Advanced Topics in Database Systems

This course will introduce to students advanced topics in database systems including advanced data structures, concurrency control, deadlock resolutions, recovery schemes, distributed database systems, multimedia database indexing techniques, and data mining; data on the web and network data analysis.

Grade Descriptor:

A

EXCELLENT - exceptionally good performance and far exceeding expectation in all or most of the course learning outcomes; demonstration of superior understanding of the subject matter, the ability to analyze problems and apply extensive knowledge, and skillful use of concepts and materials to derive proper solutions.

B

GOOD - good performance in all course learning outcomes and exceeding expectation in some of them; demonstration of good understanding of the subject matter and the ability to use proper concepts and materials to solve most of the problems encountered.

C

FAIR - adequate performance and meeting expectation in all course learning outcomes; demonstration of adequate understanding of the subject matter and the ability to solve simple problems.
有關等級說明的資料，請參閱英文版本。

D

MARGINAL - performance barely meets the expectation in the essential course learning outcomes; demonstration of partial understanding of the subject matter and the ability to solve simple problems.

有關等級說明的資料，請參閱英文版本。

F

FAILURE - performance does not meet the expectation in the essential course learning outcomes; demonstration of serious deficiencies and the need to retake the course.

有關等級說明的資料，請參閱英文版本。

Equivalent Offering:
Units: 3 (Min) / 3 (Max) / 3 (Acad Progress)
Grading Basis: Graded
Repeat for Credit: N
Multiple Enroll: N
Course Attributes: MSc Computer Science
                    MPhil-PhD Computer Sci & Erg

Topics:

COURSE OUTCOMES

Learning Outcomes:
At the end of the course of studies, students will have acquired the ability to
1. learn about some advanced topics in database systems. They include some classical topics such as distributed database systems, concurrency control in transaction management, and data replication in a distributed environment, and some special datatypes such as multimedia databases, where indexing mechanisms are studied. We also cover important topics of data mining and data on the web. We would revise the content and include new important topics from time to time. We have added the study of massive network data, and introduced algorithms for handling and analysis of such
data. We also have included the road network data querying which has become very useful in our daily life.
2. study research papers related to the topics covered.
3. summarize the major ideas from a study of a topic and give a presentation on the topic.
4. possibly come up with innovative ideas and touch on the research of related topics.

Course Syllabus:

This course will introduce to students advanced topics in database systems including advanced data structures, concurrency control, deadlock resolutions, recovery schemes, distributed database systems, multimedia database indexing techniques, and data mining, data on the web and network data analysis.

Assessment Type:

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<tr>
<td>Essays</td>
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<td>Essay test or exam</td>
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<td>Others</td>
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<td>Presentation</td>
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Feedback for Evaluation:

1. Quiz and examinations
2. Course evaluation and questionnaire
3. Reflection of teachers
4. Question-and-answer sessions during class
5. Student consultation during office hours or online

Required Readings:

To be provided by course teacher.

Recommended Readings:

2. J. Han, J. Pei, Y. Yin, Mining Frequent Patterns without Candidate Generation, SIGMOD 2000.
4. T. Chin et al, Content-Based Image Indexing VLDB 1994. (Skip Section 3.2 on Optimization)
9. S. Chu et al., Triangle Listing in Massive Networks and Its Applications KDD 2011.
11. S. J. van Schaik et al., A Memory Efficient Reachability Data Structure Through Bit Vector Compression SIGMOD 2011.
15. R. Geisberger et al., Contraction Hierarchies: Faster and Simpler Hierarchical Routing in Road Networks WEA 2008.

**OFFERINGS**

1. CSCI5120  
Acad Organization=CSEGV; Acad Career=RPG

**COMPONENTS**

LEC : Size=30; Final Exam=Y; Contact=3  
TUT : Size=30; Final Exam=N; Contact=1

**ENROLMENT REQUIREMENTS**

1. CSCI5120  
Enrollment Requirement Group:  
For students in MSc Computer Science; or  
For students in MPhil-PhD Computer Science & Engineering; or  
For students in UG Computer Science; or  
For students in UG Computer Engineering;  
Prerequisite: CSCI3170;  
Exclusion: CMSC5705 and SEEM5010

**CAF**

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**END OF REPORT**