

## General Information:

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|-------------------------------------|--------------------------------------|
| <b>Name of Course:</b>              | <b>DATABASE SYSTEMS</b>              |
| <b>Course Code:</b>                 | IVM437ANMI                           |
| <b>Semester:</b>                    | 2 <sup>th</sup>                      |
| <b>Number of Credits:</b>           | 4                                    |
| <b>Allotment of Hours per Week:</b> | 2 Lectures+2 practical classes /Week |
| <b>Evaluation:</b>                  | <b>Exam</b>                          |
| <b>Prerequisites:</b>               | -                                    |

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## Introduction, Learning Outcomes:

The focus of this course is Database architectures, logical layers, tasks implemented in layers. Physical layers, data access model through layers, multilayer architectures. Implementation of special data structures in a relational data model. Characteristics of development of special databases (spatial information, etc.) Geometric and geographic data storage and management. Web technologies and database systems. XML / SQL integration. Optimize queries. Design of distributed database systems. Replication of data. Business intelligence (data warehouse concept, design, OLAP). Big Data. NoSQL. The other focus of this course is database programming, that is, the development of applications using a relational database (MS SQL Server) as the primary source of data and using ADO.NET and Entity Framework. After finishing the course students should be able to write scripts of SQL commands, stored procedures, triggers, functions and should be able to develop programs in C# that create, update and produce data in a database using ADO.NET, Entity Framework and ASP.NET. Finishing the course students will able to design databases for business analysis.

## General Course Description and Main Content:

Students will learn to

1. Database Architectures
1. Writing Scripts and Batches in SQL
2. Create and modify Stored procedures, triggers
3. Writing User defined functions
4. Transaction processing
  - a. Understanding Locks and Concurrency
  - b. Setting isolation levels
5. Standards of data connections: ODBC, ADO, OLEDB, ADO.NET.
6. Database programming in C# language using ADO.NET Entity Framework (two- and three-tier data access models)
7. Business Intelligent, data analysis.
8. NoSQL, Big Data.

## Methodology:

- **Lectures:** will give introduction to the basic knowledge of characterise and design databases, manipulate data with SQL language
- **Practices:** Students will be able to create databases, manipulate data, create SQL stored procedure, create programs to manipulate data in databases
- **Exams:** Accumulated knowledge is tested by two exams, one midterm and a final exam.

## Schedule:

The rough outline of the schedule is as follows:

Week 1-4: Database architectures.

- Sql scripts, stored procedures.
- User Defined functions
- Triggers
- Transactions

Week 5-7 Create programs in C# with using ADO.NET classes

- ADO.NET Connected model
- ADO.NET Disconnected model
- LINQ, Programming Entity Framework

Week 8: **Midterm Exam**

Week 9: **Spring holiday**

Week 10-11: LINQ, Programming Entity Framework

Week 12-14 Business Intelligent, Data Analysis

Week 15: **Final Exam (Test and problem solving in computer lab)**

#### Attendance:

Attending is required all classes, and will impact the grade (max. 10%). Unexcused absences will adversely affect the grade, and in case of absence from more than 30% of the total number of lesson will be grounds for failing the class. **To be in class at the beginning time and stay until the scheduled end of the lesson is required, tardiness of more than 10 minutes will be counted as an absence.** In the case of an illness or family emergency, the student must present a valid excuse, such as a doctor's note.

#### Grading:

The Course grade is determined as a combination of 1 midterm exam (45%), a final exam (45%) and attendance of lessons and practices (10%).

All exams are closed-book and closed-notes. A student with a proper excuse of being absent from the examination must inform and get a permission from the teacher prior to the time of examination. Any students who do not take the examination at the scheduled time will receive a zero score.

#### Grading Scale:

|                        |          |         |         |         |       |
|------------------------|----------|---------|---------|---------|-------|
| Numeric Grade:         | 5        | 4       | 3       | 2       | 1     |
| Evaluation in percent: | 89%-100% | 77%-88% | 66%-76% | 55%-65% | 0-54% |

Exams in Exam period between: 21th of May, 2018 – 15th of June 2018

#### Students with Special Needs:

Students with a disability and needs to request special accommodations, please, notify the Deans Office. Proper documentation of disability will be required. All attempts to provide an equal learning environment for all will be made.

#### Readings and Reference Materials:

1. Kathi Kellenberger and Scott Shaw, *Beginning T-SQL*, Third Edition, Apress, 2014, ISBN: 978-1-4842-0047-6
2. John Paul Mueller, *Microsoft ADO.NET Entity Framework Step by Step*, O'Reilly Media, Inc., 2013
3. Tim Patrick, *Microsoft® ADO.NET 4 Step by Step*, O'Reilly Media, Inc., 2010

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