COURSE HANDBOOK

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| **AMBO**  **UNIVERSITY** |  | Woliso Campus  Technology and Informatics School |

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| **Department:** *Computer Science* | |
| **Module Title:** Database Systems | **Module Code: CoSc-M2071** |
| **Module ECTS:** 12 |
| **Course Tile:** Fundamentals of Database Systems | **Course Code**: CoSc2071 |
| **Instructor Name**: Abraham A. | **Course ECTS**: 6 |

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| **Instructor’s Contact Information:**    Email: ***abrahamojip210@gmail.com*** | **Course Information:**  Academic Year: **2012 E.C**  Year :**II(Extension)**  Semester: **II** |

1. **Course Description**:

This course is assumed to be the first course in database management systems. It starts by introducing what database is and database systems, and how it differs with the traditional file processing system. It then deals with data models, ER diagrams, database design methods, normalization, relational algebra and calculus, file organizations and storage management, index structure for files, and SQL statements. The course mainly emphasizes on basics of database systems how to retrieve and modify data. It also deals different database environments.

1. **Course Goals or Learning Outcomes:**

By the end of this course, students will be able to:

* Understand what database is, database system and DBMS
* Differentiate database system from file system
* Identify the pros and cons of manual approach, file based approach and database approach
* Understand the basic principles of database design systems using different database models
* Appreciate the use of database system in the real world.
* Design different types of databases
* Understand database normalization & functional dependency
* Understand the principles of relational database management systems and their languages
* Understand file organizations and storage management, and index structure for files
* Demonstrate queries in the relational algebra.
* Demonstrate queries in the tuple relational calculus.
* Create a relational database schema in SQL that incorporates key, entity integrity, and referential integrity constraints.

1. **Prerequisites:** Introduction to Computer Science(CoSc1011)
2. **Reference**

**Text book:**

* RamezElmasri and Shamkant B. Navathe (2000) Fundamentals of Database Systems, 3rd edition.

**Reference books:**

* Massachusetts AddisonWesleyC. J. Date (2000) An Introduction to Database Systems. Massachusetts: Addison Wesley
* Ramakrishna, Raghu & Johannes Gehrke (2000) Database Management Systems, 2nd edition. McGraw Hill
* Shepherd John C. (1990) Database Management: Theory and Practice. Boston:

1. **Schedule**

The following is an outline of the order in which syllabus contents will be covered. The exact dates and due dates for assignments and exams can be found on the class calendar and are subject to change with notice.

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| ***Date*** | ***Topics to be discussed*** |
| Week 1 | **Introduction to Database Systems**   * Introduction to database system * Database system and File System * Characteristics of the Database Approach * Actors on the Scene |
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| Week 1-2 | **Database System Concepts and Architecture**   * Data Models, Schema and Instances * DBMS Architecture and Data Independence * Database Language and Interface * The Database System Environment * Classification of DBMS |
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| Week 3-4 | **Database Modeling**   * Introduction to ODL * E/R Model * Design principles, Network and hierarchical |
| Week 5-6 | **Data Modelling using Entity Relationship Model**   * Using High level Data Models for Database Design * Entity types and Sets, Attributes and Keys * Relationships, Roles and Structural Constraints * Weak Entity Types * Database Abstraction * E/R Diagram naming conventions, and Design issues |
| Week 7 | **Record Storage and Primary File Organization**   * Introduction * Operations on Files * Files of Unordered Records (Heap Files) * Files of Ordered Records (Sorted Files) * Hashing Techniques |
| Week 8 | **Index Structure for Files**   * Types of Single level Ordered Index * Dynamic Multilevel indexes using B-Trees and B+ Trees * Indexes on Multiple Indexes |
| Week 9-10 | **Relational algebra and Relational calculus**   * Introduction |
| Week 10-11 | **Database Design**   * Introduction * Functional Dependency * Normalization |
| Week 12 | **Structured Query Language(SQL**)   * SQL Statements * SQL Query * Data Manipulation Language * Constraints and Triggers |
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**11. Assessment Arrangements:**

List the assessment methods along with weight distribution.

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| Test #1 | 20% |
| Final examination | 40% |
| Quizzes | 5% |
| Lab Examination | 15% |
| Project | 20% |
| Total | 100% |