

 SLIIT <i>Discover Your Future</i>	DEPARTMENT OF COMPUTER SYSTEMS ENGINEERING		
	FACULTY OF COMPUTING		

MODULE DESCRIPTION			
Module Name	Database Management Systems for Security		
Module Code	IE2042	Version No.	2018 - 1
Year	2	Semester	1
Credit Points	4		
Pre-requisites	None		
Co-requisites	None		
Methods of Delivery	Lectures (Face-to-face)	2	Hours/Week
	Tutorials	1	Hours/Week
	Labs	2	Hours/Week
Course Web Site	http://courseweb.sliit.lk/		
Date of Original Approval	October, 2018		
Date of Next Review	October, 2023		

MODULE DESCRIPTION		
Introduction	The aim of the module is to provide the knowledge required to design, develop and maintain a database considering security requirements. The module covers conceptual database design, logical database design, schema refinement, SQL, database programming, database recovery and security fundamentals. Furthermore, the students will obtain hands-on-experience in developing a database and performing administrative tasks on a database.	
Learning Outcomes	At the end of the module student will be able to:	
	LO1:	Design and develop database solutions for real world applications.
	LO2:	Apply relational query languages and database programming languages in database applications.
	LO3:	Evaluate query plans and recommend solutions to speed up the database servers.

	LO4: Apply appropriate solutions to address security and performance concerns related to databases.			
Assessment Criteria	The module is assessed through an assignment, a mid-term examination, and a final examination. The final examination is a comprehensive formal exam based on the lectures, tutorials, and lab classes.			
	Continuous Assessments			
	• Assignment	30	%	LO1- LO4
	• Mid-term Examination	20	%	LO1- LO3
	End Semester Assessment			
	• Final Examination	50	%	LO1-LO4
	TOTAL	100	%	
Estimated Student Workload	Contact Hours			
	• Lecture	26 hours		
	• Tutorial	13 hours		
	• Laboratory	26 hours		
	Time Allocated for Assessments			
	• Continuous Assessments	15 hours		
	• Final Examination	02 hours		
	Reading and Independent Study		118 hours	
	TOTAL		200 hours	
Module Requirement	To pass this module, students need to obtain an overall mark that would qualify for a “C” grade or above.			
Primary References	1. R. Rankins, P. Bertucci, C. Gallelli, and A. T. Silverstein, “Microsoft SQL Server 2014 unleashed”, 1st edition. INpolis, IN: Sams, 2015.			
	2. Syverson and J. Murach, “Murach's SQL server 2016 for developers: training and reference”. Fresno, CA: Mike Murach & Associates, 2016.			
	3. Elmasri, R. and Navathe, S.B., “Fundamentals of Database Systems”, 5th edition., Addison-Wesley, 2015			

CONTENTS OF THE MODULE	
Topic	Learning Outcomes Covered
1. Introduction to Database Management Systems and Requirement Analysis <ul style="list-style-type: none"> • Data requirements • User identification • Security requirements • Performance requirement 	LO1

2. Conceptual Database Design <ul style="list-style-type: none"> • ER model • ISA hierarchies and aggregations 	LO1
3. Logical Database Design <ul style="list-style-type: none"> • Relational model • ER to relational mapping • ISA hierarchy and aggregation mapping 	LO1
4. Schema Refinement <ul style="list-style-type: none"> • Use of Armstrong's Axioms to find closure for set of functional dependencies • Use of attribute closure to find functional dependencies and keys • Normal forms 	LO1
5. Structured Query Language <ul style="list-style-type: none"> • Formal query languages • Advanced SQL 	LO1, LO2
6. Database Programming <ul style="list-style-type: none"> • T-SQL programming constructs • Functions • Stored procedures • Views • Triggers 	LO1, LO2
7. File Organization and Indexing <ul style="list-style-type: none"> • File organization vs. database operation • Types of organizing • Properties of indexes • Indexing techniques 	LO3
8. Query Processing <ul style="list-style-type: none"> • Process of query processing • Query trees • I/O cost estimation model • Cost estimation for joining algorithms • Analysis of query execution 	LO3

9. Transactions and Concurrency Control <ul style="list-style-type: none"> • Transaction properties • Scheduling transactions • Problems in scheduling transactions • Lock based concurrency control • Deadlocks • Phantoms • Simple tree locking algorithm 	LO3, LO4
10. Database Security <ul style="list-style-type: none"> • Fundamentals of database security • Database server authentication methods • Server and database roles • Ownership and user-schema separation • Authorization and permissions • Data encryption • Database vulnerabilities 	LO1, LO4

GENERIC INFORMATION
<p>Any type of plagiarism is not allowed.</p> <p>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.</p> <p>-----End of Module Outline-----</p>