THE INDEPENDENT
INSTITUTE OF
IIE EDUCATION

Advanced Databases
ADDB7311
MODULE OUTLINE 2023
(First Edition: 2018)

THE INDEPENDENT
INSTITUTE OF
IIE EDUCATION
Company registration number: 1987/004754/07.

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Introduction

Welcome to the Advanced Databases module. This module covers database implementation and management using Oracle XE™. You will gain enormously from this module as skills in database design are often neglected in programming courses. Ninety percent of most business applications have a database working in the background. If you never become involved in database administration, design and/or database development, it can lead to a real loss in development in the IT world.

After you have completed this module, you should be proficient in going into any small to medium business (or a business unit of a large corporate), analysing the data needs of the business and, thereafter, designing, building and implementing a database using any Database Management System (DBMS) software specified. The skills learned in Oracle XE™ are easily transferable to Access, SQL Server, etc. The emphasis of the module is to develop strong skills in Oracle. Oracle skills are one of the most sought-after skills for programmers.

This is a practical module and is best learnt by "**doing**". Questions and exercises are provided at the end of each learning unit. If you need more exercises, please feel free to refer to the textbooks prescribed in the bibliography section. These texts also have many examples.

The module has 12 learning units. You will need to gain adequate experience in the field to supplement the examples given in the textbook. Your lecturer will provide different approaches and examples for the different concepts.
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Using this Module Outline

This module outline has been developed to **support your learning**. Please note that the content of this module is on Learn as well as in the prescribed material. You will not succeed in this module if you focus on this document alone.

- This document does not reflect all the content on Learn, the links to different resources, nor the specific instructions for the group and individual activities.
- Your lecturer will decide when activities are available/open for submission and when these submissions or contributions are due. Ensure that you take note of announcements made during lectures and/or posted within Learn in this regard.

This Module on Learn

Learn is an online space, designed to support and maximise your learning in an active manner. Its main purpose is to **guide and pace** you through the module. In addition to the information provided in this document, you will find the following when you access Learn:

- A list of prescribed material;
- A variety of additional online resources (articles, videos, audio, interactive graphics, etc.) in each learning unit that will further help to explain theoretical concepts;
- Critical questions to guide you through the module's objectives;
- Collaborative and individual activities (all of which are gradable) with time-on-task estimates to assist you in managing your time around these;
- Revision questions, or references to revision questions, after each learning unit.

Kindly note:

- Unless you are completing this as a distance module, Learn does **not** replace your contact time with your lecturers and/or tutors.
- **ADDB7311** is a Learn module, and as such, you are required to engage extensively with the content on the Learn platform. Effective use of this tool will provide you with opportunities to discuss, debate, and consolidate your understanding of the content presented in this module.
- You are expected to work through the learning units on Learn in your own time – especially before class. Any contact sessions will therefore be used to raise and address any questions or interesting points with your lecturer, and **not** to cover every aspect of this module.
- Your lecturer will communicate **submission dates** for specific activities in class and/or on Learn.

Icons Used in this Document and on Learn

The following icons are used in all your modules on Learn:

Icon	Description
Objectives	A list of what you should be able to do after working through the learning unit.
Prescribed Work	Specific references to sections in the prescribed work.
ThinkAbout	Questions to help you recognise or think about theoretical concepts to be covered.
Active Learning	Sections where you get to grapple with the content/theory. This is mainly presented in the form of questions which focus your attention and are aimed at helping you to understand the content better. You will be presented with online resources to work through (in addition to the textbook or manual references) and find some of the answers to the questions posed.
Connect the dots	Opportunities to make connections between different chunks of theory in the module or to real life.
That is life!	Real life or world of work information or examples of application of theory, using online resources for self-exploration.

REMEMBER:

You need to log onto Learn to:
- Access online resources such as articles, interactive graphics, explanations, video clips, etc. which will assist you in mastering the content; and
- View instructions and submit or post your contributions to individual or group activities which are managed and tracked on Learn.

Module Resources	
Prescribed Material (PM) for this Module	Masterskill.. Oracle Database 11g™. Masterskill. IIE80-063ig_rev3.0
Recommended Readings, Digital, and Web Resources	Please note that a number of additional resources and links to resources are provided throughout this module on the Learn platform. You are encouraged to engage with these as they will assist you in mastering the various objectives of this module. They may also be useful resources for completing any assignments. You will not, however, be assessed under examination conditions on any additional or recommended reading material. • Cengage Learning. 2020. *Database Principles. Fundamentals of Design, Implementation, and Management. Cengage Learning*. • Microsoft ®. 2012. *Microsoft SQL Server 2012 Programming*. USA: John Wiley & Sons, Inc. • Thomson Learning. 2014. *Database Systems, Design, Implementation and Management*. International Student Edition. Canada: Thomson Learning. •
Software required	Oracle Database Express Edition (Latest version)
Software Licence requirements	https://www.oracle.com/za/database/technologies/xe-downloads.html
System Requirements	https://www.oracle.com/za/database/technologies/xe-downloads.html
Lab minimum requirements	https://www.oracle.com/za/database/technologies/xe-downloads.html
Lab configuration settings	Run on Host Computer – Standalone Machine
Module Overview	You will find an overview of this module on Learn under the *Module Information* link in the Course Menu.
Assessments	Find more information on this module's assessments in this document and on the Student Portal.

Module Purpose	
The purpose of this module is to advance and develop your applied skills in database design and implementation within a commercial database management system.	
Module Outcomes	
MO1	Demonstrate the ability to control database objects.
MO2	Define Structured Query Language (SQL) statements and SQL functions.
MO3	Demonstrate creating and manipulating tables within a database using SQL queries and controls.
MO4	Describe the Procedural Language (PL)/SQL coding language.
MO5	Illustrate data manipulation using PL/SQL structures.
MO6	Define and apply exception handling techniques.
MO7	Demonstrate the use of procedures and functions to develop and maintain databases.

Assessments

Integrated Curriculum Engagement (ICE)	
Minimum number of ICE activities to complete	4
Weighting towards the final module mark	10%

Formative Assessments:	Test	Assignment
Weighting	30%	25%
Duration	1.5 hour	Approximately 15 hours
Write/ Submit after	LU 6	LU 8
Learning Units covered	LU1 To LU6	LU1 To LU8
Period	Period 3	Period 5
Open/ closed book	Open book. – (Practical)	Open book.
Resources required	Oracle Database Express Edition (XE)™ Prescribed Textbook	Oracle Database Express Edition (XE)™ Prescribed Textbook

Summative	Examination
Weighting	35%
Duration	2 hours
Total marks	120
Open/Closed book	Open book (Practical Paper)
Resources required	Oracle Database Express Edition (XE)™ Prescribed Textbook
Learning Units covered	All

Assessment Preparation Guidelines

	Format of the Assessment (The Focus/ Approach/ Objectives)	Preparation Hints (How to Prepare, Resources to Use, etc.)
Test	The test will be focused on all the skills acquired from LU1–LU6. Questions will be the practical-based using SQL*Plus and SQL Developer in Oracle Database Express Edition (XE)™	To prepare effectively for this test you can include the following in your preparation: • Ensure that you work through all the review questions in the LUs tested. • Check if you are confident that you could answer questions relating to all of the Learning Objectives for the LUs tested. • Work through Mock Assessments. • Ensure that you understand how to create and insert into tables. In other words how to populate tables using SQL Developer or SQL*Plus. • Make certain that you can create views to display fields from a table. • Make sure that you know how to create a PL/SQL query to display information and write up iterative control statements. • Design SQL queries using SQL*Plus and SQL Developer. • Revise using past test papers.
Assignment	This assignment will challenge you to do some problem solving and research on the material covered in LU1–LU8. Pay special attention in class as each skill acquired is vital in your foundation of programming using	In your preparation for Assignment 1, pay special attention to all the skills acquired from LU1–LU8. Pay attention to: • Database Modelling;

| | Oracle Database Express Edition (XE)™ | • Identifying errors from given code;
 • Creating and inserting into tables;
 • SQL queries;
 • Creating views;
 • PL/SQL queries using cursors and selection and iterative control statements.

 It is recommended that you look at Oracle examples when working on your assignment.

 • NOTE: Even though you should look at other examples of Oracle code, you may NOT copy code directly from a source without referencing correctly. |

Assessment Preparation Guidelines

	Format of the Assessment (The Focus/Approach/Objectives)	Preparation Hints (How to Prepare, Resources to Use, etc.)
Examination	The examination will be focused on all the skills acquired. Questions will be theory and practical-based, and will consist of a variety of formats, such as short questions, paragraph questions and query creation in Oracle Database Express Edition (XE)™ using SQL*Plus and SQL Developer. Practical Assessment (Total Marks = 120; Duration: 2 Hours) – This is an Open Book Assessment. Take note: In the Practical Assessment: you are expected to know how to execute a script/ preload that will create and load the tables. You are also expected to be able to read, review, modify and write code where necessary. For open book assessments the students may have open access to all resources inclusive of notes, books (hardcopy and e-books) and the internet. These resources may be accessed as hard copies or as electronic files on electronic devices. All electronic devices batteries must be fully charged before the assessment as no charging of devices will be permitted during the sitting of the	To prepare effectively for this exam you can include the following in your preparation: • Ensure that you work through all the review questions in the LUs tested. • Ensure you are confident to discuss key theoretical concepts. • Check if you are confident that you could answer questions relating to all of the Learning Objectives for the LUs tested. • Check you are confident with executing SQL queries to create a database schema using SQL*Plus and SQL Developer. • Design SQL queries using SQL*Plus and SQL Developer. • Create PL/SQL queries using simple cursors, selection and iterative control statements. • Create views to display data. • Design procedures that receive one or multiple parameters. • Design functions that receive one or multiple parameters. • Create triggers to execute depending on situations.

	assessment. The IIE and associated brands accept no liability for the loss or damage incurred to electronic devices used during open book assessments.	

Module Pacer			
Code	Programme	Contact Sessions	Credits
ADDB6311	DIS3	48	15
Learning Unit 1	Fundamentals of Oracle Database		

Overview:

In this first learning unit, we will review basic database concepts, look at the fundamentals of Oracle database and how Oracle database™ can provide a flexible, easy interface to manage large volumes of data.

The learning unit starts with a look at different database models and tiered architecture. Relational database management systems and database environments are explored. We will also discuss data warehousing, distinguish between the different types of RDBMS applications and analyse the advantages of using Oracle database Express Edition™. The roles of various Oracle users will be explored. A comparison of various program categories.

If you are a contact student, you will likely spend two sessions on this learning unit.

Please work through Themes 1 and 2 on Learn, together with the relevant sections of your prescribed source/s. To ensure that you are working towards mastering the objectives for this learning unit, please also ensure that you complete the activities on Learn.

Learning Unit 1: Theme Breakdown		
Sessions: 1-2	Fundamentals of Oracle Database ™	Prescribed Material (PM)
Related Outcomes: MO001 Demonstrate the ability to control database objects.	• Discuss the different database models; • Describe tiered architecture as a way to manage data more effectively; • Discuss relational database management systems; • Compare the various database environments; • Discuss data warehousing; • Distinguish between the different types of RDBMS applications; • Analyse the advantages of using Oracle database ™; • Compare the roles of various Oracle users; • Identify the various program categories enabling a user to operate a database.	PM: pp.1–17

Learning Unit 2	Using SQL Commands to work with data

Overview:

In this learning unit, we will explore SQL, a language that every database administrator should be comfortable with. The learning unit starts by examining the various data definition commands and distinguishes between SQL*PLUS and SQL Developer. The various data types available in Oracle are also reviewed as well as the data manipulation language commands used to modify a database. You will have the opportunity to formulate select, insert, update and delete statements. We will finally compare the commit, rollback and savepoint statements.

If you are a contact student, you will likely spend four sessions on this learning unit.

Please work through Themes 1 and 2 on Learn, together with the relevant sections of your prescribed source/s. To ensure that you are working towards mastering the objectives for this learning unit, please complete the activities on Learn.

Learning Unit 2: Theme Breakdown		
Sessions: 3–6	Using SQL Commands to work with Tables	Prescribed Material (PM)
Related Outcomes: MO001: Demonstrate the ability to control database objects. MO002: Define Structured Query Language (SQL) statements and SQL functions	• Distinguish between SQL*Plus and SQL Developer; • Discuss the various data types available; • Compare the various Data Definition Commands; • Discuss the various Data Manipulation Language commands; • Formulate and use the following statements: o CREATE statement; o ALTER statement; o SELECT statement o INSERT statement o UPDATE statement o DELETE statement • Construct and explain how and why to use: o Aliases; o Set Operators; o Subqueries; o Joins. • Compare the various functions supported by the GROUP BY function; • Discuss the purpose of the following statements: o COMMIT; o ROLLBACK; o SAVEPOINT.	PM: pp.19–52
25% of ICE Tasks to be completed by this point.		

Learning Unit 3	Administering a Database

Overview:

In this learning unit, we will explore the administration of databases. You will learn to manage and monitor database components and processes. The learning unit covers statements needed to create a database in a specific user environment. Various database administrative tasks and administrative privileges in Oracle DBA are discussed. Important topics such as managing memory spaces and Oracle database server processes are also explored. Critical steps to manage and enhance data storage are outlined.

The learning unit starts with the formulation of database statements and explains the purpose of the database configuration assistant. The various database administrator tasks are examined and the privileges that are available to perform database operations. A distinction between manual and automatic memory management is made and finally there is a discussion on how to manage database processes effectively.

If you are a contact student, you will likely spend four sessions on this learning unit.

Please work through Themes 1 and 2 on Learn, together with the relevant sections of your prescribed source/s. To ensure that you are working towards mastering the objectives for this learning unit, please complete the activities on Learn.

Learning Unit 3: Theme Breakdown		
Sessions:	Administering a Database	Prescribed Material (PM)
7–10		PM: pp.53–82
Related Outcomes: MO001 MO002 MO003 MO004	• Explain how to create a database; • Explain the database configuration assistant (DBCA); • Describe the various administrator tasks and privileges to perform database operations; • Describe the initialisation parameters to accomplish automatic memory management; • Compare various methods associated with manual memory management; • Describe how to manage database memory; • Compare the types of databases server processes; • Describe how to manage processes effectively; • Explain how to use table spaces to optimise table storage space; • Explain predefined and administrative user accounts; • Explain how to assign and revoke user privileges.	

Learning Unit 4	Using PL/SQL Commands to Manipulate Data

Overview:

Programming Language/ Structured Query Language commands are used to select and manage data. This learning unit introduces the PL/SQL language, a procedural language developed by Oracle to serve as an extension to SQL.

The learning unit starts by addressing the creation of a PL/SQL Block with variables, constants, selection control structures, iterative control structures, and cursors. Packages, to group related PL/SQL procedures, functions and variables, are explained next. Trigger types are examined, explaining how these triggers respond to events such as data modification. Finally you will learn how to work with object-relational databases using user-defined data types.

If you are a contact student, you will likely spend four sessions on this learning unit.

Please work through Themes 1 to 3 on Learn, together with the relevant sections of your prescribed source/s. To ensure that you are working towards mastering the objectives for this learning unit, please complete the activities on Learn.

Learning Unit 4: Theme Breakdown		
Sessions: 11–14	Using PL/SQL Commands to Manipulate Data	Prescribed Material (PM)
Related Outcomes: MO004	• Construct PL/SQL Blocks; • Design PL/SQL Queries that use Variables; • Design PL/SQL Queries with Constants; • Construct Selection Control Statements; • Formulate Iterative Control Statements; • Construct a PL/SQL query with a Cursor; • Explain what packages are; • Compare the various Trigger Types; • Formulate Triggers to respond to data events; • Construct Objects used in an Object Relational Database; • Design Methods used in an Object Relational Database.	PM: pp.83–115

Learning Unit 5	Creating Other Database Objects

Overview:

In this learning unit, we will explore various database objects such as indexes, sequences, views and synonyms. Oracle provides these features to enhance the manageability of a database. You will also learn how to handle the increasing number of users accessing databases at once.

At the start of the learning unit you will learn to create firstly, indexes to facilitate faster retrieval of data and secondly sequences to ensure that every row in a table is unique. After this you will learn to create and use views to partition data in a table, both vertically and horizontally. We will conclude the learning unit with an introduction to synonyms, used to shorten long and cumbersome object names.

If you are a contact student, you will likely spend two sessions on this learning unit.

Please work through Themes 1 and 2 on Learn, together with the relevant sections of your prescribed source/s. To ensure that you are working towards mastering the objectives for this learning unit, please complete the activities on Learn.

Learning Unit 5: Theme Breakdown		
Sessions:	Creating Other Database Objects	Prescribed Material (PM)
15–16		PM: pp.117–132
Related Outcomes: MO001 MO003	• Create indexes; • Apply sequences to a table; • Write a CREATE VIEW statement; • Create and use synonyms.	
50% of ICE Tasks to be completed by this point.		

Learning Unit 6	Getting Started with PL/SQL Programming

Overview:

In this learning unit, you will learn to create PL/SQL blocks that can be used or shared by multiple forms, reports and data management applications.

The learning unit starts by examining PL/SQL basics and development environments such as SQL*Plus and SQL Developer. You will also learn how to write a simple PL/SQL program block and produce output messages.

If you are a contact student, you will likely spend six sessions on this learning unit.

Please work through Themes 1 and 2 on Learn, together with the relevant sections of your prescribed source/s. To ensure that you are working towards mastering the objectives for this learning unit, please complete the activities on Learn.

Learning Unit 6: Theme Breakdown		
Sessions: 17–22	Getting Started with PL/SQL Programming	Prescribed Material (PM)
Related Outcomes: MO004	• **Compare** the features of PL/SQL; • **Compare** the components of the PL/SQL environment; • **Describe** the PL/SQL engine; • **Explain** how SQL*Plus can submit SQL statements and PL/SQL blocks for execution; • **Discuss** how the Oracle SQL developer can improve productivity; • **Distinguish between** the types of PL/SQL blocks; • **Explain** how to output messages using PL/SQL.	PM: pp.133–143
FORMATIVE ASSESSMENT 1 (PRACTICAL TEST)		

Learning Unit 7	Using Variables and Lexical Units

Overview:

PL/SQL variables are used in a program/query to structure it and perform data operations. Using these variables will allow communication between various blocks in a program and take your skill to the next level.

The learning unit starts by introducing predefined, scalar and large object data types that are used to declare PL/SQL variables and will be used in PL/SQL statements. PL/SQL lexical units are explored in the second theme.

If you are a contact student, you will likely spend four sessions on this learning unit.

Please work through Themes 1 and 2 on Learn, together with the relevant sections of your prescribed source/s. To ensure that you are working towards mastering the objectives for this learning unit, please complete the activities on Learn.

Learning Unit 7: Theme Breakdown		
Sessions:	Using Variables and Lexical Units	Prescribed Material (PM)
23 - 26		PM: pp.145–156

Related Outcomes: MO004 MO005	• Compare the predefined data types;
	 • Discuss the scalar data types;
	 • Differentiate between the different types of large objects;
	 • Justify the use of user-defined PL/SQL subtypes;
	 • Create and use:
	   o PL/SQL variables; and
	   o PL/SQL constants.
	 • Distinguish between the different lexical units;
	 • Outline/summarise the PL/SQL character sets;
	 • Discuss delimiters;
	 • Explain what an identifier is;
	 • Justify why comments are added to promote readability and understanding;
	 • Compare the different literal types;
	 • Explain the purpose of the:
	   o %TYPE attribute;
	   o %ROWTYPE attribute.
	 • Create and use PL/SQL lexical units.	

Learning Unit 8	Using Control Structures

Overview:

Using control structures in PL/SQL assists in the branching of a program sequence. Control structures also help in incorporating a decision-making approach to programming. The learning unit starts with exploring various control structures. Next, you will be introduced to alternating execution logic in your code. Finally, you will use control-flow statements to control the sequential flow of your instructions.

If you are a contact student, you will likely spend six sessions on this learning unit.

Please work through Themes 1 and 2 on Learn, together with the relevant sections of your prescribed source/s. To ensure that you are working towards mastering the objectives for this learning unit, please complete the activities on Learn.

Learning Unit 8: Theme Breakdown		
Sessions:	Using Control Structures	Prescribed Material (PM)
27 - 32	Learning Objectives:	PM: pp.157–182
Related Outcomes: MO001 MO004 MO005	- Identify applicable/suitable arithmetic operators used to perform expressions; - Evaluate comparison operators to compare expressions or values; - Explain how to combine two string expressions into one expression; - Compare the three logical operators used in PL/SQL; - Explain operator precedence; - Create and use expressions; - Contrast the types of Boolean expressions supported in procedural statements; - Compare the three basic control structures; - Explain conditional control statements; - Identify the types of IF statements used to control the execution of statements; - Create and use CASE statements; - Compare the three types of LOOP statements used in PL/SQL statements; - Compare and use the two types of EXIT statements; - Use the two forms of CONTINUE statements.	
75% of ICE Tasks to be completed by this point.		
FORMATIVE ASSESSMENT 2 (ASSIGNMENT)		

Learning Unit 9	Handling PL/SQL Exceptions

Overview:

The focus of this learning unit is dealing with database programming errors. You will learn to declare, raise and handle exceptions. We will start by investigating the scope and advantages of exception handling as a mechanism to deal with runtime errors. You will also learn to handle user-defined exceptions that must be declared and raised explicitly, using either a procedure or a raise statement.

If you are a contact student, you will likely spend four sessions on this learning unit.

Please work through Themes 1 on Learn, together with the relevant sections of your prescribed source/s. To ensure that you are working towards mastering the objectives for this learning unit, please complete the activities on Learn.

Learning Unit 9: Theme Breakdown		
Sessions: 33 - 36	Handling PL/SQL Exceptions	Prescribed Material (PM)
Related Outcomes: MO006	- Explain how to deal with exceptions; - Explain the rules for declaring exceptions; - Discuss the advantages of exceptions; - Justify the use of pre-defined system exceptions; - Explain how to handle user-defined exceptions; - Describe how to deal with unhandled exceptions.	PM: pp.183-194

Learning Unit 10	Working with PL/SQL Cursors

Overview:

Using PL/SQL cursors is an efficient, organised and compatible manner for executing rows. In this learning unit, we will work with more than one row at a time in a database, using cursors.

The learning unit starts with an introduction to cursors to manage data by providing the ability to work with multiple records. You will learn to handle situations by simplifying your code instead of writing numerous statements to achieve the desired results. Implicit and explicit cursors will be explored and the "FOR UPDATE" and "CURRENT OF" clauses will be explained. You will also learn to create PL/SQL queries that use cursor variables. The retrieval of data using the cursor with looping mechanisms, will conclude the learning unit.

If you are a contact student, you will likely spend four sessions on this learning unit.

Please work through Themes 1 and 2 on Learn, together with the relevant sections of your prescribed source/s. To ensure that you are working towards mastering the objectives for this learning unit, please complete the activities on Learn.

Learning Unit 10: Theme Breakdown		
Sessions:	Working with PL/SQL Cursors	Prescribed Material (PM)
37–40		PM: pp.195–210

Related Outcomes: MO004 MO005	• Explain how to manage data using cursors;
	• Motivate how and why to use:
	   o The implicit cursor attributes;
	   o The explicit cursor attributes.
	• Explain how to use the following clauses:
	   o FOR UPDATE;
	   o CURRENT OF.
	• Create PL/SQL queries that use cursor variables;
	• Explain how to retrieve data using the cursor with looping mechanisms.	

Learning Unit 11	Creating PL/SQL Subprograms
Overview: There will be situations where you will want to store a particular set of database code and repeatedly execute it or divide large, complex PL/SQL programs into multiple subprograms in order to increase programming efficiency. You can achieve this by creating subprograms. We start this learning unit with a look at PL/SQL subprograms, stored procedures and return statements. We will compare procedures and different types of functions and also investigate implicit and explicit conversions, overloading, the NOCOPY hint and finally the deterministic clause. If you are a contact student, you will likely spend four sessions on this learning unit. Please work through Themes 1 to 3 on Learn, together with the relevant sections of your prescribed source/s. To ensure that you are working towards mastering the objectives for this learning unit, please complete the activities on Learn.	

Learning Unit 11: Theme Breakdown		
Sessions:	Creating PL/SQL Subprograms	Prescribed Material (PM)
41–44		PM: pp.211–227

Related Outcomes: MO004 MO005 MO007	• Motivate the use of stored subprograms;
	 • Describe the parts of a subprogram;
	 • Compare the benefits of subprograms;
	 • Compare anonymous blocks to subprograms;
	 • Create and use:
	  o Stored procedures;
	  o Return statements.
	 • Explain the uses of functions;
	 • Compare functions and procedures;
	 • Create and use stored functions;
	 • Compare the different categories of built-in functions;
	 • Compare implicit and explicit conversions;
	 • Explain what overloading is;
	 • Compare the different subprogram parameter modes;
	 • Discuss the NOCOPY hint;
	  o Describe the function of the DETERMINISTIC clause.	

Learning Unit 12	Triggers and Advanced Interface Methods

Overview:

Triggers are used to validate procedures when a table is modified, e.g. to prevent any erroneous conditions such as NULL values. Triggers also assist with automating tasks when working with and managing large amounts of data in a database. Modification statements including the insert, delete and update statements can also be used with triggers.

This learning unit also explores PL/SQL subprograms that invoke external class methods. You will also discover how external C routines and Java code can be implemented into your PL/SQL programs. External procedures and the benefits of using these external procedures are also discussed.

If you are a contact student, you will likely spend four sessions on this learning unit.

Please work through Theme 1 on Learn, together with the relevant sections of your prescribed source/s. To ensure that you are working towards mastering the objectives for this learning unit, please complete the activities on Learn.

Learning Unit 12: Theme Breakdown		
Sessions: 45–48 Related Outcomes: MO004 MO005 MO007	Using Advanced Interface Methods	Prescribed Material (PM)
	- Create and execute simple trigger; - Compare the different: - Trigger categories; - Trigger states. - Create and use compound triggers; - Distinguish between the various compound timing points; - Explain trigger execution; - Describe external procedures; - Discuss the benefits of external procedures; - Explain how to execute external C programs from PL/SQL; - Execute Java programs from PL/SQL.	PM: pp.229–246