**CMPS 4420 Advanced Database Systems**

**Catalog Description**

**CMPS 4420 Advanced Database Systems (4)**

A wide range of topics such as query processing and optimization, object-oriented database systems, distributed database systems, database warehousing and data mining will be discussed. The course will also be used to introduce emerging issues related to database systems. Each week lecture meets for 150 minutes and lab meets for 150 minutes. Prerequisite: CMPS 3420.

**Prerequisites by Topic**

Students must know entity-relationship modeling, relational database query languages including relational algebra, relational calculus, and SQL, and used one of database management systems such as Oracle, Microsoft SQL server, MySQL and etc.

**Units and Contact Time**

4 semester units. 3 units lecture (150 minutes), 1 unit lab (150 minutes).

**Type**

Elective for CS

**Required Textbook**

Fundamentals of Database Systems, 6th Ed.by Elmasri & Navathe, published by Addison Wesley ISBN 978-0-13-608620-8

**Coordinator(s)**

Huaqing Wang

**Student Learning Outcomes**

ACM/IEEE Body of Knowledge Topics:

IM/DatabaseSystems

IM/Indexing

IM/RelationalDatabases

IM/QueryLanguages

IM/TransactionProcessing

IM/DistributedDatabases

IM/PhysicalDatabaseDesign

IM/DataMining 89

IM/InformationStorageAndRetrieval

**ABET Outcome Coverage**

3h. Recognition of the need for and an ability to engage in continuing professional development.

3j. An ability to apply mathematical foundations, algorithmic principles, and computer science

theory in the modeling and design of computer-based systems in a way that demonstrates

comprehension of the tradeoﬀs involved in design choices.

3k. An ability to apply design and development principles in the construction of software systems

of varying complexity.

**Lecture Topics and Rough Schedule**

Most of topics will be addressed in lectures, some topics will be discussed by invited professionals, and /or some individual students or teams depending on class size and availability of professional.

Week 1 Chapter 13 Intro. to SQL Programming Technology

Week 2 Chapter 14 Web Database Programming Using PHP

Week 3 Chapter 11 Object and Object-Relational Databases

Week 4 Chapter 12 XML: Extensible Markup Language

Week 5 Chapter 17 Disk Storage, Basic File Structures Indexing and Hashing

Week 6 Chapter 18 Indexing Structures for Files

Week 7 Chapter 19 Algorithms for Query Processing and Optimization

Week 8 Chapter 20 Physical Database Design and Tuning.

Week 9 Chapter 21 Introduction to Transaction Professing Concepts and Theory

Week 10 Chapter 22 Concurrency Control Techniques

Week 11 Chapter 23 Database Recovery Techniques. -- Invited Speaker & Team presentation and discussions

Week 12 Chapter 24 Database Security -- Invited Speaker & Team presentation and discussions

Week 13 Chapter 25 Distributed Databases -- Invited Speaker & Team presentation and discussions

Week 14 Chapter 28 Data Mining Concepts -- Invited Speaker & Team presentation and discussions

Week 15 Chapter 29 Overview of Data Warehousing and OLAP -- Invited Speaker & Team presentation and discussions

**Prepared By**

Huaqing Wang on [date]

**Approval**

Approved by CEE/CS Department on [date]   
Effective [term]