Меѓународен Универзитет Визион - International Vision University
Universiteti Ndërkombëtar Vizion - Uluslararası Vizyon Üniversitesi

Adres: Ul. Major C. Filiposki No.1, Gostivar – Kuzey Makedonya
tel: +389 42 222 325, www.vizyon.edu.mk, info@vizyon.edu.mk

# SYLLABUS

| COURSE NAME | COURSE CODE | SEMESTER | COURSE LOAD | ECTS |
|---|---|---|---|---|
| **ADVANCED DATABASES** | **CEN-4006** | **7** | **150** | **5** |

| Prerequisite(s) | None |
|---|---|

| Course Language | Macedonian, Turkish, English |
|---|---|
| **Course Type** | Required |
| **Course Level** | First Cycle |
| **Course Lecturer** | |
| **Course Assistants** | |
| **Classroom** | |
| **Extra Curricular Office Hours and Location** | **Meeting:** <br> **Consultancy:** |

| Course Objectives | The aim of the module is to introduce students to current techniques, methods and results from the active field of database systems and data management. Typical topics include query planning and optimization; transaction processing and concurrency control; big management; data warehousing and OLAP; theory of databases. |
|---|---|
| **Course Learning Outcomes** | By the end of the module, students should be able to: <br><br> ▪ - Demonstrate understanding of issues surrounding concurrency control and parallelism in data management. <br><br> ▪ - Express queries in different forms (relational algebra, SQL, etc). <br><br> ▪ - Devise appropriate ways to store and index data. <br><br> ▪ - Show understanding of modern data processing paradigm such as NoSQL and MapReduce/PigLatin. <br><br> ▪ - Explain methods suitable for particular types of data such as temporal, multimedia or spatial data. |
| **Course Contents** | Concurrency control and parallelism in data management. Data management design and modelling, Devising appropriate ways to store and index data, Show understanding of modern data processing paradigms such as NoSQL and MapReduce, Explain methods suitable for particular types of data such as temporal, multimedia or spatial data, Analytical and computational thinking, Methods and tools for the above |

**WEEKLY SUBJECTS AND RELATED PREPARATION STUDIES**

| Week | Subjects | Related Preparation |
|------|----------|---------------------|
| 1 | Refresher on databases and modelling | Related Chapters of Course Sources |
| 2 | Relational algebra, tuple relational calculus, SQL, and equivalences between them | Related Chapters of Course Sources |
| 3 | Query planning, evaluation and optimization | Related Chapters of Course Sources |
| 4 | Transaction processing, concurrency, ACID rules, OLTP | Related Chapters of Course Sources |
| 5 | Online analytical processing (OLAP), data warehouses | Related Chapters of Course Sources |
| 6 | Data storage and indexing, B-trees | Related Chapters of Course Sources |
| 7 | Mid-term Exam | Related Chapters of Course Sources |
| 8 | Data storage and indexing, hashing | Related Chapters of Course Sources |
| 9 | NoSQL to relax ACID rules; consistency, availability, partition tolerance | Related Chapters of Course Sources |
| 10 | Parallel databases, hardware and software | Related Chapters of Course Sources |
| 11 | Big data, MapReduce, PigLatin | Related Chapters of Course Sources |
| 12 | Special purpose databases, e.g. temporal, spatial, or multimedia databases | Related Chapters of Course Sources |
| 13 | Project Presentation | Related Chapters of Course Sources |
| 14 | Project Presentation | Related Chapters of Course Sources |
| 15 | Final Exam | Related Chapters of Course Sources |

## ECTS / WORKLOAD TABLE

| | | | |
|---|---|---|---|
| Presentation / Seminar | | | |
| Hours for off-the-classroom study (Pre-study, practice) | 14 | 3 | 42 |
| Midterm Exam | 1 | 12 | 12 |
| Final examination | 1 | 14 | 14 |
| **Total Work Load** | | | |
| **ECTS** | **8** | | |

## GENERAL PRINCIPLE RELATED WITH COURSE

Dear students,

In order to be included, learn and achieve full success that you deserve in the courses you need to come well prepared by reading the basic and secondary textbooks. We are expecting from you carefully to obey to the course hours, not to interrupt the lessons unless is very indispensable, to be an active participant on the courses, easily to communicate with the other professor and classmates, and to be interactive by participating to the class discussions. In case of unethical behavior both in courses or on exams, will be acting in framework of the relevant regulations. The attendance of the students will be checked in the beginning, in the middle or at the end of the lessons. Throughout the semester the students who attend to all lectures will be given 15 activity-attendance points in addition to their exam grades.

| COMPULSORY LITERATURE | | |
|---|---|---|
| **No** | **Author's Name** | **Name of the book, Publishing House, Publication Year** |
| 1 | Raghu Ramakrishnan, Johannes Gehrke | Database Management Systems, 3rd Edition, |
| 2 | Carlos Coronel , Steven Morris | Database Systems: Design, Implementation, & Management, 13th Edition |
| 3 | | |

| ADDITIONAL LITERATURE | | |
|---|---|---|
| **No** | **Author's Name** | **Name of the book, Publishing House, Publication Year** |
| 1 | Michael J Hernandez | Database Design for Mere Mortals: 25th Anniversary Edition, 4th Edition |
| 2 | | |
| 3 | | |

**EVALUATION SYSTEM**

| Underlying the Assessment Studies | NUMBER | PERCENTAGE OF GRADE |
|---|---|---|
| Attendance/Participation | 15 | %10 |
| Project / Event | 1 | %20 |
| Mid-Term Exam | 1 | %35 |
| Final Exam | 1 | %35 |
| **TOTAL** | **17** | **%100** |

**ETHICAL CODE OF THE UNIVERSITY**

In case of the students are cheating or attempt to cheat on exams, and in the case of not to reference the sources used in seminar studies, assignments, projects and presentations, in accordance to the legislations of the Ministry of Education and Science of Republic of Macedonia and International Vision University, will be applied the relevant disciplinary rules. International Vision University students are expected never to attempt to this kind of behavior.