

Sri Lanka Institute of Information Technology
Unit Outline

Course Identification

Unit Name	Database Management Systems III		
Unit Code	IT302	Version No.	2012.1
	(Old Code: 311)		
Credit Points	4		
Pre-requisites	Database Management Systems I (Unit Code IT103 / Old Code 112)		
	Database Management Systems II (Unit Code IT202 / Old Code 215)		
Co-requisites	None		

Methods of Delivery	Lecture (Face-to-face)	2 hours/week
	Practical Sessions	2 hours/week
	Tutorial Sessions	1 hour/week
Course Web Site	http://moodle.sliit.lk	

Course Description

Introduction This is a required unit for the 3rd year students in the Information Technology stream. This unit is a continuation of Database Management Systems II (IT202) which extends to object-relational databases, database implementation techniques, distributed databases and emerging areas such as data warehousing, OLAP and data mining

The syllabus This unit covers topics in design and implementation of object-relational databases, concepts in data storage, indexes and query optimization, principles and techniques in database tuning, distributed databases and concepts covering data warehousing, OLAP and data mining techniques.

Unit Learning Outcomes At the end of this unit, students should be able to:

- Understand the concepts underlying contemporary object-relational database systems as well as design and implement such databases.
- Understand the principles and techniques of query optimization and estimate the cost of query plans.
- Understand the principles of database tuning and apply them.
- Understand the principles and techniques used to implement distributed databases and to analyze the cost of a query plan executed in a distributed database.
- Understand the concepts and some of the methods of data mining, and data warehousing.

In addition to the subject objectives, students will develop the following skills and generic attributes:

- **Ability to apply knowledge of basic science and engineering:** Principles of algorithms and languages form the base for understanding database models, structures and programming. The unit also draws upon the knowledge of the relational model and associated query languages.

- **In-depth technical competence:**

In the use of ER model for object-relational database design and the knowledge of object-oriented database concepts and languages.

- **Ability to undertake problem identification, formulation and solution:**

The unit involves identifying the data requirements of enterprises, design of suitable database structures and access methods, and their implementation using object-relational database systems.

- **In-depth knowledge of Computer Science:**

In the areas of object-oriented database model and language, query optimization concepts.

- **Awareness of issues associated with changes in technology and the ability to adapt:**

Focus on future directions including the emerging areas of data mining, data warehousing and on-line analytical processing (OLAP).

Assessment
Criteria

During the semester, there will be a series of lectures, laboratory assignments and tutorials. A midterm examination,

The distribution of marks for the assessed components of the unit are as follows:

Midterm	20%
Practicals	20%
Final	<u>60%</u>
Total	100%

Unit
Requirement

To pass this unit, students are required to get a total of at least 45% from all assessed work.

Learning
Resources

Recommended texts & handouts

1. Database Management Systems III – *SLIIT*, 2009.
2. Ramakrishnan, R. and Gehrke, J., *Database Management Systems*, 3rd Edition, McGraw-Hill, 2003.
3. Garcia-Molina, H., Ullman, J.D. and Widom, J., *Database Systems: The Complete Book*, Prentice-Hall, 2002.

Recommended References

4. Elmasri, R. and Navathe, S.B., *Fundamentals of Database Systems*, 4th Ed. Addison-Wesley, 2004.
5. Silberschatz A., Korth H.F. and Sudarchan S., *Database Systems Concepts*, 3rd Edition, McGrawHill , 1996.

Additional Course Materials

1. Refer course website.

Unit Administration Procedure

Contact Information

Lecturer-in-charge	Asitha Perera		
Telephone	011-2301904 x 403	Email	asitha.p@sliit.lk
Location	Metropolitan Campus & Malabe campus on selected dates		
Consultation Time	See courseweb		

Time Schedule*

Week 1	Lecture 1: <ul style="list-style-type: none">○ Introduction to Unit. Problems with relational model, OO model features and ORDB. ORDB intro: UDTs and REFs Lab Assignment 1: <ul style="list-style-type: none">○ Practical on relational database for familiarity with Oracle and refresh SQL. Tutorial 1: <ul style="list-style-type: none">○ Exercises on Oracle's Object SQL
Week 2	Lecture 2: <ul style="list-style-type: none">○ ORDB: Collections Types (VARRAYs and Nested Tables) Lab Assignment 2: <ul style="list-style-type: none">○ Exercises on UDT, REF, and DMLs on OR Tables Tutorial 2: <ul style="list-style-type: none">○ Exercises on VARRAY and NESTED TABLE
Week 3	Lecture 3: <ul style="list-style-type: none">○ ORDB: Methods and Inheritance Lab Assignment 3: <ul style="list-style-type: none">○ Exercise on varrays and nested tables (DDL, DML and selects) Tutorial 3: <ul style="list-style-type: none">○ Exercise on methods and inheritance
Week 4	Lecture 4: <ul style="list-style-type: none">○ ER-ORDB mapping Lab Assignment 4: <ul style="list-style-type: none">○ Exercise on methods Tutorial 4: <ul style="list-style-type: none">○ Exercise on ER-ORDB mapping
Week 5	Lecture 5: <ul style="list-style-type: none">○ Review: Storage and indexing Lab Assignment 5: <ul style="list-style-type: none">○ Week free from labs Tutorial 5: <ul style="list-style-type: none">○ Exercises on storage and indexing

Week 6	Lecture 6: <ul style="list-style-type: none">○ Query Optimization – Part 1 Lab Assignment 6: <ul style="list-style-type: none">○ Practical Exam 1 Tutorial 6: <ul style="list-style-type: none">○ Exercises on index matches and basic cost estimates
Week 7	Lecture 7: <ul style="list-style-type: none">○ Query Optimization – Part 2 Lab Assignment 7: <ul style="list-style-type: none">○ Exercises using Oracle's EXPLAIN PLAN Tutorial 7: <ul style="list-style-type: none">○ Tutorial on indexes and cost estimations
Week 8: Mid-Term Examination	
Week 9	Lecture 8: <ul style="list-style-type: none">○ Database Tuning Lab Assignment 8: <ul style="list-style-type: none">○ Discussion of midterm paper and answers Tutorial 8: <ul style="list-style-type: none">○ Exercises on index selection and schema refinements
Week 10	Lecture 9: <ul style="list-style-type: none">○ Distributed Databases Lab Assignment 9: <ul style="list-style-type: none">○ Week free from labs Tutorial 9: <ul style="list-style-type: none">○ Exercises on distributed databases and cost estimations in distributed databases
Week 11	Lecture 10: <ul style="list-style-type: none">○ Data Warehousing and Decision Support – Part 1 Lab Assignment 10: <ul style="list-style-type: none">○ Exercises on materialized views, CUBE and ROLLUP operators Tutorial 10: <ul style="list-style-type: none">○ Exercises on data warehouse basics – terms and concepts
Week 12	Lecture 11: <ul style="list-style-type: none">○ Data Warehousing and Decision Support – Part 2 Lab Assignment 11: <ul style="list-style-type: none">○ Exercises on association rules Tutorial 11: <ul style="list-style-type: none">○ Exercises on data warehouses – techniques and concepts
Week 13	Lecture 12: <ul style="list-style-type: none">○ Data Mining Lab Assignment 12: <ul style="list-style-type: none">○ Practical Exam 2 Tutorial 12: <ul style="list-style-type: none">○ Exercises on concepts in association rules, clustering and classification

- Week 14 Lecture 13:
 ○ Review
 Lab Assignment 13:
 ○ Week free from labs
 Tutorial 13:
 ○ Review

Final Examination

The dates and weeks mentioned above are approximate*.

Generic Information

Plagiarism: Academic honesty is crucial to a student's credibility and self-esteem, and ultimately reflects the values and morals of the Institute as whole. A student may work together with one or a group of students discussing assignment content, identifying relevant references, and debating issues relevant to the subject. Plagiarism occurs when the work of another person, or persons, is used and presented as one's own. Any student found guilty of plagiarism will result in a zero mark for the assessed work and may even result in failure of the unit.

End of Unit Outline