

<p style="text-align: center;">Wollo University Kombolcha Institute of Technology College of Informatics Department of Computer Science</p>					
Program	Regular				
Course Code	CoSc2072				
Course Title:	Advanced Database Systems				
Degree Program	Computer Science				
Module Name	Database Systems				
Module Code	CoSc-M2061				
Instructor	Melkam A.				
	Office Location:				
	e-mail:melkama2011@gmail.com				
	Consultation Hours:Monday:5:10-6:00 LT and Tuesday 8:00-11:30 LT				
Course Ects	6				
Contact Hours (per week)	Lecture	Tutorial	Lab/Practical	Home Study	Total
	48	16	48	50	162
Lecture days, Hours and Room:	Sec A:Monday:2:10-5:00 LT (CR-1703) Sec B:Tuesday:2:10-5:00 LT (CR-1705)				
Tutorial/Lab days and Hours	Sec A:Wensday:7:40-11:30 LT(Lab),Thursday:2:10-6:00 LT (Tutor) Sec B:Friday:2:10-6:00 LT (Lab and Tutor)				
Target Group:	2 nd year Computer Science Students				
Year /Semester	Year: II, Semester: II				
Pre-requisites	CoSc2071				
Status of the Course	Core				
Course Description	This course deals with query optimization, transaction management, recovery, and concurrency control, database authorization and security. Additional topics including, object oriented and object relational database system, distributed databases, databases, and integration may also be				

	covered. A major component of the course is a database implementation project using current database languages and systems.
Course Objectives	<p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> • Describe the main concepts of the OO model such as object identity, type constructors, encapsulation, inheritance, polymorphism, and versioning. • Evaluate a set of query processing strategies and select the optimal strategy. Know the basics of transaction management and concurrency control. • Understand database security. • Use different recovery methods when there is a database failure. • Design a distributed database system in homogenous and heterogeneous environments.
Weeks 1 and 2	<p>Chapter 1: Concepts for Object-Oriented Databases</p> <ul style="list-style-type: none"> • Overview of Object-Oriented Concepts • Object Identity, Object Structure, and Type Constructors • Encapsulation of Operations, Methods, and Persistence • Type Hierarchies and Inheritance
Weeks 3 and 4	<p>Chapter 2: Query processing and Optimization</p> <ul style="list-style-type: none"> • Translating SQL Queries into Relational Algebra • Basic Algorithms for Executing Query Operations • Using Heuristic in Query Optimization • Using Selectivity and Cost Estimates in Query Optimization • Semantic Query Optimization
Weeks 5 and 6	<p><i># test</i></p> <p>Chapter 3: Transaction Processing Concepts</p> <ul style="list-style-type: none"> • Introduction • Transaction and System Concepts

Weeks 7 and 8	<ul style="list-style-type: none"> • Properties of Transaction • Schedules and Recoverability • Serializability of Schedules • Transaction Support in SQL <p><i># project work</i></p>
Weeks 9 and 10	<p>Chapter 4: Concurrency Control Techniques</p> <ul style="list-style-type: none"> • Locking Techniques for Concurrency Control • Concurrency Control Based ON Timestamp Ordering • Multiversion Concurrency Control Techniques • Validation (Optimistic) Concurrency Control Technique • Granularity of Data Items and Multiple Granularity Locking • Using Locks for Concurrency Control in Indexes
Week 11 and 12	<p>Chapter 5: Database Recovery Techniques</p> <ul style="list-style-type: none"> • Recovery Concepts • Recovery Concepts Based on Deferred Update • Recovery Concepts Based on Immediate Update • Shadow Paging • The ARIES Recovery Algorithm • Recovery in Multi database Systems <p><i># assignment</i></p>
Week 13 and 14	<p>Chapter 6: Database Security and Authorization</p> <ul style="list-style-type: none"> • Introduction to DB Security Issues • Discretionary Access Control Based on Granting /Revoking of Privileges • Mandatory Access Control for Multilevel Security <p>Statistical DB Security</p> <p>Chapter 7: Distributed Database System</p> <ul style="list-style-type: none"> • Distributed Database Concepts • Data Fragmentation, Replication, and Allocation Techniques for Distributed database Design

	<ul style="list-style-type: none"> • Types of Distributed Database Systems • Query Processing in Distributed Databases <p><i># written final exam</i></p>
Assessment	<p>Assignments15%</p> <p>Quiz and test..... 20%</p> <p>Final examination45%</p> <p>Project and Lab Exercise20%</p>
Text Book and References	<ol style="list-style-type: none"> 1. Elmasri et al (2004). Fundamentals of Database Systems, 4th ed, Pearson education 2. Thomas M. Connolly and Carolyn E.Begg. (2004). A step by step approach to building databases, 2nd ed. Pearson Education Limited. 3. Ramon A ,etal. Shaum's outlines, fundamentals of relational databases 4. David M. Kroenke. (1998). Database processing, 6th ed. Prentice Hall 5. Van der Lans (2006). Introduction to SQL, Mastering the relational database language. 3rd ed. London, Addis Wesley 6. Silbershatz A. Korth H and Sundarshan (2006). Database System concepts, 5th ed. Boston, McGraw Hill 7. RamaKrishnan(1998). Database Management 8. Systems. Boston McGraw Hill 9. Namdagopalan (2003). Database Management Systems with oracle and vb. Gandhinagar, Appa Book house. 10. Date, J (1981). An Introduction to Database systems. 3rd ed. Vol. 1. New Delhi. Narosa publishing House