COURSE SYLLABUS
COM342: NoSQL Databases

Course Description

NoSQL databases provide a mechanism for the storage and retrieval of data modeled in means other than the tuple relations existing in relational databases. These databases have seen an exponential growth in usage in big data and real time web applications. This course will examine the motivations for this approach to data handling, along with the various models available, design, and strengths and weaknesses of each in terms of data integrity, availability, security, and atomicity.

General Course Information

Number of Units/Weeks	4/10
#Hours Lecture/#Hours Laboratory/#Hours Homework	40/00/80
Prerequisite(s)	COM332
Co-requisites (s)	None
Course Developer(s)	Leticia Rabor, MS
Date Approved / Last Review	January 2018 / January 2018

Learning Outcomes

Upon completion of this course the graduate will:
- (CLO1) Discuss in detail how NoSQL databases differ from relational databases from a theoretical perspective.
- (CLO2) Describe the thought process in selecting a particular NoSQL database for specific use cases.
- (CLO3) Discuss the advantages, disadvantages, and application of the four types of NoSQL Databases (Document-oriented, Key - Value Pairs, Column-oriented and Graph).
- (CLO4) Discuss and evaluate current NoSQL database development tools and programming languages.

Instructional Methods Employed in this Course

- Lecture and reading assignments
- Hands-on exercises and labs
- Research
- Student presentations
- Practical application of theory and skills in authentic projects
- Build on prior knowledge and experience of students to enhance richness of class activities

Information Resources for this Course

📖 **Textbook**

Sullivan, Dan (2015). <u>NoSQL for Mere Mortals (1st Ed).</u> USA: Addison-Wesley Professional. ISBN: 978-0134023212

📁 **Other Materials**

📁 **Recommended Readings**

Dan McCreary and Ann Kelly (2015). Making Sense of NoSQL. Manning Publication. ISBN: 978-1617291074.

🖱 **Web Site Readings**

SQL vs NoSQL. Retrieved from https://www.upwork.com/hiring/data/sql-vs-nosql-databases-whats-the-difference/

Table/Topics & Assignments

Types of Assignments:

Lecture -

Considered Lecture Hours

Classroom Discussion -

Considered Lecture Hours

In Class Critique -

Considered Lecture Hours

Delivering Oral Presentations -

Considered Lecture Hours

In Class (IC) Exercise -

Considered Lecture Hours

Reading -

Considered Homework (HW), work done outside of class

WebClass lesson (non-online courses) -

Considered HW, work done outside of class

Lab Work -

Considered Lab Hours

Quiz, Midterm or Final -

Considered Lecture Hours

Week 1

Type	Topic/Description	LEC Hours	LAB Hours	HW Hours	Point Value	Due
LEC 1A	Introduction to class / Review Relational Database Design	3				
IC EX 1A	In class exercise	1				
HW 1A	Read chapter 1 (32 pgs). Evaluated by HW 1B.			3.2		
HW 1B	Project 1			4	65	Week 2
Total Week 1		4	0	7.2	65	

Week 2

Type	Topic/Description	LEC Hours	LAB Hours	HW Hours	Point Value	Due
LEC 2A	Variety of NoSQL Databases	3				
IC EX 2A	In class exercise	1				
HW 2A	Read chapter 2 (36 pgs) Evaluated by HW 2B.			3.6		
HW 2B	Project 2			5	65	Week 3
Total Week 2		4	0	8.6	65	

Week 3

Type	Topic/Description	LEC Hours	LAB Hours	HW Hours	Point Value	Due
LEC 3A	Key-Value Databases	3				
IC EX 3A	In class exercise	1				
HW 3A	Read chapter 3 (33 pgs) Evaluated by HW 3B.			3.3		
HW 3B	Project 3			3	65	Week 4
Total Week 3		4	0	6.3	65	

Week 4

Type	Topic/Description	LEC Hours	LAB Hours	HW Hours	Point Value	Due
LEC 4A	Key-Value Database Terminology / Designing Key-Value Databases	3				
IC EX 4A	In class exercise	1				

Type	Topic/Description	LEC Hours	LAB Hours	HW Hours	Point Value	Due
HW 4A	Read chapters 4 & 5 (54 pgs) Evaluated by HW 4B.			5.4		
HW 4B	Project 4			5	65	Week 5
Total Week 4		4	0	10.4	65	

Week 5

Type	Topic/Description	LEC Hours	LAB Hours	HW Hours	Point Value	Due
LEC 5A	Document Databases	1				
IC EX 5A	In class exercise	1				
Exam 5A	Mid-Term Chapters 1-5	1.5			150	Week 5
HW 5A	Read Chapter 6 (29 pgs) Evaluated by HW 5B.			2.9		
HW 5B	Project 5			5	65	Week 6
HW 5C	Introduction to the Final Project	0.5		10		Week 10
Total Week 5		4	0	17.9	215	

Week 6

Type	Topic/Description	LEC Hours	LAB Hours	HW Hours	Point Value	Due
LEC 6A	Document Database Terminology / Designing for Document Databases	3				
IC EX 6A	In class exercise	1				
HW 6A	Read chapters 7 & 8 (57 pgs) Evaluated by HW 6B.			5.7		
HW 6B	Project 6			4	65	Week 7
Total Week 6		4	0	9.7	65	

Week 7

Type	Topic/Description	LEC Hours	LAB Hours	HW Hours	Point Value	Due
LEC 7A	Column Family Databases / Column Family Databases Terminology	3				
IC EX 7A	In class exercise	1				

Type	Topic/Description	LEC Hours	LAB Hours	HW Hours	Point Value	Due
HW 7A	Read chapters 9 & 10 (46 pgs) Evaluated by HW 7B.			4.6		
HW 7B	Project 7			6	65	Week 8
Total Week 7		4	0	10.6	65	

Week 8

Type	Topic/Description	LEC Hours	LAB Hours	HW Hours	Point Value	Due
LEC 8A	Designing for Column Family Databases / Graph Databases	3				
IC EX 8A	In class exercise	1				
HW 8A	Read chapters 11 & 12 (41 pgs). Evaluated by HW 8B.			4.1		
HW 8B	Project 8			2	65	Week 9
Total Week 8		4	0	6.1	65	

Week 9

Type	Topic/Description	LEC Hours	LAB Hours	HW Hours	Point Value	Due
LEC 9A	Graph Database Terminology / Designing for Graph Databases	2				
IC EX 9A	In class exercise	2				
HW 9A	Read chapters 13 & 14 (34 pgs). Evaluated by HW 9B.			3.4		
HW 9B	Project 9			5	65	Week 10
Total Week 9		4	0	8.4	65	

Week 10

Type	Topic/Description	LEC Hours	LAB Hours	HW Hours	Point Value	Due
LEC 10A	Guidelines for Selecting a Database	2				
EXAM 10A	Final Exam Chapters 6-14	2			150	
HW 10A	Final Project. CL01, CL02, CL03, CL04				115	
Total Week 10		4	0	0	265	

Course Hours Summary

Week	Topic	LEC Hours	LAB Hours	HW Hours
1	Introduction to Class / Relational Database Design Review	4	0	7.2
2	Variety of NoSQL Databases	4	0	8.6
3	Key-Value Databases	4	0	6.3
4	Key-Value Database Terminology / Designing Key-Value Databases	4	0	10.4
5	Document Databases / Midterm	4	0	17.9
6	Document Database Terminology / Designing for Document Databases	4	0	9.7
7	Column Family Databases / Column Family Databases Terminology	4	0	10.6
8	Designing for Column Family Databases / Graph Databases	4	0	6.1
9	Graph Database Terminology / Designing for Graph Databases	4	0	8.4
10	Guidelines for Selecting a Database / Final	4	0	0
Total		40	0	85.2

Table/Point Breakdown

Week	Assignment	Possible Points	Percent of Grade
1	Project 1	65	6.5%
2	Project 2	65	6.5%
3	Project 3	65	6.5%
4	Project 4	65	6.5%
5	Midterm Exam	150	15%
5	Project 5	65	6.5%
6	Project 6	65	6.5%
7	Project 7	65	6.5%
8	Project 8	65	6.5%
9	Project 9	65	6.5%
10	Final Exam	150	15%
10	Final Project	115	11.5%
Total		1000	100%

Your Grades for this Course

Your final grade for this course will be based on an assessment by the Instructor of your performance on a number of course activities, which may include objective tests, classroom exercises, laboratory demonstrations, project papers, or other types of activities. The chart below indicates in what activities you will engage, how many possible points can be earned for each activity, and the percentage of your final grade that will be accounted for by each activity.

Students in this course should be graded following Coleman University assessment practices and policies. A point system is used in the University to indicate student performance on various required activities or projects. For this course, it is recommended that points be distributed as follows:

Coleman University Grade Assignment Policy:
The Coleman University guidelines for the assignment of grades to total points earned is as follows:

Percent	Letter Grade	Grade Points
94-100	A	4.0
90-93	A-	3.67
87-89	B+	3.33
84-86	B	3.0
80-83	B-	2.67
77-79	C+	2.33
74-76	C	2.00
70-73	C-	1.67
67-69	D+	1.33
64-66	D	1.00
60-63	D-	0.67
N/A	INC	0
N/A	W	0
60 or above	CR	0
59 or below	NC	0
70 or above	PASS	0

Requirements

Assignments: All assignments (including projects, lab work, quizzes and exams) must be completed as scheduled. The following will apply to late assignments:

- 1-24 hours after due date = 20% off point value
- 25-48 hours after due date = 60% off point value
- 49+ hours after due date = No points given

If an assignment equals less than 5 points, no points will be given for late work. If there are extenuating circumstances, the student must submit a written explanation to the department Senior Instructor. Upon evaluation, points will be given according to the Senior Instructor's discretion.

Coleman University Policy on Academic Dishonesty:

Academic dishonesty is cause for dismissal from Coleman University. Presenting another person's ideas, methods, course work, or test answers with the intention that they be taken as one's own is theft of a special kind. It defrauds the originator of the work, the institution, its graduates, its students, and its future students.

The student has full responsibility for the authenticity of all academic work and examinations submitted. A student who appears to have violated this policy must submit to a hearing with the reporting instructor and the associate dean. If it is determined that a violation occurred, the matter will be referred to an Officer of the University with recommendations for an appropriate penalty. The student may be dismissed, suspended, or given another penalty.

Coleman University employs the plagiarism software known as Turnitin. Students are expected to use this tool in an appropriate manner with the sole purpose to support their own academic endeavors at Coleman University. Turnitin account information can not be shared with anyone. Contact your instructor if you have any questions about plagiarism related issues.

Academic Accommodation / Adjustment Policy:

In accordance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA), Coleman University offers accommodations to students with documented physical, psychological, and/or cognitive disabilities. Coleman University will adhere to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations as required to offer equal educational opportunities to qualified disabled individuals.

To qualify for an academic accommodation under ADA, the student must provide adequate documentation of a disability. Students seeking academic accommodations should contact the campus ADA Coordinator at 858-966-3953 or via email at ada@coleman.edu. The ADA Coordinator will review the documentation provided and verify ADA coverage. Students covered under ADA must meet with the ADA Coordinator at the beginning of every term to determine the appropriate academic accommodations. Failing to meet with the ADA Coordinator at the beginning of every term may impact the availability of accommodations.

After the academic accommodations have been determined, the students' instructors will be notified by the ADA Coordinator. If any problems or concerns regarding the provision of accommodations occur, the student must inform the ADA Coordinator. If the student feels accommodation is not being made appropriately, the student may follow the published Student Grievance Procedures.