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CS-320 Database Administration

Professor: Zane Harvey Email: zwharvey@captechu.edu Phone: (412) 709-2184	Office Hours: Mondays 7-7:45 PM ET Dates/Times: Monday 7:45-10:25 PM ET Number of Meetings: 16 All Meetings are Live online in Canvas.

Fall 2018

Course Description:

This course will cover both theoretical and practical aspects of database design and database administration. The course should be considered an extension of CS-220 (Database Management), which is a pre-requisite. Overlap between this course and CS-220 exists, and we will review most concepts discussed in that course. The course will focus on the tasks performed by a database administrator as well as advanced database topics including non-relational databases. We will cover some of the mathematical foundations of relational and non-relational databases while continuing to focus on a practical goal of database administration.

A review of the mathematical concepts necessary for this course will be provided during the lectures.

Course Objectives and Expectations

Upon completion of the course, the student will have spent time preparing for the Oracle 12c Database Installation and Administration Exam. The student will be well grounded in basic relational database theory. Additionally, the student will have a working knowledge of SQL and be comfortable creating, maintaining, and administering relational databases (with a focus on Oracle databases). The student will have some knowledge of and experience with non-relational style databases.

Upon Completion of the course, the student will be knowledgeable in the following topics and concepts (in no respective order):

Relational Database	Client/Server and Database Architecture
Non-relational database	Variables vs. Values
Database Management System (distinct from an individual database)	Orthogonal Design
Data Types	Semantic Modeling
Predicates	Backup and Recovery
Relational Algebra and Relational Calculus	Concurrency
Relational Operators	Database Security
Constraints	Database Optimization
Normalization/Denormalization	Type Inheritance
Redundancy	Distributed Databases
Functional Dependence	Decision Support
ACID	Temporal Databases
Aggregate Functions	Logic Based Databases
Conditionals	Propositional & Predicate Calculus
Views	User Management
Subqueries	NoSQL/NewSQL
Stored Procedures	OLAP
Pivoting	OTLP
Schema	XML
Data Independence	JSON
Hadoop	MapReduce Algorithm
Scalability	Scaling Up vs. Scaling Out
Database Modeling	Sharding
Key/Value Pairs	Database Architecture
Database instances	Database Auditing
Database Maintenance	Database Performance
Database Tuning	ETL – Extract, Transform, Load

Time and Locations

Synchronous lessons will be online on Monday Evenings from 7:45 - 10:20 PM ET.

Course Materials/Books:

The course content will draw from multiple sources.

- An Introduction to Database Systems (8th Edition), C. J. Date (Pearson Education 2004)
- OCA Oracle Database 12c Installation and Administration Exam Guide (Exam 1Z0-062) J. Watson (Oracle Press)
- My own self-developed course notes/documents and other supplemental material

Course Schedule

The schedule will follow a weekly format with three exams on the dates provided below. The provided required readings are subject to change and additional readings will be assigned throughout the semester.

Week	Main Topic/Event	Other Notes
1	General Overview and Review	
2	Chapters 1 and 2 OCA Exam Guide	
3	Chapters 3 and 4 OCA Exam Guide	
4	Chapters 5 and 6 OCA Exam Guide	
5	Chapters 7 and 8 OCA Exam Guide	
6	Chapters 9 and 10 OCA Exam Guide	
7	Chapters 11 and 12 OCA Exam Guide	
8	Chapters 13 and 14 OCA Exam Guide	
9	Chapters 15 and 16 OCA Exam Guide	
10	Chapters 17 and 18 OCA Exam Guide	
11	Chapters 19 and 20 OCA Exam Guide	
12	Chapter 21 OCA Exam Guide	
13	Chapter 22 OCA Exam Guide	
14	Chapter 23 OCA Exam Guide	
15	Special Topics	
16	Special Topics	

Three Exams:

Week of October 15th – Take Home Exam

November 29th – Timed Exam in Canvas

Week of December 17th – Take Home Final

Grading

Grading Components:

Projects: 40% (Various reports will be requested throughout the semester, graduate students will be requested to submit extra reports)

Exam 1: 10%

Exam 2: 10%

Final: 20%

HW: 15%

Attendance: 5%

Late homework and assignments will be accepted with a 50% penalty for up to one week after due date. After one week from due date, the student will receive a score of 0.

Course Requirements

Prerequisites: CS-220 and CT152 (3-0-3)

Participation

Attendance for class is tracked in Canvas.

Homework

Homework will be due on the indicated due date in Canvas. Late homework will receive 50% credit.

Final Examination

The midterm will be a proctored exam. The final will be a take home exam.

Communication

Emails, phone calls, text. Canvas Appointments are suggested. Course announcements will be used frequently to communicate with the class.

Academic Integrity

Every Student is expected to be familiar with Capitol Technology University's Code of Academic Conduct including (but not limited to) the issues of cheating, plagiarism, etc. All cases of suspected academic dishonesty will be reported to the appropriate school officials,

and disciplinary action may result, following investigation by a judiciary committee. Some of the core concepts are given here:

DEFINITION AND EXPECTATIONS OF ACADEMIC INTEGRITY:

Cheating – intentionally using or attempting to use unauthorized materials, information or study aids in any academic exercise. Examples include, but are not limited to, submitting another student's work as your own, using books or notes during closed book tests.

Fabrication – intentional and unauthorized falsification or invention of any information or citation in an academic exercise. Examples include, but are not limited to, changing collected data to meet the hypothesis, listing a research source that does not exist, listing a quote that does not exist.

Facilitating academic dishonesty – intentionally or knowingly helping or attempting to help another to violate any provision of this code. Examples include, but are not limited to, giving any individual other than the professor your completed assignment, suggesting ways to cheat or plagiarize.

Plagiarism – The Technology University plagiarism policy may be found online at http://www.captechu.edu/resources/lib/writingguide/plagarism.html

Self-Plagiarism – submitting the same paper or assignment for more than one class for a grade without the professor's knowledge or permission.

Complicity – failing to report the incidents of academic dishonesty to the professor, department chair, Dean of Academic Affairs, or the Vice President for Academic Affairs.

Code of Conduct – the academic integrity code is incorporated into the Capitol Technology University's Code of Conduct Standards.

Judicial Process

Any incidents should be reported to the appropriate Department Chair with written documentation. The Department Chair will forward academic integrity cases to the Academic Affairs Council for review and all other incidents to the Dean of Students. Once the case is reviewed, the Judicial Facilitator, Dean of Students or designee, will meet with the student to discuss the allegations. The student will have the opportunity to accept responsibility and sanctions or to have the case heard by a Conduct Review Panel (CRP). If a CRP is needed, the student and all other faculty, staff or students who have direct knowledge of the incident will be asked to participate in a hearing. The CRP is composed of three members who are selected by the Judicial Facilitator from a pool of faculty, staff, or students. In cases of potential violations of the Academic Integrity Code, the CRP is generally composed of faculty members. The CRP will determine if it is more likely than not that the campus policies have been violated. If the CRP finds that the policies have been violated, they will recommend sanctions. The Judicial Facilitator will notify the student in writing of the CRP's findings. The student has the opportunity to appeal to the VP for Academic Affairs.

To learn more about the official policies of the university on this issue, please read "Code of Academic Integrity" beginning on page 18 and "Sanctions for Violations of Regulations"

beginning on page 63 of the Student Handbook. The Student Handbook can be downloaded from:
http://www.captechu.edu/current-students/undergraduate/academic-resources

The contents of this syllabus or the scheduled contained herein can be modified at any time without notice.by the Professor.