Identification	Subject	CMS 455 - Introduction to Compilers-3 KU (6 ECTS) credits
	Department	Computer Science
	Program	Undergraduate
	Term	Spring, 2023
	Instructor	Javad Mehri
	E-mail:	jmehri@khazar.org
	Classroom/hours	41 Mehseti str. (Neftchilar campus), Tuesday 13:40-15:10 & Thursday 13:40-15:10
Prerequisites		CMS 370 Introduction to Theory of Computation, CMS 215 Data Structures
Language		English
Compulsory/Elective		Required
Required textbooks and course materials		*Core textbooks:* 1. Keith D. Cooper, Linda Torczon, Engineering a Compiler (Third Edition), Morgan Kaufmann, 2023, ISBN 9780128154120 *References:* 1. Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, Compilers, Principles, Techniques, and Tools, 2nd Edition, Addison-Wesley, 2007, ISBN: 978-0321486813. 2. Hopcroft, John E., Motwani, Rajeev and Ullman, Jeffrey D.. Introduction to Automata Theory, Languages, and Computation. Third Boston: Pearson/Addison Wesley, 2007. 3. Pratt, Terrence W and Zelkowitz, Marvin V. Programming Languages: Design and Implementation. 4 : Pearson Education, Inc., 2001.
Course outline		Creating a compiler is a design exercise in engineering. The final product's quality is determined by the decisions made at each stage of design process. As a result, there is no single correct answer for these choices. Every decision has an effect, from the amount of time and space needed to the algorithm that should be used in each step. In this course, we will not only learn about the steps of compiler design, but we will also look at the problems and solutions associated with each of these steps. Scanners, parsers, code generation, and optimization of a general-purpose programming language are among the steps we will investigate.
Course objectives		• To learn modern knowledge and compiler implementation • To carry out a self-directed project • To investigate the creation of a compiler for a programming language
Learning outcomes		Upon completion of this course, the students must be able to: ✓ Design and implement scanners in compilers. ✓ Identify and select the best syntax analysis strategy for a compiler in various situations. ✓ Apply automata theory and knowledge of formal languages. ✓ Clarify concepts and the various stages of compilation. ✓ Create intermediate code for a high-level language statements.

Teaching methods		
	Lecture	x
	Group discussion	x
	Experiential exercise	x
	Lab	
	Case analysis	
	Course paper	
	Others	

	Methods	Date/deadlines	Percentage (%)
	Midterm Exam		30
	Case studies		
	Activity		10

Evaluation	Assignment and quizzes		
	Project	16/05/2023	20
	Presentation/Group Discussion		
	Final Exam		40
	Others		
	Total		100
Policy	• **Preparation for class** The structure of this course makes your individual study and preparation outside the class extremely important. The lecture material will focus on the major points introduced in the text. Reading the assigned chapters and having some familiarity with them before class will greatly assist your understanding of the lecture. After the lecture, you should study your notes and work relevant problems and cases from the end of the chapter and sample exam questions. Throughout the semester we will also have many review sessions. These review sessions will take place during the regularly scheduled class periods. • **Withdrawal (pass/fail)** This course strictly follows grading policy of the School of Engineering and Applied Science. Thus, a student is normally expected to achieve a mark of at least 60% to pass. In case of failure, he/she will be required to repeat the course the following term or year. • **Cheating/plagiarism** Cheating or other plagiarism during the Quizzes, Mid-term and Final Examinations will lead to paper cancellation. In this case, the student will automatically get zero (0), without any considerations. • **Professional behavior guidelines** The students shall behave in the way to create favorable academic and professional environment during the class hours. Unauthorized discussions and unethical behavior are strictly prohibited. • **Ethics** Students should not arrive in late to class. All cell phones must be turned off and stowed away before entering class. Use of any electronic devices is not allowed in the classroom and violators will be punished accordingly. • **Exams** All exams will be closed book. • **Project** This course is not about programming. For this reason, the result of the project is the most important part of it, and the projects that are not executed on the computer are not given a grade. The number of people in each group in the project can be maximum 3 people. A maximum of one third of the project score is related to its presentation in less than ten minutes and answers to the questions. All team members are responsible for answering any questions about the project.

WK	Date/Day (tentative)	Topics	Textbook/Assignments
1	14/02/2023 16/02/2023	• **Introduction** • **Scanners**	**Ch. 1 & Ch. 2.1-2.3**
2	21/02/2023 23/02/2023	• **Scanners (cont.)** • **Parsers** • **Introducing the subject and the members of each team in the project via email**	**Ch. 2.4-2.6 & Ch. 3.1-3.2**
3	28/02/2023 02/03/2023	• **Parsers (cont.)**	**Ch. 3.3-3.6**
4	07/03/2023 09/03/2023	• **Intermediate Representations**	**Ch. 4**
5	14/03/2023 16/03/2023	• **Exercise** • **Syntax-Driven Translation**	**Ch. 5.1-5.3**
6	21/03/2023 23/03/2023	• **Novruz Holiday**	
7	28/03/2023 30/03/2023	• **Syntax-Driven Translation (cont.)**	**Ch. 5.4-5.6**
8	04/04/2023 06/04/2023	• **Preparation for the midterm** • **Midterm Exam**	
9	11/04/2023 13/04/2023	• **Implementing Procedures**	**Ch. 6**
10	18/04/2023 20/04/2023	• **Code Shape**	**Ch. 7.1-7.4**
11	25/04/2023 27/04/2023	• **Code Shape (cont.)**	**Ch. 7.5-7.7**
12	02/05/2023 04/05/2023	• **Introduction to Optimization**	**Ch. 8.1-8.4**
13	09/05/2023 11/05/2023	• **Introduction to Optimization (cont.)**	**Ch. 8.5-8.7**
14	16/05/2023 18/05/2023	• **Projects/Presentations**	
15	23/05/2023 25/05/2023	• **Exercise** • **Preparation for the final exam**	
16	TBA	**Final Exam**	

This syllabus is a guide for the course and any modifications to it will be announced in advance.