



جمهورية مصر العربية

وزارة التعليم العالي والبحث العلمي

Ministry of Higher Education and Scientific Research



المعلومات وتكنولوجيا للحاسبات العالي المعهد  
القاهرة - الشروق مدينة  
شعبة علوم الحاسب

## Course specification

**Course Code:** CS 121

**Course Title:** Logic Design

**Academic Year:** 2025 /2026

**Course specification**  
**(CS 121 – Logic Design)**

**Course Outline**

<b>Faculty:</b>	<i>HICIT- (Higher Institute for Computers &amp; Information Technology-El Shorouk Academy)</i>		
<b>Programme(s) on which the course is given:</b>	Undergraduate program in Computer Science		
<b>Major or minor element of programme:</b>	Compulsory		
<b>Department offering the program</b>	Department of Computer Science		
<b>Department offering the course:</b>	Department of Computer Science		
<b>Level</b>	First Level		
<b>Date of specification approval</b>	08/08/2023		

**Basic Information**

<b>Code:</b>	CS 121	<b>Title:</b>	Logic Design	
<b>Prerequisites:</b>	None			
<b>Weekly Hours:</b>	4			
<b>Lecture:</b> 2	<b>Exercise:</b> 1	<b>Practical :</b> 1	<b>Total:</b> 3 credit hours	

**Professional Information**

**Course Aims:**

The aim of CS121 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.

### Intended learning outcomes of course ILOs)

After Completing this course, the student must demonstrate the Knowledge, and the skills listed below.

## 2- Intended Learning Outcomes of the course (ILOs)

By completing this course successfully, the student will be able to:

Intended learning outcomes of course (ILOs)	
<b>a. Knowledge and Under-Standing:</b>	
a1. Understand Numbering systems with focus on binary, octal, decimal and Hexadecimal.	
a2. Understand Boolean operation and Boolean gates.	
a3. Comprehend Boolean expressions and simplification methods.	
a4 Understand how to perform Boolean Algebra	
a5 Comprehend how to perform expressions Simplification using k-maps	
a6 Understand how to design Combinational logic circuits	
a7 Understand how to design Simple sequential circuit.	
<b>b. Intellectual Skills:</b>	
b1. Simplification of Boolean expression.	
b2. Express logic problem with logic expression	
b3. Perform combinational logic circuit and simple sequential circuit designs.	
<b>c. Professional and practical skills</b>	
c1. Binary Circuits analysis and design.	
c2. Realization of combinational circuits from specification to hardware realization.	
c4. Comprehend circuits from design layouts for combination a binary circuits.	
<b>d. General and transferable skills</b>	
d1. Demonstrate skills in group working, team management, time management and organizational skills.	
d2. Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry or the academic community.	

Program ILOs Covered by Course			
Knowledge and understanding	Intellectual Skills	Professional and practical skills	General and Transferable skills
A1,A4,A8,A10	B1,B5,B7,B8	C5,C6,C16	D1,D2,D7,D9

Contents		
Topic	Contact Hours	
	lecture	Lab

Numbering system	4	4
Boolean operation and gates	4	4
Boolean Algebra	4	4
Simplification and K-map	4	4
Combinational logic circuits	6	6
Sequential logic circuits	8	8
Numbering system	4	4
Boolean operation and gates	4	4
Boolean Algebra	4	4
Simplification and K-map	4	4

Teaching and learning methods	
Teaching and learning methods	Used
Lectures	√
Tutorial Exercises	√
Practical Lab	√
Discussions.	√
Self – Learning (Reading material, Websites search,)	√
Self-studies	√
Group work	√
Presentation	√
Problem solving/problem solving learning based	√
Case study	-
Synchronous E-Learning	-
Video lectures	√
Asynchronous E-Learning	√

Student assessment methods & Schedule		
Methods	Used	Week#
Midterm Exam	√	8
Final Exam	√	16
Course Project	√	3-14
Course Work & Quizzes	√	2-14
Practical Exam	√	15

Assessment Weight	
Assessment	Weight %
Mid Term Exam	15%
Practical Exam and Project	15%
Final Exam	60%

Course Work & Quizzes	10%
Total	100

Course Work & Quizzes	
Short Exams, Assignments, Research, Reports, Presentations	
Class/Project discussion	

List of references	
<b>Essential books (textbooks)</b>	- Floyd, Thomas L <i>Digital Fundamentals</i> 11ed.2 Pearson Higher wd,2014 - M. Mano and M.D. Ciletti, <i>Digital Design</i> , Pearson International, Prentice Hall, New Jersey, USA, 2013-
<b>Course notes</b>	E-Learning Portal
<b>Recommended books</b>	- C.H. Roth, Jr. and L.L. Kinney, <i>Fundamentals of Logic Design</i> , CengageLearning, Stamford CT, USA, 2014.
<b>Periodicals, website</b>	PowerPoint presentations of all course materials All labs material33112 <a href="https://moodle.sha.edu/course/view.php?id=33112">[https://moodle.sha.edu/course/view.php?id=33112]</a>
<b>Videos link</b>	Video of lectures and sections <a href="https://moodle.sha.edu/course/view.php?id=33112">[https://moodle.sha.edu/course/view.php?id=33112]</a>

Required Facilities		
Tools & SW (Technology facilities):	- Microsoft TEAMS to create virtual classrooms for lectures, discussions for project.	
	- Academy Portal (MOODLE) to make electronic quizzes and electronic midterm exam.	
Teaching facilities:	- Academy Portal (MOODLE) to upload project deliverable and assignment.	
	- Academy portal (MOODLE) to upload electronic material.	
	Whiteboard	√
	Digital Circuits Lab	√
	Data show	√
	E-Learning	√
Videos	√	
Website	√	

Course Content ILOs Matrix																
Course Content	Knowledge and understanding							Intellectual Skills			Professional and practical skills				General	
	a1	a2	a3	a4	a5	a6	a7	b1	b2	b3	c1	c2	c3	c4	d1	d2
Number system	√										√			√		
Boolean operation and gates	√				√			√		√	√					
Boolean Algebra				√					√	√				√		
Simplification and K-map	√				√							√		√		√
Combinational logic circuits	√								√				√		√	√
Sequential logic circuits	√														√	√

Learning Method /ILOs Matrix																
Learning Methods	Knowledge and understanding							Intellectual Skills			Professional and practical skills				General	
	a1	a2	a3	a4	a5	a6	a7	b1	b2	b3	c1	c2	c3	c4	d1	d2
Lectures	x	x	x	x	x	x	x	x	x	x	x				x	x
Tutorial Exercises						x	x	x		x	x	x				
Reading material																
Websites search						x	x					x		x	x	
Research and reporting						x	x					x	x		x	
Problem solving/proble						x	x	x	x							
Discussions.	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

### Assessment Methods /ILOs Matrix

Assessment Methods	Knowledge & understanding							Intellectual skills			Professional & practical skills				General	
	a1	a2	a3	a4	a5	a6	a7	b1	b2	b3	c1	c2	c3	c4	d1	d2
Mid Term Exam	x	x	x	x	x	x	x	x	x	x						
Final Exam	x	x	x	x	x	x	x	x	x	x						
Course Work & Quizzes	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Course ILOs		Knowledge & understanding				Intellectual skills				Professional and practical skills			General			
		A1	A4	A8	A10	B1	B5	B7	B8	C5	C6	C16	D1	D2	D7	D9
Knowledge and Understanding	a1		√		√											
	a2	√			√											
	a3				√											
	a4															
	a5				√											
	a6															
	a7				√											
Intellectual skills	b1					√	√									
	b2							√	√							
	b3					√	√		√							
Professional and practical skills	c1									√	√	√				
	c2										√	√				
	c3									√		√				
	c4									√	√	√				
General skills	d1												√	√		
	d2														√	√

Course Coordinator: Dr. Salah Elewa ( )

Head of Department: Dr. Ahmed Al Abbassy ( )

Date: 8/6/2023