



# Broward Community College

## Course Outline

STATUS:   A  

COMMON COURSE NUMBER:   CTS 2444C  

COURSE TITLE:   Oracle DBA: Performance Tuning  

CREDIT HOURS:           4          

**CONTACT HOURS BREAKDOWN:**

Lecture/Discussion           56          

Lab                   8          

Other                   0          

Contact Hours/Week           4          

**CATALOG COURSE DESCRIPTION:**

Prerequisite: COP 2742C

Corequisite: None

This course will introduce students to the importance of good initial database design, and the methods used to tune a production Oracle database. The focus is on Database and Instance tuning, rather than specific operating system performance issues. Using available Oracle tools, students will learn how to recognize, troubleshoot, and resolve common performance related problems in administering an Oracle database. The skills developed in this class will help prepare students for one of the Oracle DBA certification exams.

General Education Requirements - Associate of Arts Degree, meet Area(s):

General Education Requirements - Associate of Science Degree, meets Area(s):

**UNIT TITLES:**

1. Business Requirements and Tuning.
2. Oracle ALERT Logs, Trace Files, and Events
3. Utilities and Dynamic Performance Views
4. Tuning for Different Application Requirements
5. SQL Tuning

6. Generic Operating System Tuning
7. Tuning the Shared Pool
8. Tuning the Buffer Cache
9. Tuning Redo Mechanisms
10. Database Configuration and I/O Issues
11. Tuning Rollback Segments
12. Using Oracle Blocks Effectively
13. Monitoring and Detecting Lock Contention
14. Resolving Latch and Contention Issues
15. Tuning Sort Operations

## **I. Course Overview:**

Upon successful completion of this course, the students should be able to

List the options to enhance performance across differing application environments

List the important steps for outlining a tuning methodology

Use Oracle tools to diagnose performance problems

Diagnose and resolve performance issues associated with multithread server

Reconfiguring file structures to enhance performance

List the specific performance tuning requirements of types of applications

Identify and resolve I/O, data storage, and database configuration issues

Configure memory and disk resources to optimize sort operations

Detect and resolve latch and lock contention problems.

## **II. Units:**

### **Unit 1. 1. Business Requirements and Tuning**

#### General Outcome:

1.0 The students should be able to identify the relationships between business requirements and performance quality of an Oracle Server and which modules may be affected.

#### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

1.1 Discuss the roles associated with tuning.

1.2 List the steps associated with tuning.

1.3 Discuss different tuning goals.



## Unit 2. 2. Oracle ALERT Logs, Trace Files, and Events

### General Outcome:

2.0 The students should be able to recognize the methods available for documenting performance problems.

### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

2.1 Describe the location and use of the ALERT log.

2.2 Describe the location and use of trace files.

2.3 Retrieve and display wait events

2.4 Set predefined events using OEM

**Unit 3. 3. Utilities and Dynamic Performance Views**

General Outcome:

3.0 The students should be able to utilize, and distinguish the available utilities and dynamic views used to analyze performance of the Oracle Database.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 3.1 Use dynamic performance views.
- 3.2 Use the UTLBSTAT.UTLESTAT output report
- 3.3 Use appropriate OEM tools.

Unit 4. 4.

General Outcome:

4.0 The students should be able to

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

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4.2

4.3

4.4

4.5

4.6

**Unit 5. 5.**

General Outcome:

5.0 The students should be able to

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

5.1

5.2

5.3

5.4

5.5

## Unit 6. 6. Generic Operating System Tuning

### General Outcome:

6.0 The students should be able to identify the relationship of operating performance and Oracle database performance, and how to improve the operating system's performance in order to improve the database performance.

### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 6.1 List the primary steps for OS tuning.
- 6.2 Discuss the similarities between OS and database tuning.
- 6.3 Identify the difference between processes and threads.
- 6.4 Describe paging and swapping.

## Unit 7. 7. Tuning the Shared Pool

### General Outcome:

7.0 The students should be able to identify the relationship between performance and data availability in memory and improve the database performance by increasing memory data availability.

### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

7.1 Tune the library cache and dictionary cache.

7.2 Measure shared-pool hit percentage.

7.3 Size the shared pool.

7.4 Pin objects in the shared pool.

7.5 Tune shared pool reserved space.

7.6 List the UGA and session memory.

## Unit 8. 8. Tuning the Buffer Cache

### General Outcome:

8.0 The students should be able to recognize the effect of the buffer cache usage upon the database's performance and manage the buffer each in order to improve performance.

### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 8.1 Explain how Oracle manages the buffer cache.
- 8.2 Calculate the buffer cache hit ratio.
- 8.3 Assess the impact of adding or removing buffers.
- 8.4 Create multiple buffer pools.
- 8.5 Size multiple buffer pools.
- 8.6 Monitor the buffer cache.
- 8.7 Use table caching.

## Unit 9. 9. Tuning Redo Mechanisms

### General Outcome:

9.0 The students should be able to recognize the effect of the redo log upon database performance and manage the redo log in order to improve performance.

### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

9.1 Determine contention for the redo log buffer.

9.2 Size the redo log buffer.

9.3 Reduce redo operations.

**Unit 10. 10.**

General Outcome:

10.0 The students should be able to

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

10.1

10.2

**Unit 11. 11**

General Outcome:

11.0 The students should be able to

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

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**Unit 12. 12**

General Outcome:

12.0 The students should be able to

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

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12.7

**Unit 13. 13**

General Outcome:

13.0 The students should be able to

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

13.1

13.2

**Unit 14. 14**

General Outcome:

14.0 The students should be able to

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

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14.2

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14.6

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14.8

## Unit 15. 15. Tuning Sort Operations

### General Outcome:

15.0 The students should be able to define and describe the sorting processes and how to improve sorting speed.

### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 15.1 Identify SQL operations that use sorts.
- 15.2 Ensure that sorts happen in memory.
- 15.3 Allocate temporary disk space for sorts.
- 15.4 Use direct writes for sorts.

## Unit 16. Tuning with Oracle Expert

### General Outcome:

16.0 The students should be able to utilize the Oracle Expert Product to analyze database performance issues and suggest recommendations regarding how to improve performance.

### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 16.1 Discuss Oracle Expert features.
- 16.2 Create a tuning session.
- 16.3 Gather, view, and edit input data.
- 16.4 Analyze collected data using Rules.
- 16.5 Review tuning recommendations.
- 16.6 Implement tuning recommendations.