OSTIM TECHNICAL UNIVERSITY
FACULTY OF ECONOMICS AND ADMINISTRATIVE SCIENCES
MANAGEMENT INFORMATION SYSTEMS DEPARTMENT
COURSE SYLLABUS FORM

MIS 231 Data Structures and Algorithms							
Course Name	**Course Code**	**Period**	**Hours**	**Application**	**Laboratory**	**Credit**	**ECTS**
Data Structures and Algorithms	MIS 231	1	4	0	0	4	5

Language of Instruction	English
Course Status	Compulsory
Course Level	Bachelor
Learning and Teaching Techniques of the Course	Lecture, Question-Answer, Problem Solving, Example

Course Objective

The purpose of this course is to achieve an understanding of fundamental data structures and algorithms and the tradeoffs between different implementations of these abstractions. Theoretical analysis, implementation, and application. Concepts that the students should learn in this course are lists, stacks, queues, heaps, dictionaries, maps, hashing, trees and balanced trees, sets, and graphs. Also included is general understanding of searching and sorting algorithms.

Learning Outcomes

The students who succeeded in this course will be able to:

- Learn Java language and implement data structures in Java
- Understand basic mechanisms for algorithm analysis and apply them for algorithm analysis
- Understand and analyze the functionalities of lists, stacks, queues, trees, hashing, priority queues and graphs
- Compare and assess lists, stacks, queues, trees, hashing, priority queues and graphs for a given problem
- Develop algorithms involving the use of lists, stacks, queues, trees, hashing, priority queues or graphs
- Understand comparison-based sorting algorithms and analyze them

Course Outline
This course covers the classification of data structures, space and time considerations. Linked lists, stacks and queues, priority queues. Array and pointer-based implementations. Heaps and Tree structures, binary search trees, balanced AVL and red-black trees. Fundamentals of sorting and searching. Hash-tables and collision handling. Representation of graphs and introduction to graph algorithms.

Weekly Topics and Related Preparation Studies		
Weeks	**Topics**	**Preparation Studies**
1	Course Introduction	–
2	Analysis of Algorithms	–
3	Linked Lists	–
4	Stacks	–
5	Queues	–
6	Trees	–
7	Search Trees	–
8	**MIDTERM EXAM**	
9	AVL Trees	
10	Heaps	–
11	Hashing	–
12	Graphs	–
13	Sorting	–
14	Review	–
15	**FINAL EXAM**	

Textbook(s)/References/Materials:
Textbook: Goodrich, M. T., Tamassia, R., & Goldwasser, M. H. (2014). Data structures and algorithms in Java. John Wiley & Sons.
Supplementary References: -
Other Materials: -

Assessment		
Studies	**Number**	**Contribution margin (%)**
Attendance	1	10
Lab		
Class participation and performance	1	10
Field Study		
Course-Specific Internship (if any)		
Quizzes / Studio / Critical		
Homework		
Presentation		
Projects		
Report		
Seminar		
Midterm Exam/Midterm Jury	**1**	**30**
General Exam / Final Jury	**1**	**50**
Total		**100**
Success Grade Contribution of Semester Studies		**50**
Success Grade Contribution of End of Term		**50**
Total		**100**

ECTS / Workload Table			
Activities	**Number**	**Duration (Hours)**	**Total Workload**
Course hours (Including the exam week): 16 x total course hours)	16	3	48
Laboratory	5	2	10
Application			
Course-Specific Internship (if any)			
Field Study			
Study Time Out of Class	16	2	32
Presentation / Seminar Preparation			
Projects			
Reports			
Homework			
Quizzes / Studio Review	10	1	10
Preparation Time for Midterm Exams / Midterm Jury	**1**	**20**	**20**
Preparation Period for the Final Exam / General Jury	**1**	**30**	**30**
Total Workload	**(150/30 = 5)**		**150**

Course' Contribution Level to Learning Outcomes						
Nu	**Learning Outcomes**	**Contribution Level**				
		1	**2**	**3**	**4**	**5**
LO1	Learn Java language and implement data structures in Java					X
LO2	Understand basic mechanisms for algorithm analysis and apply them for algorithm analysis					X
LO3	Understand and analyze the functionalities of lists, stacks, queues, trees, hashing, priority queues and graphs					X
LO4	Compare and assess lists, stacks, queues, trees, hashing, priority queues and graphs for a given problem					X
LO5	Develop algorithms involving the use of lists, stacks, queues, trees, hashing, priority queues or graphs					X
LO6	Understand comparison-based sorting algorithms and analyze them					X

	Relationship Between Course Learning Outcomes and Program Competencies (Department of Management Information Systems)							
Nu	**Program Competencies**	**Learning Outcomes**						**Total Effect (1-5)**
		LO1	**LO2**	**LO3**	**LO4**	**LO5**	**LO6**	
1	Recognize and distinguish the basic concepts such as data, information, and knowledge in the field of Management Information Systems and know the processes to be followed for data acquisition, storage, updating, and security.	x	x	x	x	x	x	**5**
2	Develop and manage databases suitable for collecting, storing, and updating data.	x	x	x	x	x	x	**5**
3	As a result of his/her ability to think algorithmically, and easily find solutions to problems concerning basic business functions.							
4	Learn programming logic, and have information about current programming languages.	x	x	x	x	x	x	**5**
5	Be able to use up-to-date programming languages.	x	x	x	x	x	x	**5**
6	Be able to take part in teamwork or lead a team using knowledge of project management processes.							
7	Know ethical and legal rules, and use professional field knowledge within the scope of ethical and legal rules.							
8	Know the fundamental areas of business administration namely management and organization, production, finance, marketing, numerical methods, accounting, etc., and have the knowledge and skills to work in-depth in at least one of them.							
9	Be able to solve the problems encountered in the field of internet programming by designing web applications.							
10	Develop and manage logistics and supply chain management activities							
11	Adapt his/her theoretical knowledge and the experience he/she will gain through practice at the departments of businesses such as information technologies, R&D, and management to real life.							
12	Be able to develop strategies that will provide a competitive advantage with his/her advanced knowledge of							

	management strategies and management functions.							
13	Develop a business idea, commercialize the business idea, and design and manage his/her venture using entrepreneurial knowledge.							
14	By using English effectively, they can follow, read, write, speak and communicate universal information in the field of management information systems in a foreign language with professional competence.	x	x	x	x	x	x	**5**
Total Effect								**25**

Policies and Procedures
Web page: https://www.ostimteknik.edu.tr/management-information-systems-english-1241/915
Exams: The exams aim at assessing various dimensions of learning: knowledge of concepts and theories and the ability to apply this knowledge to real-world phenomena, through analyzing the situation, distinguishing problems, and suggesting solutions. The written exams can be of two types, ie. open-ended questions, which can also be in the form of problems or multiple-choice questions.
Assignments: Quizzes and Homework (Assignments) might be applicable. Scientific Research Ethics Rules are very important while preparing assignments. The students should be careful about citing any material used from outside sources and reference them appropriately.
Missed exams: Any student missing an exam needs to bring an official medical report to be able to take a make-up exam.
Projects: A group project with teamwork is welcome.
Attendance: Attendance requirements are announced at the beginning of the term. Students are usually expected to attend at least 70% of the classes during each term.
Objections: If the student observes a material error in his/her grade, he/she has the right to place an objection to the Faculty or the Department. The claim is examined and the student is notified about its outcome.