**College of arts & sciences**

**2021 - 2022**

**DATA 742: Principles of Data Warehousing**

**Credit Hours:** 3

**Prerequisite(s): DATA 710**

**Course Description**

This course introduces the concept of data warehousing and data integration architecture and explains the role they play in overall business intelligence and analytics strategy of an organization. The course covers predominate architecture design strategies as well as hybrid designs that combine best practices from multiple areas. A key component of instruction is an emphasis on following industry best practices such as adhering to the requirements of an integrated data platform, selecting an appropriate design strategy and the tools to support it, selecting metrics for monitoring performance and data quality, and planning for future enhancements. The course provides hands-on experience in combining structural and design elements with best practices for data governance and coding standards to build a high-level plan for implementing a data warehouse and data integration system for organizations.

**Learning Outcomes**

1. Build high-level action plan for implementing a data warehouse design and data integration system
2. Analyze an organization’s need for an integrated data architecture
3. Evaluate various technologies used in data warehousing and data integration
4. Describe the historical evolution of data warehousing and data integration
5. Identify the core elements of a data warehouse and data integration engine

**Course Outline:**

1. Review the fundamental concepts and business uses of a data warehouse and data integration systems
2. Understand the major design elements
3. Explore the Inmon model for data warehousing in detail
4. Analyze the major structural components of a data warehouse and data integration systems
   1. Data Integration Hubs
   2. Hadoop
   3. External and Unstructured Data
   4. The Operational Data Store
5. Evaluate various technologies used for data warehousing
6. Discuss advanced data modeling techniques and assess their usage within an organizational context
   1. Relational Models
   2. Multidimensional Models
   3. Snowflake Designs
   4. Compare and contrast Inmon and Kimball specific hybrids
7. Analyze advanced hybrid designs within an organizational context
8. Evaluate the use of standards for data quality, coding, and regulatory compliance
9. Create an action plan for a data warehouse migration
10. Recommend appropriate methodologies related to a data warehouse project, and evaluate best practices for a design review
11. The culmination of the course will be the creation of an action plan for implementing a data warehouse or enhancing an existing warehouse environment.

**REQUIRED USAGE OF BLACKBOARD FOR INSEAT AND BLENDED:**

* Syllabus must be posted in Bb
* Grades must be posted in Bb
* Must require students to post assignments to Bb
* RAAS must be graded according to rubrics

**REQUIRED TEXTBOOKS**

William H. Inmon. (2005). Building the Data Warehouse (4th ed.). Wiley Publishing. ISBN: 978-0764599446

Davenport University has made the primary text available online at this link:

<https://search-ebscohost-com.proxy.davenport.edu/login.aspx?direct=true&db=e000xna&AN=140444&site=ehost-live>

Alex Gorelik. (2019). The Enterprise Big Data Lake: Delivering the Promise of Big Data and Data Science. O’Reilly Media. ISBN: 978-1491931554

**SUPPLEMENTAL INFORMATION**

Mark Grover. Hadoop Application Architectures: Designing Real-World Big Data Applications 1st Edition. O’Reilly Media: ISBN: 9781491900086

Bill Inmon. Data Lake Architecture: Designing the Data Lake and Avoiding the Garbage Dump. Technics Publications. ISBN: 978-1634621175

Inmon Reference Material: <http://www.inmoncif.com/library/cif/>

Kimball Reference Material: <http://www.kimballgroup.com/data-warehouse-business-intelligence-resources/>

Discussion on Third Normal Form: <http://www.techopedia.com/definition/22561/third-normal-form-3nf>

**REQUIRED COURSE EQUIPMENT:** All assignments will be posted to blackboard. For the final presentation, the student can utilize Microsoft Word or PowerPoint.

MINIMAL NUMBER OF ASSESSMENTS AND ASSESSMENT REQUIREMENTS, INCLUDING RAA RUBRICS FOR PROGRAM AND EXCELLENCE SYSTEM COMPETENCIES.

|  |  |  |  |
| --- | --- | --- | --- |
| Assignments | Number | Point Value | Total Points |
| Discussion Questions | 13 | 20 each | 260 |
| Written Homework Assignments | 42 questions | 10 each | 420 |
| Written Assignments | 2 | 60 pt ea | 120 |
| Final Project | 1 | 200 | 200 |
| Total Points |  |  | 1000 |

**Weekly Outline:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Week** | **Topic** | **Discussion Question** | **Assignment** |
| 1 | Historical Evolution | x | 7 homework questions |
| 2 | Data Warehouse and Data Lake Design Overview | x | 4 homework questions |
| 3 | Data Lake and Hadoop Architecture | x | Written Assignment |
| 4 | External and Unstructured Data | x | 2 homework questions |
| 5 | Operational Data Store | x | 5 homework questions |
| 6 | Technology Used in Data Warehousing and Data Integration Systems | x | 7 homework questions |
| 7 | Additional Data Warehousing and Data Integration System Topics | x | 3 homework questions |
| 8 | Advanced Topics in Data Warehousing and Data Integration Systems | x | 4 homework questions |
| 9 | Standards and Why They Are Important | x | 2 homework questions |
| 10 | Data Quality and Compliance | x | 4 homework questions |
| 11 | Design Reviews | x | 1 homework question |
| 12 | Planning for a Data Warehouse Implementation | x | 3 homework questions |
| 13 | The Case for a Data Warehouse | x | Written Action Plan |
| 14-15 | Final Project |  | PowerPoint Presentation |

## DU Excellence System

The Davenport University Excellence System consists of nine learning outcomes that demonstrate professional competencies necessary for graduates to engage in life-long learning and succeed in their chosen profession. These learning outcomes are reinforced throughout the curriculum of each academic program and are assessed at the course and program levels, where appropriate. The Excellence System covers:

* Global and Intercultural Competence
* Civic and Social Responsibility
* Ethical Reasoning and Action
* Critical and Creative Thinking
* Analysis and Problem Solving
* Leadership and Teamwork
* Information and Technology Proficiency.
* Written Communication
* Professional Communication

**Academic Integrity**

Davenport University recognizes the principles of honesty and truth as fundamental to ethical business dealings and to a vibrant academic community of faculty and students. All members of an academic community shall be confident that each person's work has been responsibly and honorably acquired, developed and presented. The work that a student submits shall be a fair representation of his/her ability, knowledge and skill. The University expects students to respect and exhibit these principles as they form the basis of the quality of the institution and the quality of Davenport’s graduates.

As stated in the Student Code of Conduct, the University may discipline a student for academic dishonesty which is defined as any activity that tends to undermine the academic integrity of the institution. Academic dishonesty includes, but is not limited to: cheating, fabrication, facilitating academic dishonesty, interference, plagiarism, or violation of course rules. Definitions, procedures, and sanctions for these violations may be found under Student Code in the University catalog.

A minor violation occurs the first time the student has a breach of academic integrity and typically involves an assignment or activity that **does not** represent a significant part of the course grade. For example, the student knowingly and intentionally cheats on a weekly assignment; copies a source without proper citation; etc.

A major violation occurs as a first violation on an assignment or activity that **is** a significant part of the course grade, such as an exam or major paper, **or** as the result of a second minor violation. Students are expected to review the complete Academic Integrity policy in the University catalog under Academic Policies and Procedures.

The University utilizes Turnitin.com plagiarism detection software. All papers will be submitted to Turnitin.com where they will be compared against the entire Internet and against a database of previously submitted student papers.

**ADA Statement**

Students with disabilities may request accommodations as provided within federal law. In order for the University to adequately review each case, requests should be made to the Student Access Coordinator prior to the start of the semester. Requests made after the start of the semester should be completed as early in the semester as possible to prevent delays in accommodation. Students may contact their advisor or go to the Davenport University website for the name of the Student Access Coordinator for the location where they attend.

**Military Assistance**

Davenport University recognizes the extraordinary contributions of the members of our armed services. Service members and their dependents should check the military page of the DU website for educational benefits. Davenport University is committed to ensuring continuity of study for every Active Duty, Reserve, and Guard service member who is prohibited from completing a semester as planned due to reassignment, long term training/schools or deployments. Service members should work with their DU military specialist and instructors prior to these events in order to ensure proper preparation and handling of DU financial records and academic coursework so that academic re-integration is as seamless as possible upon return.

## Student Responsibilities

Students are bound by all policies of Davenport University and should familiarize themselves with these through reading the catalog and student handbook. Students should review the DU website under Refund Policies for tuition reimbursement rules and procedures.

All students must complete the final assessment for the course, such as the final exam, project, or presentation. ***Students who do not complete the final assessment will receive a grade of F.***

Students are expected to be adequately prepared for each class session. It is reasonable to expect *at least* two hours of outside study for every hour spent in the classroom (inseat or online).

Students are expected to assist in maintaining a classroom environment that is conducive to learning. Free discussion, inquiry, and expression are encouraged. Behavior that interferes with the instructor’s ability to conduct the class or the ability of students to benefit from that instruction is not acceptable.

## Alternative Delivery Statement

## Alternative delivery formats require considerably more student time outside of class and maintain the same level of assignments and academic rigor as the traditional classroom format. “Blended inseat w/online” is an example of an alternative delivery format.

**Scheduled Class Meeting Times**

The state dictates minimal contact hour requirements that are rigidly upheld by the University. Some of that instructional time is used for tests. The University's expectation is that classes will meet for the entire assigned time.

**Attendance Requirement**Davenport University is focused on helping you succeed academically and preparing you to start your career upon graduation.Regular attendance and active participation are essential elements in the learning process. Therefore, Davenport has implemented an Attendance Practice for 200 level courses and above for the first two weeks of the semester/session.

For in-seat classes, attendance will be taken on a daily basis starting the first class meeting. An absence is defined as missing more than one-half of a class period. Any unexcused absence will start the process for administrative withdrawal from the course.

Attendance for **online students** will be defined as participating in at least one graded academic activity each week. Postings not related to the graded discussion topics, emails, or other forms of communication not related to the actual course assignments will be reviewed but may be disqualified for attendance purposes.

The instructor should be notified of a planned absence a minimum of 24 hours prior to the course meeting time. Any unexcused absence will initiate the withdrawal process and merely notifying the instructor does not guarantee that the absence alert will be cleared. For complete details and ramifications, students are expected to read the full [Attendance Practice](http://www.davenport.edu/academics/academic-catalogs/attendance-policy) available on the DU website.

**Standardized Grade Scale**

The following grading scale is a University standard for courses in this area of study:

|  |  |  |  |
| --- | --- | --- | --- |
| **Grade** | **Grade Points** | **Percentages (%)** | **Attainment Level** |
| A | 4.0 | 100 – 94 | Superior |
| A- | 3.7 | 93 – 90 |  |
| B+ | 3.3 | 87 – 89 | Above Average |
| B | 3.0 | 83 – 86 | Acceptable |
| B- | 2.7 | 80 – 82 |  |
| C+ | 2.3 | 77 -- 79 | Average |
| C | 2.0 | 73 -- 76 | Lowest acceptable |
| F | 0.0 | 72 -- 0 | Failure |
| NF | 0.0 | n/a | Failure / No Show |
| W | - | n/a | Withdraw |

**Graduate Failing Grade Policy**

Students who receive a failing grade in a graduate course must repeat the course in the upcoming semester. Students who fail the same course a second time will be placed on academic suspension. In both cases, students are to immediately contact their advisor. Students should read the full policy in the DU Graduate catalog.

**Research Approval**

Davenport University’s Institutional Review Board is a committee mandated by Federal laws to protect the rights and welfare of the human subjects participating in research activities. Compliance is monitored by the Office of Human Research Protection of the U.S. Department of Health and Human Services. DU’s IRB must review and approve **all** proposed academic research at DU or by DU faculty, staff or students that involve certain criteria to ensure that the research meets these governmental standards for the safety and protection of any human subjects involved in the research.

*NOTE: If your research involves surveys, questionnaires, focus-groups, or other methods involving people, you will need to have your study approved by the Davenport University Institutional Review Board. Review materials on the DU IRB website.*