Dept Number	CS 530	Course Title	Advanced Data Base Systems
Semester Hours	3	Course Coordinator	Wen-Chi Hou
Catalog Description	A detailed treatment of advanced topics in database systems, including but not limited or restricted to, relational database theory, query optimization, recovery techniques, concurrency control, distributed database systems, security and integrity, and database machines.		

Textbooks

References

Course Learning Outcomes

- To develop a theoretical understanding of the relational model.
- To prepare for possible research in some advanced topics in database systems.

Assessment of the Contribution to Program Outcomes

Outcome →	1	2	3	4	5	6	7	8	9	10
Assessed →	X	X			X		X			

Prerequisites by Topic

CS 430.

Major Topics Covered in the Course

1. Design Theory for Relational Database Systems

   Normalization, Functional and Multivalued Dependencies (review and complete the discussion started in CS 430) {8 classes}
2. Query Optimization

   Query Processing Cost, Access Cost, Join Strategies {5 classes}
3. Crash and Failure Recovery Techniques

   Log-based Schemes, Checkpoints, Shadow Paging {3 classes}
4. Concurrent Operations in Databases

   Serializability, Locking, Timestamping, Deadlock Handling {7 classes}
5. Distributed Database Systems

   Centralized vs. Distributed Trade-offs, Query Processing, Recovery, Concurrency Control, Deadlock handling {7 classes}
6. Database Security and Integrity

   Types of Violations, Authorizations, Constraints, Encryption, Statistical Inference {4 classes}
7. Database Machines

   Approaches, Examples {4 classes}
8. New Applications

   Knowledge Bases, CAD/CAM Databases {2 classes}