

INSTRUCTIONS FOR COMPLETION OF THE UAMS GRADUATE SCHOOL COURSE APPROVAL FORM

1. Please save this PDF to your computer for editing.
2. The form has been designed with fields for your responses, and these are indicated in blue and gray shading. Please complete all fields. Use the "tab" key to move between fields. A 'beep' will sound if you attempt to enter a response that contains more characters than is permitted. **IF YOU NEED HELP IN ANY OF THE FIELDS, PRESS THE F1 KEY AND A HELP WINDOW WILL OPEN.**
3. Print the document, and then obtain the appropriate signatures before submitting the form to the Graduate Office.

SYLLABUS

COURSE NUMBER: BIOM _____

COURSE TITLE: Data Warehousing, Aggregation and Reporting

COURSE DESCRIPTION:

This graduate course covers data warehousing in biomedical informatics.

PRE-REQUISITES: Prior coursework, training or experience with relational databases.

GENERAL INFORMATION:

CREDITS: 1 credit hour

SEMESTER: Fall, Spring

LOCATION: Campus and Online (hybrid)

FACULTY: Ahmad Baghal, MD

SPECIAL ASSISTANCE: Students who believe they may need accommodations in this class based on mental or physical impairments must contact the Students with a disability that need accommodations should contact the Associate Dean for Academic Affairs at (501) 686-5730 to schedule an appointment to discuss your needs. Please make arrangements as soon as possible so accommodations can be made in a timely manner.

COURSE OBJECTIVES:

Upon successful completion of this course, the student is able to:

1. Describe factors that complicate data warehousing in healthcare compared to other industries.
2. Compare and contrast normalized relational approaches and dimensional approaches.
3. Compare and contrast reverse engineering and ontological approaches to domain modeling
4. Build a conceptual dimensional model of a domain using an ontological approach.
5. Describe dimensions used to support healthcare data warehouses

6. Write specifications for an Extract, Transform, and Load (ELT) process from a given data model to a star schema.
7. Execute queries to retrieve data from a healthcare data warehouse given data model.
8. Describe the role of metadata, master data and reference data in data warehousing
9. Outline a scalable (automated or semi-automated) process to manage ETLs into the data warehouse.
10. Outline a project plan for design, development and implementation of an institutional data warehouse.
11. Describe components of data governance necessary for a data warehouse
12. Describe a scalable data quality program for a data warehouse

MAJOR TOPICS:

Introduction to data warehousing in biomedicine
 Normalized and dimensional modeling
 Knowledge acquisition for domain modeling
 Dimensions relevant to healthcare
 Information retrieval from data warehouses given a data model
 i2b2 (Informatics for Integrating Biology and the Bedside)
 Populating the data warehouse
 Automating extract, transform and load processes
 Metadata, master data and reference data
 Processes for design, development and implementation of data warehouses
 Software quality assurance in data warehousing
 Data quality management for data warehousing
 Data governance for data warehousing

ASSIGNMENTS:

Listed below for each week.

Week 1: Data warehousing in biomedicine

Assignment: Describe or create a fishbone diagram showing factors that complicate data warehousing in healthcare compared to other industries.

Reading: Biehl Chapter 1, Bergeron Chapter 1, provided articles

Week 2: Degree of normalization and dimensional data modeling

Assignment: Compare and contrast highly normalized and dimensional approaches. Describe star, multi-star and snowflake models.

Reading: Biehl Chapter 2, provided articles

- Week 3: Knowledge acquisition and Domain analysis
Assignment: Compare and contrast reverse engineering and ontological approaches to domain analysis
Reading: Biehl Chapter 3, Sim decomposition methods article
- Week 4: A dimensional data warehouse for healthcare
Assignment: quiz to assess understanding of the data model in the chapter.
Reading: Biehl Chapter 4
- Week 5: Dimension structure
Assignment: quiz based on the chapter.
Reading: Biehl Chapter 5
- Week 6: Creating a straw-man or alpha version of a warehouse
Assignment: Write the Data Definition Language (DDL) to implement the straw-man warehouse described in the chapter.
Reading: Biehl Chapter 6
- Week 7: Populating the data warehouse
Assignment: Write the extract, transform and load code to populate your straw-man warehouse. Write specifications for data standardization or cleaning for the data imported into your warehouse.
Reading: Biehl Chapter 6
- Week 8: Expanding the straw-man
Assignment: Work the assigned problems.
Reading: Biehl Chapter 7
- Week 9: Example warehouses; Informatics for Integrating Biology and the Bedside (i2b2) and UAMS institutional data warehouse
Assignment: Work the assigned problems. Problems will require execution of SQL code and form-based query from a live data warehouse.
Reading: Resources provided by professor

- Week 10: Data sourcing, data quality and data warehouses
Assignment: Answer questions based on your understanding of the data model in the chapter. Write specifications for data standardization or cleaning for the data imported into your warehouse.
Reading: Biehl Chapters 8 and 15, Articles provided by instructor
- Week 11: Automated ETL methods; software quality assurance for data warehousing
Assignment: Answer questions based on your understanding of the data model in the chapter.
Reading: Biehl Chapters 9-12
- Week 12: Planning a warehouse development project
Assignment: quiz.
Reading: Bergeron Chapter 8
- Week 13: Data aggregation and reporting
Assignment: Answer quiz questions based on report types and methodology.
Reading: Bergeron Chapter 2
- Week 14: Building reports
Assignment: Create an assigned report in Tableau.
Reading: Resources provided by professor
- Week 15: Data governance for data warehousing
Assignment: Outline a data governance program for a healthcare data warehouse.
Reading: Resources provided by professor

TEXTBOOKS:

Richard E. Biehl, Data warehousing for biomedical informatics. CRC Press, Taylor & Francis Group, 2016.

Bryan Bergeron (Ed.), Hamad Al-Daig, John Glaser, Ben Loop, Enam UL Hoque, Fadwa Saad AlBawardi, Osama Alswailem, Developing a data warehouse for the healthcare enterprise: Lessons from the trenches, Second Edition, HIMSS, Chicago IL, 2013.

EVALUATION:

This is a graded course. Grades will be assigned based on their course average according to the following scale: A (93-100), B (85-92), C(75-84), D(65-74), Fail (lower than 64).


The course average will be comprised of course assignments and the final exam.

Assignments.....	70%
Final exam.....	30%

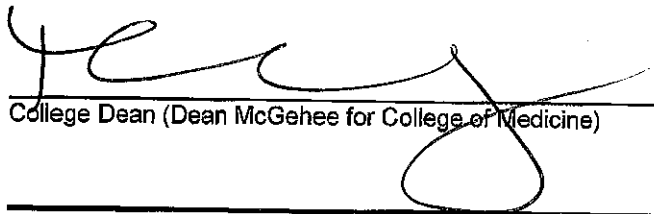
6. Program Approvals:

Fred Prior, PhD

(Print or type) Chairperson, Academic Department or Area

 10/26/16

(Signature) Chairperson, Academic Department or Area Date

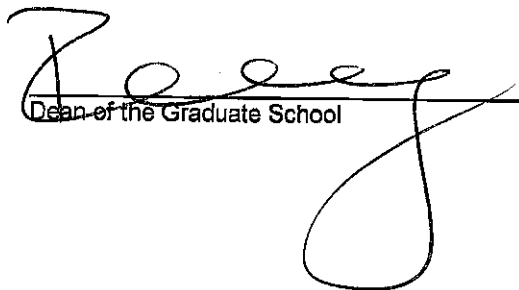
 11/17/2016

College Dean (Dean McGehee for College of Medicine) Date

7. Graduate School Approvals

 11/17/2016

Chairperson, Graduate Council Date

 11/17/2016

Dean of the Graduate School Date