

Unit 135: Oracle: Data Design

Unit code: D/601/7546

QCF Level 3: BTEC in IT

Credit value: 10

Guided learning hours: 80

● Aim and purpose

This unit teaches students the skills needed to manage the processes involved in supporting Database Design and Programming with SQL. With the database design and programming in SQL unit, students upon completion of this course, students have the opportunity to sit for the first of two exams required to earn the Oracle Certified Associate.

● Unit introduction

This unit is a comprehensive introduction to the principles behind the relational database data design used on all database systems irrespective of the software system being utilised. Databases are used in many complex systems, with operating systems using databases for the management of user access privileges as well as all ecommerce entities using database systems to manage and track their transactions. The simple process of making an online purchase will involve the interaction of a range of database systems, from your bank (or card provider) to the retailer offering the service and possibly an additional third party supplier.

The unit covers the different conceptual and physical models used in database design and deployment. Techniques such as entity relationship diagrams, normalisation and CRUD analysis are covered in detail by the Oracle Data Design unit. Learners will also explore the purpose of entities, instances, attributes and identifiers as well as artificial, composite and secondary UID's.

This course involves class based, team oriented activities that focus on the development of thinking in data design terms, learners will produce independent work as well as benefit from team participation. Theory aspects are studied and tested online using Oracles own electronic curriculum which learners may also access from home. The course is delivered through a blended learning approach where tutor-led teaching is combined with the electronic materials and testing.

This unit will prepare learners to sit the Oracle Data Design end of course exam the first step towards achieving the globally recognised Oracle Certified Associate qualification. This unit is also assessed with BTEC merit and distinction criteria.

To view general information about Oracle Data Design objectives please visit: ... The detailed scope and sequence documents are available to academies on the Oracle Academy internal site.

● Learning outcomes

On completion of this unit a learner should:

- 1 Understand the context of database systems and data design
- 2 Be able to design an entity relationship diagram
- 3 Be able to create a normalised data structure

Unit content in relation to the Merit and Distinction Criteria

Existing system: eg corporate database, academic database, small business database, ecommerce system, exemplar system, case study for design

Entity relationship modelling: eg entities, relationships, instances, attributes, identifiers, entity relationship design, conceptual models, physical models

Normalised data: eg Artificial, Composite and Secondary UID, normalisation, first normal form, second normal form, third normal form

Data: eg representative of the 'existing system' used for assignment, the learner should be working on a solution that requires at least three 'tables' as a solution

Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

| Assessment and grading criteria | | |
|--|---|---|
| To achieve a pass grade the evidence must show that the learner is able to: | To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to: | To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to: |
| Pass Oracle: Data Design end of course exam The centre will evidence this with a copy of the learners results, the learner MUST PASS at the minimum set by Oracle. | M1 investigate the 'data structure' of an existing system [IE] | D1 justify the entity relationship model [IE, CT, SM] |
| | M2 design an entity relationship model [IE] | D2 justify the normalisation of data. [SM] |
| | M3 design 'Normalisation' of data. [TW, EP, SM] | |

PLTS: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

| | | | |
|------------|--|---|--|
| Key | IE – independent enquirers CT – creative thinkers | RL – reflective learners TW – team workers | SM – self-managers EP – effective participators |
|------------|--|---|--|

Essential guidance for tutors

Delivery

The Oracle Academy course and associated Oracle Certified Associate and Professional certification are delivered via a selection of proprietary courses available from the Oracle Academy programme. Centres within this programme are advised to seek guidance on what current courses comprise the study/delivery required for learners to access the certification.

More information on the programme, membership and delivery requirements can be found at

If learners are taking Oracle study as part of their BTEC programme, it is recommended that both programmes of study are integrated. Practical and theory tasks for the Oracle programme can be integrated into the study required for the merit and distinction criteria within this unit.

The outcomes of this unit are synergic with the Oracle Data Design course, both units may be delivered in parallel or in sequence. Units in programming and database design, that are both BTEC specific as well as from other vendors may be taught in conjunction with the Oracle units to enhance the learners experience.

Outline learning plan

Oracle as part of their academy programme, provide learning plans and study guidance for their courses. Oracle recommend an estimated 75 hours of delivery to attain the pass criteria, in line with QCF credit and notional learning hours. The notional hours for managed learning is set at 40 for learners to attempt the merit and distinction

Assessment

To achieve a pass grade, learners must pass the Oracle Data Design end of course examination.

Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

| Criteria covered | Assignment title | Scenario | Assessment method |
|------------------|------------------------------------|---|--|
| M1, M2, M3 | Data Design and investigation | Learners are asked to review an existing data system (using either a manual record or older database), they must either in groups or individually create a ERD and Normalised data design for the older system. | Presentation, poster, oral, report, video. |
| D1, D2 | Justify the validity of the design | Based on the design proposed in M23, the learner must either as an individual or as part of a group justify the effectiveness and validity of their design. | Presentation, poster, oral, report, video. |

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

To be completed, links to 6.1 of the NOS and may be co-presented with all other Oracle Modules.

Essential resources

As members of the Oracle Academy programme, centres will have access to all required teaching and database resources to deliver this programme. The technological requirement for this unit does not demand any more than the 'average' centre is already providing. You may wish to explore use of MySQL as well as the Oracle Academy solution.

Employer engagement and vocational contexts

Oracle certification is internationally recognized by a diverse range of employers (from SME's to large corporations) as one of the principal certifications in Database design and management.

Indicative reading for learners

For access to the Oracle academy resources and more information on joining the programme, please visit <https://academy.oracle.com/index.html>

Delivery of personal, learning and thinking skills

The table below identifies the opportunities for personal, learning and thinking skills (PLTS) that have been included within the pass assessment criteria of this unit.

| Skill | When learners are ... |
|-------------------------|--|
| Independent enquirers | The pass criteria is set by an examination, the PLTS of self management and reflective learning is supported by the learner, taking personal study and revision in advance of the Examination. |
| Creative thinkers | |
| Reflective learners | |
| Team workers | |
| Self-managers | |
| Effective participators | |

Although PLTS are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

| Skill | When learners are ... |
|-------------------------|--|
| Independent enquirers | completing and considering the design of the database solution, investigating the old model and considering new ideas based on the rules behind entity relationship and normalisation models |
| Creative thinkers | completing and considering the design of the database solution, investigating the old model and considering new ideas based on the rules behind entity relationship and normalisation models |
| Reflective learners | completing and considering the design of the database solution, investigating the old model and considering new ideas based on the rules behind entity relationship and normalisation models |
| Team workers | working on the assessment as a group (team) for the given exercise |
| Self-managers | working on set personal tasks within the assessment (either as an individual effort, or as part of a group) |
| Effective participators | working on the assessment as a group (team) for the given exercise. |

● Functional Skills – Level 2

| Skill | When learners are ... |
|--|---|
| ICT – Use ICT systems | |
| Select, interact with and use ICT systems independently for a complex task to meet a variety of needs | Planning the database design, using productivity and case tools |
| Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used | Planning the database design, using productivity and case tools |
| Manage information storage to enable efficient retrieval | Planning the database design, using productivity and case tools |
| Troubleshoot | Using case tools to justify the design |
| ICT – Find and select information | |
| Select and use a variety of sources of information independently for a complex task | Gathering information for the design scenario |
| Access, search for, select and use ICT-based information and evaluate its fitness for purpose | Gathering information for the design scenario |
| ICT – Develop, present and communicate information | |
| Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> • text and tables • images • numbers • records | Presenting the database design |
| Bring together information to suit content and purpose | Presenting the database design |
| Present information in ways that are fit for purpose and audience | Presenting the database design |
| Evaluate the selection and use of ICT tools and facilities used to present information | Justifying the database design |
| Mathematics | |
| Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations | Use of ERD and normalisation |
| Select and apply a range of skills to find solutions | Use of ERD and normalisation |
| Use appropriate checking procedures and evaluate their effectiveness at each stage | Use of ERD and normalisation |
| Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations | Use of ERD and normalisation |

| Skill | When learners are ... |
|---|---|
| English | |
| Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts | Working in a group to develop the database design |
| Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions | Gathering information for the database design |
| Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively | Presenting the database design. |