Course specification

(4203 Compiler Theory)

Faculty:	*HICIT- **Higher Institute for Computers & Information Technology**-El Shorouk Academy*
Programme(s) on which the course is given:	Under graduate program in Computer Science
Major or minor element of programme:	Compulsory
Department offering the programme	Department of Computer Science
Department offering the course:	Department of Computer Science
Year / Class	4th Year – 2nd semester
Date of specification approval	1/8/2022

A- Basic Information

Title: Compiler Theory	***Code:*** 4203		
Weekly Hours:			
Lecture : 3	**Exercise: -**	**Practical :**3	**Total:** 6

B- Professional Information

1- Course Objectives:

The student will learn principles of compiler construction and operation. Topics will include: lexical analysis, symbol tables, parsing, type checking, optimization, and code generation.

2- Program ILOs Covered by Course

Program Intended Learning Outcomes			
Knowledge and understanding	**Intellectual Skills**	**Professional and practical skills**	**General and Transferable skills**
A10	**B1, B2, B4, B15**	**C10**	**D12**

3- Intended learning outcomes of course (ILOs)

a. Knowledge and Under-Standing:

Students should:

a1. Define the basic phases of Compilation. [A10]

a2. Explain how compilers operate.[A10]

b. Intellectual Skills:

The ability to:

b1. Analyze and recognize the significance of the several phases through which a typical Program is compiled. [B1, B2, B4, B15]

c- Professional and practical skills

The ability to:

c1. Implement typical compilation phases. [C10]

c2. Design a simple compiler.[C10]

d- General and transferable skills

The ability to:

d1. Work in a group in order to design and implement a typical high level language compiler.[D12]

d2. Present the implemented compiler and make a demo.[D12]

4- Contents

Topic	Hours	Lec.	Exc/Lab
Introduction to compiler theory	6	3	3
Scanning & Finite Automata	18	9	9
Context- Free Grammars & Parsing	18	9	9
Semantic Analysis	6	3	3
Runtime Environment	6	3	3
Code Generation	12	6	6
Implementation project in compiler design	9	3	6
Selected Topics	3	3	-

4 -Teaching and learning methods

Teaching and learning methods	Used
Active Learning	
Lectures(blending learning – online learning using virtual classroom)	√
Tutorial Exercises (hybrid learning – online learning)	√
Practical Lab(blending learning– online learning)	-
Exercises	-
Discussions.	√
Self – Learning strategy	
Reading material	√
Websites search	√
Research and reporting	√
Self-studies	-
Experimental strategy	-
Group work	-
Presentation	-
Problem solving strategy	
Problem solving/problem solving learning based	-
Case study	√
Synchronous E-Learning	

Virtual lab	-
Virtual class	-
Chat Room	-
Video lectures	-
Asynchronous E-Learning	
E-Learning	√

5 -Student assessment methods

Methods	Assessment	Used
Electronic Midterm Exam	To assess the knowledge and understanding achieved by the student during the previous weeks. (online on e-learning hub)	√
Pencil-to-Paper Final Exam	To evaluate what the student gain at the end of the course, and to assess: the knowledge and understanding, general skills, and intellectual skills.	√
Course Project	To allow students work in team, and to evaluate knowledge, understanding, intellectual, and transferable skills. (online on e-learning hub , FTF)	√
Electronic Course Work & Quizzes	To keep the student always in the course, and to evaluate knowledge, understanding, intellectual, and transferable skills.(online on e-learning hub)	√
Practical Exam	to measure the ability of students to design and implement a software program(FTF).	---
Participation	To assess the knowledge and understanding achieved by the student during the previous weeks.	√

Assessment Schedule

Assessment	Week #
Participation	**3-14**
Electronic Mid Term Exam	**8**
Final Exam	**16**
Electronic/ hard copy Course Project	**3-14**
Electronic/ hard copy Course Work &Quizzes	**2-14**

Assessment Weight

Assessment	Weight %
Participation	**5%**
Electronic Mid Term Exam	
Final Exam	**80%**
Electronic / hard copy Course Project	**10%**
Electronic/ hard copy Course Work &Quizzes	**5%**
Total	**100**

-Course Work &Quizzes:

- Short Exams, Assignments, Researches, Reports, Presentations on e-learning hub
- Class/Project discussion in a virtual classroom

6 -List of references

Essential books(text books)	Louden, K. C. (1997, January 24). *Compiler Construction: Principles and Practice*. https://doi.org/10.1604/978053493972 Aho, A., Lam, M., Sethi, R., & Ullman, J. (2013, July 26). *Compilers: Principles, Techniques, and Tools: Pearson New International Edition*. Pearson.
Course notes	http://lambda.uta.edu/cse5317/notes.pdf http://www.sai.msu.su/sal/F/1 http:///www.compilerconnection.com http://www.thefreecountry.com
Recommended books	Allen, R., & Kennedy, K. (2001, January 1). *Optimizing Compilers for Modern Architectures: A Dependence-Based Approach*. https://doi.org/10.1604/9780585456997 Morgan, B. (2004, October 1). *Building an Optimizing Compiler*.
Periodicals, website	**Powerpoint presentations of all course materials** **All labs material** **[https://moodle.sha.edu.eg/course/view.php?id=2269]**

1- Required Facilities

To assess professional and practical skills given the following facilities:

a. Tools & SW (Technologies facilities):

- **Microsoft TEAMS to create virtual classrooms for lectures, discussions for project**
- **portal(MOODLE) to make electronic quizzes and electronic midterm exam**
- **portal(MOODLE) to upload project deliverable and assignment**
- **academy portal(MOODLE) to upload electronic material**

b. Teaching facilities:

	Lecture	*class*	*Lab*
Whiteboard	used	-	used
Pc/laptop	used	-	used
Data show	used	-	used
Webinars	MS TEAMS	-	MS TEAMS
SocialMedia	Facebook Page for 4th year	-	Facebook Page for 4th year
ChatRoom	Chat Teams	-	Chat Teams
Videos	Stream-MOODLE	-	Stream-MOODLE
Website	MOODLE	-	MOODLE

8-Course Matrices

8.1-Course Content/ILO Matrix

Course Contents	Knowledge & understanding		Intellectual skills	Professional and practical skills		General	
	a1	**a2**	**b1**	**c1**	**c2**	**d1**	**d2**
Introduction to compiler theory	√						
Scanning & Finite Automata		√	√	√	√		

Context- Free Grammars & Parsing		√	√	√	√		
Semantic Analysis		√	√	√	√		
Runtime Environment			√				
Code Generation		√	√	√	√		
Selected Topics	√		√	√	√		
Course Project						√	√

8.2-Learning Method /ILOs Matrix

Learning Methods	Knowledge and understanding		Intellectual skills	Professional and practical skills		General	
	a1	a2	b1	c1	c2	d1	d2
Lectures	x	x	x	x	x		
Tutorial Exercises			x	x	x		
Reading material	x	x	x	x	x		
Websites search	x	x	x		x	x	x
Research and reporting	x	x				x	x
Discussions.			x	x	x	x	x

8-3 Assessment Methods /ILOs Matrix

Assessment Methods	Knowledge & understanding		Intellectual skills	Professional & practical skills		General	
	a1	a2	b1	c1	c2	d1	d2
Electronic Mid Term Exam	x	x	x				
Final Exam	x	x	x				
Electronic Course Project	x	x	x	x	x	x	x
Electronic Course Work &Quizzes	x	x	x	x	x	x	x

9. Course ILOs Vs Program ILOs

Course ILOs \ Prog ILOs		Knowledge and understanding	Intellectual skills				Professional and practical skills	General
		A10	B1	B2	B4	B15	C10	D12
K&U	a1	√						
	a2	√						
Int.	b1		√	√	√	√		
P. &P.	c1						√	
	c2						√	
General	d1							√
	d2							√

Course Coordinator: Prof.Dr. Ahmed El-Abbassy **(** **)**
Head of Department: Prof.Dr. Ahmed El-Abbassy **(** **)**
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