SYLLABUS

CS 336 – DATA WAREHOUSING AND MANAGEMENT (REQUIRED)
(ENTREPOSAGE ET GESTION DES DONNÉES)

Course Catalog Description

This course covers the fundamental principles and techniques of data warehousing and data management. Students will learn how data warehouses are designed, implemented, and maintained to support decision-making processes in organizations. Topics include data warehousing architecture, data modeling, ETL (Extract, Transform, Load) processes, and data governance. Hands-on assignments will involve creating and managing a data warehouse using modern tools.

Course Requirements

- **Pre-requisites**: Intro to databases (CS 231).
- **Co-requisites**: None.
- **Credit Hours**: 4 ECTS/TN (2 US).
- **Program Outcomes ("Compétences Programme")**: 2, 10, 16, 20, 37, 47.
- **ABET Student Outcomes**: 2.

References

- **Textbook(s):**
  - Required: Kimball, R., & Ross, M. (2013). *"The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling"*.
  - Reference: Inmon, W. H. (2005). *Building the Data Warehouse*.
- **Others:**
  - Online guided course on MUST's learning platform.

Instructor/Course Coordinator

Instructor:
Office:
Course coordinator:
Email:
Office Hours:
Teaching Assistant:

Grading Policy

Assessment	*Week*	*Weight*
1. Midterm		30%
2. Quizzes		10 %
3. Programming assignments		20%
4. Final		40%

Course Learning Outcomes (CLOs)

No.	*CLOs*	*Assessment Methods*	*Student Outcomes (SO)*
CLO1.	Demonstrate an understanding of the purpose and structure of data warehouses and distinguish them from transactional databases.	ALL	2
CLO2.	Design a data warehouse schema using dimensional data modeling techniques.	ALL	2
CLO3.	Implement ETL processes to extract, transform, and load data into a warehouse.	ALL	2
CLO4.	Manage and query data within a data warehouse for reporting and analysis.	ALL	2
CLO5.	Apply best practices in data quality management and data governance.	ALL	2

Course Topics

Topics	**Chapter**	**Weeks**
Overview of data warehousing: *Evolution of data warehousing and its role in business intelligence, OLTP vs OLAP, example applications.*		1
Data Warehouse Architecture: *Components of a data warehouse (data sources, ETL, storage, metadata, front-end tools), Types of data warehouse architectures.*		2
Data Modeling for Data Warehouses: *Dimensional modeling, advanced data modeling techniques*.		3-4
ETL Process and Data Integration: *ETL process overview, Data extraction & transformation, Data loading and incremental updates.*		5-7
Review. **Midterm exam.**		8
Data Warehouse Implementation and Management: *Data Warehouse Storage and Indexing, Query optimization, Performance tuning, OLAP and data cubes.*		9-11
Data Governance and Quality Management: *Data quality, governance, and compliance.*		12
Data Warehousing in the Cloud & Big Data: *Cloud data warehousing (advantages & challenges, comparison of cloud-based data warehouse services), Data Lakes, Big Data.*		13-14
Final exam **Project presentations**		15-16

Student Outcomes (SOs)

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Approvals

Prepared by: ____	Signature:	Date:
Approved by the Dept.:	Signature:	Date: