SLIIT Discover Your Future	**DEPARTMENT OF COMPUTER SCIENCE AND SOFTWARE ENGINEERING** **FACULTY OF COMPUTING**

MODULE OUTLINE

Module Name	**Database Systems**		
Module Code	SE3060	Version No.	2017 - 1
Year/Level	3	Semester	2
Credit Points	4		
Pre-requisites	None		
Co-requisites	None		
Methods of Delivery	Lectures (Face-to-face) Tutorials Labs	2 Hours/Week 1 Hours/Week 2 Hours/Week	
Course Web Site	http://courseweb.sliit.lk/		
Date of Original Approval	January, 2017		
Date of Next Review	January, 2022		

MODULE DESCRIPTION

Introduction	This unit is a continuation of IT1030, and IT2040 which extends to NoSQL and Hadoop Framework, XML integration, Object RDBMS, RDBMS and Parallel and Distributed DB architectures. Further Topics related to query optimization and database tuning, and transactions and concurrency control techniques are discussed in detail.	
Learning Outcomes	At the end of the module student will be able to:	
	LO1:	Design and develop NoSQL and XML database systems for real world applications.
	LO2:	Describe the principles and techniques of query optimization, estimate the cost of query plans and database tuning.

	LO3:	Recommend suitable transaction and concurrency control solutions for data intensive application.
	LO4:	Explain the concepts underlying in Distributed and Parallel RDBMS architectures and associate protocols for distributed transaction processing.
	LO5:	Utilize Hadoop framework and supporting tools to execute Map Reduce program model for distributed processing.

Assessment Criteria	During the semester, there will be a mid-term test, practical tests, and a final written examination. The mid-term test will be based on the practical work, the questions discussed in tutorial sessions, and lecture material covered until the week before it is held. Practical tests will be given to assess the certain configurations and implementation knowledge and skills. The final written examination will be a comprehensive exam based on the practical assignments and lecture materials covered during the semester.			
	Continuous Assessments			
	• Lab Tests	20	%	LO1- LO3
	• Midterm Examination	20	%	LO1- LO3
	End Semester Assessment			
	• Final Examination	60	%	LO1-LO5
	TOTAL	100	%	
Estimated Student Workload	Contact Hours			
	• Lecture	26 hours		
	• Tutorial	13 hours		
	• Laboratory	26 hours		
	Time Allocated for Assessments			
	• Continuous Assessments	03 hours		
	• Final Examination	02 hours		
	Reading and Independent Study	130 hours		
	TOTAL	200 hours		
Module Requirement	To pass this module, students need to obtain a pass mark in both "Continuous Assessments" and "End of the Semester Examination" components which would result in an overall mark that would qualify for a "C" grade or above			
Primary References	1. Elmasri, R. and Navathe, S.B., *Fundamentals of Database Systems*, 7th ed., Pearson India, 2017			
	2. Silberschatz A., Korth H.F. and Sudarchan S., *Database Systems Concepts*, 7th ed. New York, McGrawHill , 2013.			

CONTENTS OF THE MODULE	
Topic	**Learning Outcomes covered**
1. Query Processing and Optimization • Query execution plans • I/O Cost Estimation model • Cost estimation for joining algorithms and sorting algorithms	**LO2**
2. Indexing Techniques • File organizations • Properties of indexes • Tree based B+ Tree Indexes, Hash Indexes, Bitmap Indexes	**LO2**
3. Physical Database Design and Database Tuning • Index selection and creation • Index-Only Plans, Query re-writing, Data partitioning • Tools for performance monitoring	**LO2**
4. XML Databases • Storing XML Data • Querying XML Data • XPath, XQuery	**LO1**
5. Crash Recovery Techniques • Stealing Frames & Forcing Pages • Write-Ahead Logging • ARIES algorithm	**LO3**
6. Transactions and Concurrency Control • Transaction properties • Scheduling Transactions • Anomalies with Interleaved Execution, Deadlocks • Dynamic Databases & Phantoms • Locking Algorithms	**LO3**
7. Parallel and Distributed Databases • Parallel and Distributed Database architecture • Parallel and Distributed Concurrency Control protocols	**LO4**
8. Big Data and NoSQL Databases • Differentiate a NoSQL database from the Relational Database Management System • Use a NoSQL database, CAP theorem, BASE model • Key-value databases, Column Databases, Document Databases and Graph databases • NoSQL CURD Operations	**LO1**

9. Hadoop Framework • Map-Reduce algorithm, Hadoop Architecture • Installing and configuring Hadoop framework • HDFS Architecture and HDFS operations • MapReduce program model for distributed processing	**LO5**
10. Introduction to Big data Analytics	**LO5**

GENERIC INFORMATION

Any type of plagiarism is not allowed.

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.

----------End of Module Outline----------