

Course #:	CSCI-C 442
Course Title:	Database Systems
Course Type:	Upper level elective
Prerequisites:	C308 Systems Analysis and Design
Credits:	3
Text Book:	Fundamentals of Database Systems, by Elmasri and Navathe, Fifth Edition, Benjamin Cummings, 2006.
References:	Introduction to Database Systems, by C. J. Date, Vol-1, Fifth Edition. and Handouts
Current Catalog Description:	The fundamental concepts, theory, and practices in the design and implementation of database management systems: data independence; data modeling; entity relationship modeling; functional dependencies; normalization; relational, hierarchical, network, and object oriented data models; relational algebra; relational calculus; data definition and manipulation languages; recovery; concurrency; security; integrity of data.
Course Goals	The student who completes this course: <ol style="list-style-type: none"> 1. Will understand of database management concepts. 2. Will be proficient in data modeling techniques and tools. 3. Will be proficient in the relational data model and relational databases technology. 4. Will be proficient in constructing a small to medium sized relational database system. (20 to 30 tables) 5. Will be proficient in writing relational algebra queries. 6. Will be proficient in writing SQL queries. 7. Will be exposed to the application developer perspective, and the use of databases in that context. 8. Will be exposed to theory behind relational databases (i.e. functional dependencies and normalization)
Major Topics Covered in the Course	<ol style="list-style-type: none"> 1. Database System Concepts and Architecture 2. Data Modeling 3. Relational Model and Relational Algebra 4. Implementations issues, File organization primitives and relational algebra operators 5. Structured Query Language (SQL) 6. Relational database management systems (MySQL, Access, Oracle, DB2) 7. Functional Dependencies and Normalization 8. Transaction Processing 9. Concurrency Control

	10. Recovery 11. Database security and authentication																		
Laboratory projects (specify number of weeks on each)	Installing MySQL, PHP My Admin, and other tools.																		
Estimate Curriculum Category Content (Semester hours)	<table border="1"> <thead> <tr> <th>Area</th> <th>Core</th> <th>Advanced</th> </tr> </thead> <tbody> <tr> <td>Algorithms</td> <td>15</td> <td></td> </tr> <tr> <td>Software Design</td> <td>10</td> <td></td> </tr> <tr> <td>Comp. Arch.</td> <td>3</td> <td></td> </tr> <tr> <td>Data Structures</td> <td>10</td> <td></td> </tr> <tr> <td>Prog. Languages</td> <td>15</td> <td></td> </tr> </tbody> </table> <p>Additional hours may be dedicated to curriculum categories not listed above. For example explanation of concepts and theories. Discussion of social and ethical issues, discussion of interpersonal relationships and working within groups.</p>	Area	Core	Advanced	Algorithms	15		Software Design	10		Comp. Arch.	3		Data Structures	10		Prog. Languages	15	
Area	Core	Advanced																	
Algorithms	15																		
Software Design	10																		
Comp. Arch.	3																		
Data Structures	10																		
Prog. Languages	15																		
Oral and Written Communications	Every student is required to submit at least __1__ written reports (not including exams, tests, quizzes, or commented programs) of typically __15__ pages and to make __1__ oral presentations of typically __15__ minute's duration.																		
Social and Ethical Issues	Database privacy, security and authorization are covered during one to two class periods.																		
Theoretical Content	Students learn the set-theoretic foundation of the relational model, relational algebra, and the formal aspects of relational design (functional dependencies, normal forms, etc.), query optimization, and the theory of serializability for concurrent transactions.																		
Problem Analysis	As part of the course project, students are required to analyze database application requirements to develop an entity relationship diagram, and implement a database application. Students must apply relational database theory to analyze and evaluate their database designs.																		
Solution Design	Students must learn to convert their analysis and design document in to a fully functioning database solution.																		
Prepared By	Hakimzadeh, Adaikkalavan																		