Unit 136: Oracle: Database Design and Programming with SQL

Unit code: J/601/7542

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. In this portion, students implement their database design by creating a physical database using SQL, the industry-standard database programming language. Upon completion of this course, students have the opportunity to sit for the first of two exams required to earn the Oracle Certified Associate. (after also taking the Oracle-DD unit).

Unit introduction

This unit is a comprehensive introduction to the principles behind the relational database data design used on all database systems using SQL as the tool to develop and implement the design. 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 functions of SQL, from a non-propriety perspective as well as open platform, managing the creation and interrogation of a complex relational database structure. Learners will implement a range of data design techniques and ensure their database system maintains integrity.

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. Practical work is integrated, using a range of tools, from both Oracle as well as the open source community.

This unit will prepare learners to sit the Oracle Database Design and Programming with SQL end of course exam. 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 SQL functions

2 Be able to construct DML and DDL statements

3 Be able to construct data views

4 Be able to manage database integrity.

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,

SQL functions: eg Character function, Number function, and Date Functions, row functions, database joins, group functions, using aggregated data, sub-queries, using proprietary Oracle Join Syntax, creating a data view

Data views: eg DDL statements, DML statements, queries

Design: 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: Database Design and Programming with SQL 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** plan SQL functions based on a given design [IE]	**D1** evaluate the SQL implementation [IE, CT, SM]
	M2 design a data view [IE]	**D2** evaluate the data view created. [SM]
	M3 implement SQL functions [TW, EP, SM]	
	M3 implement a data view. [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	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

Essential guidance for tutors

Delivery

The Oracle Academy course and associated Oracle Certified Administrator 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 Database Design and Programming with SQL 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 the 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 Database Design and Programming with SQL 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, M3, D1	Design and Implement SQL functions	Learners either in teams or individually plan, implement and evaluate a range of SQL functions.	Presentation, poster, oral, report, video, practical observation.
M2, M4, D2	Design and implement a data view	Learners either in teams or individually plan, implement and evaluate a range of SQL data view statements.	Presentation, poster, oral, report, video, practical observation.
Both assessments may be interlinked based on one problem.			

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	planning SQL and data view statements to create the database solution
Creative thinkers	planning SQL and data view statements to create the database solution
Reflective learners	planning SQL and data view statements to create the database solution
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 SQL and Data View statements to create the database solution using SQL based programming resources
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	Planning SQL and Data View statements to create the database solution using SQL based programming resources
Manage information storage to enable efficient retrieval	Planning SQL and Data View statements to create the database solution using SQL based programming resources
Troubleshoot	Planning SQL and Data View statements to create the database solution using SQL based programming resources
ICT — Find and select information	
Select and use a variety of sources of information independently for a complex task	Gathering information for the SQL and Data View implementation scenarios
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	Gathering information for the SQL and Data View implementation scenarios
ICT — Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose including: • text and tables • images • numbers • records	Presenting the SQL and Data View design
Bring together information to suit content and purpose	Presenting the SQL and Data View design
Present information in ways that are fit for purpose and audience	Presenting the SQL and Data View design
Evaluate the selection and use of ICT tools and facilities used to present information	Presenting the SQL and Data View design

Skill	When learners are ...
Mathematics	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	Using some of the SQL statements, explores set theory and the application of a variety of mathematic concepts
Identify the situation or problem and the mathematical methods needed to tackle it	Using some of the SQL statements, explores set theory and the application of a variety of mathematic concepts
Select and apply a range of skills to find solutions	Using some of the SQL statements, explores set theory and the application of a variety of mathematic concepts
Use appropriate checking procedures and evaluate their effectiveness at each stage	Using some of the SQL statements, explores set theory and the application of a variety of mathematic concepts
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	Using some of the SQL statements, explores set theory and the application of a variety of mathematic concepts
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 SQL and Data View design
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	Working in a group to develop the SQL and Data View design
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	Presenting the design.