the layout, formulae/functions used, automation features and whether the spreadsheet model is suitable for the particular needs of the client, the strengths of the spreadsheet model and how it will help the client. The learner must describe a range (at least three) of further improvements that they would make and this could be included in a report or presentation or as an extension of the merit.

Assessment Criterion P8

For assessment criterion P8 the learner is required to export the spreadsheet model as an alternative format and must evidence this by saving/exporting the spreadsheet in an alternative file format in order to meet the specified user requirements. The learner could provide screen print evidence of the spreadsheet data being saved in a different file format for an identified purpose and then viewed in the required software which could be presented as annotated screen captures.

Assessment Criterion P9

For assessment criterion P9 the learner is required to create user documentation for the spreadsheet model which could be in the form of a report. The user guide is for a person who would be using the spreadsheet as a tool.

Assessment Criterion D2

For distinction criterion D2 the learner would need to summarise how the spreadsheet model can resolve the complex problem in the given scenario. The learners could create a report analysing and describing what the spreadsheet model shows. The learner must clearly explain what their spreadsheet shows, any trends/patterns which have appeared in the data, what the graphs/charts show, as well as a conclusion.

SUGGESTED SCENARIOS

Analysing customer flow in a supermarket to establish staffing levels

- Profit and loss account for budgeting purposes
- Cash flow forecasts
- Debt analysis
- Comparison of "what if" situations e.g. increase in fuel prices, impact on delivery charges.

RESOURCES

Learners will need access to at least spreadsheet and word processing software. Learners will also benefit from access to the Internet, however, this is not essential.

MAPPING WITHIN THE QUALIFICATION TO THE OTHER UNITS

Unit 9 Project planning with IT



CONTACT US

Staff at the OCR Customer Contact Centre are available to take your call between 8am and 5.30pm, Monday to Friday.

We're always delighted to answer questions and give advice.

Telephone 02476 851509

Email cambridgetechnicals@ocr.org.uk

www.ocr.org.uk