Course specification

(2104 Logic Design)

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	2nd Year – 1st semester
Date of specification approval	1/8/2022

A- Basic Information

Title: Logic Design	*Code:* 2104		
Weekly Hours:			
Lecture : 3	**Exercise: -**	**Practical :4**	**Total: 7**

B- Professional Information

1- Course Aims:

- o The objective of CS2104 is to teach ways and techniques of numbering systems, logic design combinational circuits and introduction to sequential.   After completing this course, the student should be able to design and implement simple logic circuits as well as analysis existing ones.

2- Program ILOs Covered by Course

Program Intended Learning Outcomes			
Knowledge and understanding	**Intellectual Skills**	**Professional and practical skills**	**General and Transferable skills**
A8	**B2, B4, B7, B8**	**C5, C6, C9**	**D9**

3- Intended learning outcomes of course (ILOs)

a. Knowledge and Under-Standing:

a1. Identify Numbering systems. [A8]
a2. Define the different types of logic gates. [A8]
a3. Define Logic functions. [A8]
a4. Explain the concept of Boolean functions. [A8]
a5. Defiine Boolean algebra. [A8]
a6. Define Combinational Logic Circuits Design methods. [A8]
a7. Identity flip-flops and latches. [A8]
a8. Clarify Concept of sequential logic circuit. [A8]

b. Intellectual Skills:

Cognitive skills of critical thinking, analysis, synthesis, including :
b1. Analyze transferring from different representations to have better representations. [B7, B8]
b2. Apply Algebraic representation for systems functions. [B2,B4]
b3. Discuss optimization methodologies. [B2]
b4. Design and synthesis clearly and precisely solutions for problems. [B2,B4,B8]

c- Professional and practical skills

Specifically ability to:
c1) Design and develop combinational logic circuits. [C5]
c2) Analyse combinational circuits to mathematical formulations to its function. [C6]
c3) Develop simple sequential circuit. [C5, C9]

d- General and transferable skills

Specifically ability to:
d1) Communicate effectively by oral, written and visual means. [D9]
d2)Work effectively as an individual and as a member of a team. [D9]
d3) Develop Creativity and imagination skills, Self-assessment ability and Critical thinking and analytic ability. [D9]

4- Contents

Topic	Hours	Lec.	Exc/Lab
Number systems	6	3	3
Logic gates	6	3	3
Logic functions	12	6	6
Boolean algebra	12	6	6
Functions simplification	6	3	3
Canonical logic functions	6	3	3
Combination logic design	6	3	3

Flip flops	6	3	3
State diagrams	6	3	3
Sequential logic circuits design	6	3	3
Selected Topics	3	3	-

5- 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	√

6- 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	To evaluate what the student gain at the end of the	√

Exam	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 Work &Quizzes	2-14

Assessment Weight

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

– Course Work &Quizzes:
  o Short Exams, Assignments, Researches, Reports, Presentations on e-learning hub
  o Class/Project discussion in a virtual classroom

6 -List of references

Essential books (text books)	- Mano, M. M., & Ciletti, M. D. (2012, January 2). *Digital Design*. Prentice Hall.
Course notes	– [www.tutorialspoint.com] – [www.smartzworld.com]
Recommended books	Singh, S. (2017, September 29). *Digital Logic Design*.
Periodicals, website	Powerpoint presentations of all course materials All labs material [https://moodle.sha.edu.eg/course/view.php?id=1360]

7- 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**
  – **portal(MOODLE) to make electronic quizzes and electronic midterm exam**
  – **portal(MOODLE) to upload project deliverable and assignment**
  – **academy portal(MOODLE) to upload electronic materi**

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 2nd year	-	Facebook Page for 2nd year
ChatRoom	ChatTeams	-	ChatTeams
Videos	Stream-MOODLE	-	Stream-MOODLE
Website	MOODLE	-	MOODLE

8- Course Matrices

8.1- Course Content/ILO Matrix

Course Contents	Knowledge and understanding								Intellectual skills				Professional and practical skills			General		
	a1	a2	a3	a4	a5	a6	a7	a8	b1	b2	b3	b4	c1	c2	c3	d1	d2	d3
Numbers systems	x											x						
Logic gates			x															
Logic functions	x																	
Boolean algebra		x		x					x	x	x	x			x			
Functions simplification		x	x	x									x	x				
Canonical logic functions							x											
Combination logic functions														x				
Flip flops					x													
State diagram representations						x												
Sequential logic circuits design							x											
Selected Topic							x							x				

8.2- Learning Method /ILOs Matrix

Learning Methods	Knowledge and understanding								Intellectual skills				Professional and practical skills			General		
	a1	a2	a3	a4	a5	a6	a7	a8	b1	b2	b3	b4	c1	c2	c3	d1	d2	d3
Lectures	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
Tutorial Exercises									x	x	x	x	x	x	x			
Reading material	x	x	x	x					x	x	x	x	x	x	x			

Learning Methods	Knowledge and understanding								Intellectual skills				Professional and practical skills			General		
	a1	a2	a3	a4	a5	a6	a7	a8	b1	b2	b3	b4	c1	c2	c3	d1	d2	d3
Websites search	x	x	x	x					x	x	x		x			x	x	
Research and reporting		x							x	x			x	x	x	x		
Problem solving/problem solving learning based		x	x	x								x						
Group work													x	x	x	x	x	
Presentations										x						x	x	x
Practical Lab									x		x	x	x	x	x	x		
Discussions.									x	x	x	x	x	x	x	x	x	x

8.3 Assessment Methods /ILOs Matrix

Assessment Methods	Knowledge & understanding								Intellectual skills				Professional & practical skills			General		
	a1	a2	a3	a4	a5	a6	a7	a8	b1	b2	b3	b4	c1	c2	c3	d1	d2	d3
electronic mid term exam	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
final exam	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
electronic course work &quizzes	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

9. Course ILOs Vs Program ILOs

Course ILOs \ Prog ILOs	Knowledge & understanding	Intellectual skills				Professional and practical skills			General
	A8	B2	B4	B7	B8	C5	C6	C9	D9
K&U a1	√								
a2	√								
a3	√								
a4	√								
a5	√								
a6	√								
a7	√								
a8	√								
Int. b1				√	√				
b2		√	√						
b3		√							
b4		√	√		√				
P. &P. c1						√			
c2							√		
c3						√		√	
General d1									√
d2									√
d3									√

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Date: 1/8/2022