

## *CS 302 - Formal Languages & Automata Theory Spring 2023*

	<i>NAME / SCHEDULE</i>	<i>E-MAIL / PLACE</i>	<i>OFFICE HOUR</i>
<b>INSTRUCTOR</b>	<i>Kemal İNAN</i>	<i>inan</i>	<i>By appointment</i>
<b>ASSISTANTS</b>	<i>Alperen Doğan</i>	<i>alperend Meeting ID: alperend Password: 6pFDd0</i>	<i>Friday 8.40-10.30</i>
	<i>Ali Kağan AKBAŞ</i>	<i>akagan Meeting ID: 560 349 2647 Password: 06J4cq</i>	<i>Wednesday 9.40-11.30</i>
	<i>Nazlıcan TURAN</i>	<i>nazlicanturan Meeting ID: 321 302 3520 Password: 458796</i>	<i>Wednesday 14.40-16.30</i>
	<i>Muhammet Taha ÇAKMAK</i>	<i>tcakmak Meeting ID: 421 917 4351 (No password required)</i>	<i>Friday 15.30 - 17.30</i>
<b>LECTURES</b>	<i>W 11:40 – 13:30 remote F 13:40 – 14:30 live</i>	<a href="https://sabanciuniv.zoom.us/j/779384517">https://sabanciuniv.zoom.us/j/779384517</a> <i>FENS G032</i>	
<b>RECITATION</b>	<i>Tu 18:40 – 19:30 live</i>	<a href="https://sabanciuniv.zoom.us/j/92570139981">https://sabanciuniv.zoom.us/j/92570139981</a> <i>FENS G035</i>	

**Main Text:** [Introduction to Automata Theory, Languages and Computation](#) , Hopcroft, Motwani & Ullman, Pearson (Addison Wesley) 2006 , 3rd edition

**Auxiliary Text:** *Elements of the Theory of Computation*, Lewis & Papadimitriou, Prentice Hall 1998.

**Grading Policy:** 10% HW, 35% Quizzes, 20% MT, 35% Final

**Important:** 10 quizzes with 15 minute duration each shall be part of the course. Quizzes will be held during chosen lectures. A student missing more than 3 quizzes **fails** irrespective of medical or any other excuse! The overall quiz grading will be the average of the best 7 out of 10.

A quiz may take place in any 15 minute interval during a live lecture.

**Homework Policy:** There will be 8 HWs as part of the course. HW collection policy shall be announced in time.

**Tentative Schedule** (green dates = 2 hour remote lectures)

<b>March</b>	<b>1</b> 1,2	<b>3</b> 2	<b>8</b> 3 <b>HW1</b>	<b>10</b> 3	<b>15</b> 4,5 <b>HW2</b>	<b>17</b> 5	<b>22</b> 6,8	<b>24</b> 8	<b>29</b> 7 <b>HW3</b>	<b>31,1</b> <b>extra</b> <b>Sat.</b> 9,10
<b>April</b>	<b>5</b> 11,12 <b>HW4</b>	7 review	<b>12</b> 12 <b>Midterm</b> <b>(ZOOM)</b>	<b>14</b> 12	<b>19</b> 12,13 <b>HW5</b>	<b>21</b> <b>Holiday</b>	<b>26</b> 12,13 <b>HW6</b>	<b>28</b> 13		
<b>May</b>	<b>3</b> 13,14	<b>5</b> 14	<b>10</b> 15,16 <b>HW7</b>	<b>12</b> 16	<b>17</b> 17	<b>19</b> <b>Holiday</b>	<b>24</b> 17 <b>HW8</b>	<b>26</b> 17		
<b>May/June</b>	<b>31</b> 17			<b>Final</b> <b>10.6.2023</b> <b>12:30-</b> <b>15:30</b> <b>FASS</b> <b>G062</b>						

## *Tentative Course Outline*

- 1 – Introduction: Languages, Automata and Grammars (Main Text (MT) 1.1, 1.5) Slide1*
- 2 – Deterministic Finite Automata as Language Acceptors (DFA) (MT 2.1, 2.2) S2*
- 3 – Nondeterministic Finite Automata (NFA) and Linguistic Equivalence to DFA (MT 2.3 - 2.5) S2*
- 4 – Regular Expressions (RE) (MT 3.1) S3*
- 5 – RE and NFA (M.T 3.2) S3*
- 6 – Regular Languages and Properties (M.T. 4.1, 4.2) S3-S4*
- 7 – State Equivalence and Minimal State DFA (MT 4.4) S4*
- 8 – Algorithms for the DFA and NFA (MT 4.3, 4.4) S4*
- 9 – Context-Free Grammars (CFG) (MT 5.1) S5*
- 10– Parse Trees and Applications (MT 5.2, 5.3) S5*
- 11 – Ambiguity in Grammars and Languages (M.T. 5.4) S5*
- 12 – Pushdown Automata (PDA) (MT 6.1, 6.2) S6*
- 13 – CFG and PDA (M.T. 6.3) S6*
- 14 – Deterministic Context-Free Languages (MT 6.4) S6-S7*
- 15 – Properties of and Algorithms for Context Free Languages (MT 7.1,7.2, 7.4) S7*
- 16 - Determinism and Parsing (AT 3.7, p 158-177) S7*
- 17 - Introduction to Turing Machines (AT Chapters 4 ,5 selections) S8*

