

  
**AMOU UNIVERSITY**  
**“A Vehicle for Peace and Development”**  
**AMOU UNIVERSITY**



**FACULTY OF COMPUTING AND ICT**

**BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY PROGRAMME**

**ACADEMIC YEAR 2015/ 2016**

**COURSE DESCRIPTION**

<b>BIT 321</b>	<b>Distributed Databases</b>
Contact Hours	52
Pre-requisite	<b>BIT 221 Principles of Database Management Systems</b> <b>BIT 311 Database Design and Development</b>
Purpose/Aim	<ul style="list-style-type: none"> <li>The course focuses on some advanced topics that are important aspects in database design, implementation, optimization, and distributed application. The course primarily covers distributed database systems and the relevant techniques such as query optimization, transaction processing, and physical database design. It also introduces some new technologies related to modern database application such as database security.</li> </ul>
Course Objective (Indicative Learning Outcomes)	<ul style="list-style-type: none"> <li>Examine the basic components of a Distributed Database System.</li> <li>Validate the Types and Properties of Transactions.</li> <li>Evaluate Concurrency Control Algorithms.</li> <li>Understand reliability concepts and measures in the context of Distributed Databases.</li> <li>Explain the generic Architecture of a Parallel Database and an Object Database System.</li> <li>Construct an interface for a database application.</li> </ul>
Course Content	<ul style="list-style-type: none"> <li>Introduction</li> </ul> Distributed Data Processing; What is a DDMS; Promises of DDBM's; Complicating Factors; Problem Areas <ul style="list-style-type: none"> <li>Overview of Relational DBMS</li> </ul> Relational DB Concepts; Normalization; Integrity Rules; Relational Data Language <ul style="list-style-type: none"> <li>Distributed DBMS Architecture</li> </ul> DBMS Standardization; Architectural Models for DDBM's <ul style="list-style-type: none"> <li>Distributed Database Design</li> </ul> Alternative Design Strategies; Design issues; Fragmentation; Allocation <ul style="list-style-type: none"> <li>Semantic Data Control</li> </ul>



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	<p>View Management; Security; Integrity Control</p> <ul style="list-style-type: none"> <li>• Overview of Query Processing</li> </ul> <p>Processing Problems ; Complexity of relational; Characterization of Query Processors  Layers of Query Processing</p> <ul style="list-style-type: none"> <li>• Query Decomposition</li> </ul> <p>Query Decomposition; Localization of Distributed Queries</p> <ul style="list-style-type: none"> <li>• Optimization of Distributed Queries</li> </ul> <p>Query Optimization; Centralized Optimization; Join Ordering in Fragment Queries  Optimization Algorithms</p> <ul style="list-style-type: none"> <li>• Introduction to Transaction Management</li> </ul> <p>Definition of a Transaction; Properties of Transactions; Types of Transactions</p> <ul style="list-style-type: none"> <li>• Distributed Concurrency Control</li> </ul> <p>Serialization Theory; Control Mechanism; Control Algorithms; Parallel Execution for Hierarchical Architecture; Deadlock Management; Relaxed Concurrency Control</p> <ul style="list-style-type: none"> <li>• Distributed DBMS Reliability</li> </ul> <p>Reliability Concepts and Measures; Failures and Fault Tolerance; Reliability Protocols; Distributed Reliability Protocols; Dealing with Failures ; Network Partitioning; Architectural Considerations</p> <ul style="list-style-type: none"> <li>• Parallel Database Systems</li> </ul> <p>Database Servers; Parallel Architectures; Parallel DBMS Techniques; Parallel Execution Problems; Parallel Execution for Hierarchical Architecture</p> <ul style="list-style-type: none"> <li>• Distributed Objects Database Management Systems</li> </ul> <p>Fundamental Object Concepts and Models; Object Distributions Design  Architectural Issues; Object Management; Distributed Object Storage; Object Query Processing; Transaction Management</p> <ul style="list-style-type: none"> <li>• Database Interoperability</li> </ul> <p>Database Integration; Query Processing; Transaction Management; Object Orientation and Interoperability</p>		
Learning & Teaching Methodologies	Lectures, tutorials and computer laboratory exercises		
Instructional Materials/Equipment	Classroom with audio visual aids Computer laboratory		
Course Assessment	<b>Type</b>		<b>Weighting (%)</b>
	Final Examination		60
	Mid Term Examination		20
	Assignment		10
	Attendance		10
	Total		100
Recommended Reading	<b>Title</b>	<b>Author</b>	<b>Publisher</b>
	Principles of distributed database systems	Ozsu, M, Tamer Valduriez	Pearson education (1999)
Additional Reading	Fundamentals of Database Systems	Elmasri et al	Pearson education (2004)
	Database and Transaction Processing: An Application-Oriented Approach	Philip M. Lewis, Arthur Bernstein, and Michael Kifer	Addison Wesley (2002)
Other Support Material	A variety of multimedia systems and electronic information resources as prescribed by the lecturer. Various application manuals, URL search and journals.		