

**Spring 2020**

# **MATE 206 Algorithm and Programming**

<b>Instructor:</b> Dr. Elçin Emre-Akdoğan	<b>Place:</b> A 211/ Online (Zoom)
<b>Office Hours:</b> by appointment	<b>Textbook:</b> Lecture Notes
<b>Office:</b> GB24	<b>Program:</b> SCRATCH
<b>Email:</b> <a href="mailto:elcin.akdogan@tedu.edu.tr">elcin.akdogan@tedu.edu.tr</a>	<b>Time:</b> Friday 11:00-13:00

## **Course Description:**

- Design of an algorithm
- Flow diagrams, input-output concepts, loops, decision making, decision structures and develop appropriate algorithms for cyclic problems
- Applications of algorithms and flowcharts in Scratch
- Develop appropriate solution algorithms using functions
- Develop appropriate solution algorithms using single and double dimensional sequences.
- Coding and applications of generated algorithms in Computer Algebra Systems

## **Course objectives:**

The aim of this study is to provide students understanding of basis of algorithm and programming. By applying basic steps of algorithm and programming, students will generate solutions for problems and test their appropriateness.

## **Learning Outcomes:**

- Explain basis of design of an algorithm,
- Exemplify flow diagrams, input-output concepts, loops.
- Develop appropriate algorithms for cyclic problems.
- Use applications using algorithms and flowcharts.
- Use appropriate function to create appropriate solution algorithms.
- Develop appropriate solution algorithms using single and double dimensional sequences.
- Collaborate on coding and applications of generated algorithms in Computer Algebra Systems.

**Methods for Assessment of Learning Outcomes:** The expected learning outcomes for the course will be assessed through graded activities and ungraded activities. The graded activities include assignment, in-class activities, take-home homework and project. The ungraded activities will be used to monitor your progress. A variety of these ungraded assessment techniques may be employed, including activities to be completed during class, direct questioning of students, answering students' questions in class, and discussions during office hours.

**In-class activities:** You need to upload your project to moodle, your document's title should be NAME\_SURNAME\_In-Class Activities-X (X: number)

In-Class activities will be graded on a scale of 0-10.

**Take-Home Homework:** You need to upload your project to moodle, your document's title should be NAME\_SURNAME\_Take-home homework

**Project:** You need to upload two files to moodle;

1. Prepare your first document that include your project's information:  
*"Name-Surname:*  
*Title of the Project:*  
*Mathematical concept:*  
*Grade Level:*  
*Learning outcome:*  
*Summary of the Project: Indicate your aim of the project and give details here."*  
(Word file)
2. Second document should be your activity that you prepared in Scratch (Scratch file)  
*Plan out a project.*  
*Build it in Scratch.*  
*Be as creative as you can. Use the resources you have seen throughout the semester.*  
*Incorporate the following into your project:*  
*At least two sprites*  
*Costume or Background Change Broadcast*  
*Variable*  
*Images and sounds*  
*Numeracy aspect*  
*Upload your project to [scratch.mit.edu](http://scratch.mit.edu)*

Both of your document's title should be NAME\_SURNAME\_Project

**Attendance:** This course requires strong involvement and attendance. You are responsible for all information given out during the courses. Exceeding 20% of attendance with unexcused absences will result a half letter grade reduction. You are expected to arrive on time for the lectures.

**Communication:** All announcements will be sent to your e-mail address through Moodle. Check your e-mails regularly in order to be informed.

**Grades:** Your final grade will be weighted as follows:

<b>40 points</b>	In-Class Activities	Details will be given during class
<b>10 points</b>	Assignment	Details will be given during class
<b>20 points</b>	Take-Home Homework	Details will be given during class
<b>30 points</b>	Project	Details will be given during class

**Academic Honesty:** It hardly needs to be said that such things as plagiarism or stealing another student's work are unacceptable. However, in this class, it is entirely proper to work in teams to do discussion on the problems or the problem solving, as long as you yourself have mastery of those answers and are prepared on your own to present them in class. Plagiarism is a serious breach of academic trust. In academic work, our words and ideas are the value of our work, so turning in someone else's work as if it were your own is a form of theft. When you use someone else's words and ideas--whether it's the work of a famous writer or a fellow student--without crediting the source or authorship of those words and ideas, you are plagiarizing. So here's the bottom line: original work only, credit to ideas, writing, or words from someone other than you.

SCHEDULE		
Date	Topic	Content
Week 1 Session 1 (14/02/2020)	ALGORITHM	Introduction
Week 2 Session 1 (21/02/2020)	ALGORITHM	Design of an algorithm
Week 3 Session 3 (28/02/2020)	FLOW DIAGRAMS	Flow diagrams, input-output concepts, loops, decision making, decision structures
Week 4 Session 1 (06/03/2020)	CYCLIC PROBLEMS	Developing appropriate algorithms for cyclic problems
Week 5 Session 1 (13/03/2020)	ALGORITHM AND FLOW DIAGRAMS	Assignment (Algorithm and Flow diagrams)
Week 6 Session 1 (20/03/2020)	COVID-19 BREAK!	
Week 7 Session 1 (27/03/2020)	SCRATCH	Introducing interface and tools of Scratch
Week 8 Session 1 03/04/2020	SCRATCH	Introducing interface and tools of Scratch
Week 9 Session 1 (10/04/2020)	SCRATCH	In-Class Activities-1 (Coordinates)
Week 10 Session 1 (17/04/2020)	SCRATCH	In-Class Activities-2 (Chase Game) <b>Take Home Homework</b> <b>(Due Date: 24/04/2020)</b>
Week 11 Session 1 (24/04/2020)	BREAK! Project <b>(Due Date: 29/05/2020)</b>	
Week 12 Session 1 (01/05/2020)	HOLIDAY!	

<b>Week 13</b> <b>Session 1</b> <b>(08/05/2020)</b>	SCRATCH	In-Class Activities-3(Area of the shape) In-Class Activities-4(Rounding numbers) In-Class Activities-5 (Quiz)
<b>Week 14</b> <b>Session 1</b> <b>(15/05/2020)</b>	SCRATCH	In-Class Activities-6 (2D Shapes and Transformation Geometry)
<b>Week 15</b> <b>Session 1</b> <b>(22/05/2020)</b>	SCRATCH	In-Class Activities-7 (Maze)