

0205305 DATA STRUCTURES

Normal Education:

Evening Education:

Fall 2018-2019

**Course Format:** face-to-face

**INSTRUCTOR INFORMATION**

**Instructor:**

**Title:**

**Office:**

**Phone:**

**Office Hours:**

**E-mail:**

**COURSE DESCRIPTION**

**Credit hours:** *3 credit (3+0)*

**ECTS**: *6*

**Required or elective:** *Required*

**Catalog Description***: This course focuses on basic and essential topics in data structures, including array-based lists, linked lists,stacks, queues, hash tables, recursion, binary trees, red–black trees, heaps, sorting and searching algorithms and graphs*

**Prerequisites**: *0205205 Structured Programming*

**Textbook(s) and/or required materials:**

*Data Structures and Algorithms in Python, by Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser; 1st edition*

**Course Objectives**

|  |
| --- |
| ***The objectives of this course are to:*** |
| *1* | *Teaching analysis and design of fundamental data structures*  |
| *2* | *Using data structures as tools to algorithmically design efficient computer programs that will cope with the complexity of actual applications.* |

**Course Topics**

|  |  |
| --- | --- |
| *No* |  |
| *1* | *Measuring the Efficiency of Algorithms* |
| *2* | *Arrays, Lists, Linked Lists* |
| *3* | *Stack,* *Queues* |
| *4* | *Recursion* |
| *5* | *Recursion* |
| *6* | *Hash Tables* |
| *7* | *Binary Trees* |
| *8* | *Midterm Exam* |
| *9* | *Red–Black Trees* |
| *10* | *Heaps* |
| *11* | *Sorting and Searching Algorithms and Their Efficiency* |
| *12* | *Sorting and Searching Algorithms and Their Efficiency* |
| *13* |  *Graphs* |
| *14* |  *Graphs* |

**Course Learning Outcomes**

*At the end of this course, students will be able to;*

* *Explain the need for efficiency in data structures and algorithms.*
* *Apply methods to analyze running time of essential data structures and estimate efficiency of the algorithms and implementations.*
* *Understand and apply the concept of abstract data type to represent and implement heterogeneous data structures.*
* *Analyze and implement different types of sorting algorithms.*
* *Implement data structures for graphs and approaches for searching graphs using breadth-first, depth-first, best-first search, etc.*

**Evaluation methods**

|  |  |
| --- | --- |
| *1. Midterm Exam* | 40% |
| *2. Final Exam* | 60% |

***Professional component***

|  |  |
| --- | --- |
| *Engineering topics* | *80%* |
| *General education* | *0%* |
| *Mathematics and basic sciences* | *20%* |

**Person(s) who prepared this description and date of preparation**

*FatihVarçın, May 2018*

**Date of last revision**

*May 2018*