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

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# SYLLABUS

| COURSE NAME | COURSE CODE | SEMESTER | COURSE LOAD | ECTS |
|---|---|---|---|---|
| **ADVANCED ALGORITHMS** | **4028** | **5** | **180** | **6** |

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

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

| | |
|---|---|
| **Course Objectives** | The aim of the course is learning simple and complex data structures and algorithms that use these structures, learning recursive programming and its use in solving problems, understanding the importance of use appropriate data structures and algorithms and their use in problem solving and learn how to use them in an application, determine the effectiveness of an algorithm and to gain theoretical and practical knowledge. |
| **Course Learning Outcomes** | • Learning the importance and fundamentals of algorithm design,<br>• Learning simple and complex data structures and their use in solving problems,<br>• Learning the basics of dynamic data structures and gaining the experience of writing its application in C programming language,<br>• Learning the data structures (link list, stack, queue, tree etc.) and their use in an application and gaining the experience of determining which data structures are suitable for solving a problem,<br>• Learning the fundamental steps of software development processes, like analysis, design, implementation, testing, and learning the concept of debugging. |
| **Course Contents** | The course starts with highlighting algorithm design which is important in the software development, emphasizing the impact of data structures and used algorithms to the software performance and algorithm complexity. After explaining the basic concepts of data structure, the course continues with the importance of array for data structures, stacks, queues, trees, searching, sorting, graph algorithms, hash methods. Applications are made on the topics, discussed in the C programming language. The course is completed by giving information on data compression which is one of the main application areas of data structures. |

**WEEKLY SUBJECTS AND RELATED PREPARATION STUDIES**

| Week | Subjects | Related Preparation |
|---|---|---|
| **1** | Introduction to data structures and Algorithms | Related Chapters of Course Sources |
| **2** | Algorithm complexity and Big-O notation | Related Chapters of Course Sources |
| **3** | Array data structure and dynamic memory allocation | Related Chapters of Course Sources |
| **4** | Recursive programming | Related Chapters of Course Sources |
| **5** | Linked Lists | Related Chapters of Course Sources |
| **6** | Stacks | Related Chapters of Course Sources |
| **7** | Mid-term Exam | Related Chapters of Course Sources |
| **8** | Queues | Related Chapters of Course Sources |
| **9** | Trees | Related Chapters of Course Sources |
| **10** | Searching methods | Related Chapters of Course Sources |
| **11** | Sorting methods | Related Chapters of Course Sources |
| **12** | Hashing methods | Related Chapters of Course Sources |
| **13** | Data compression methods | Related Chapters of Course Sources |
| **14** | Simple graph algorithms | 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** | **6** | | |

**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.

**SOURCES**

| **COMPULSORY LITERATURE** | | |
|---|---|---|
| **No** | **Name of the book** | **Author's Name, Publishing House, Publication Year** |
| **1** | Veri Yapıları ve Algoritmalar | Rıfat Çölkesen |
| **2** | Database System Concepts | Abraham Silberschatz, Henry Korth , S. Sudarshan Sixth Edition, McGraw-Hill, 2010 |
| **3** | | |

| **ADDITIONAL LITERATURE** | | |
|---|---|---|
| **No** | **Name of the book** | **Author's Name, Publishing House, Publication Year** |
| **1** | Algoritmalar ve Programlamaya Giriş | Selçuk Alp, Arzu Kilitci, Umuttepe Yayınları, 2015 |
| **2** | Fundamentals of Database Systems (6th Edition) | R. Elmasri, S. Navathe, Addison Wesley, 2010 |
| **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.