جامعة الإسراء
ISRA UNIVERSITY

Course Syllabus

According to JORDAN National Qualification Framework (JNQF)

Course Name: Logic Design

Course Number: : 06051220

General Course Information:

Course title	Logic Design
Course number	0600105, 0620105, 06051220, 0640105
Credit hours	3 Hours
Education type	Hybrid (2 hours Face-to-Face, 1 hour Asynchronous)
Prerequisites/corequisites	Calculus (1) (1103101)
Academic Program	Computer Science
Program code	600 / 605
Faculty	Faculty of Information Technology
Department	Computer Science
Level of course	1
Academic year /semester	2021/2022 Summer Semester
Awarded qualification	Computer Science
Other department(s) involved in teaching the course	(All departments of Faculty of IT)
Language of instruction	English
Date of production/revision	19-Oct. 2021

Course Coordinator:

Coordinator's name	Dr. Faisal Yousef Alzyoud
Office No	4151
Office Phone extension number	962 6 4711710 ext. 2611
Office Hours	Sun (9-10), Mon (9:30-11:00), and Thu. (10-11)
Email	faisal.alzyoud@iu.edu.jo

Other Instructors:

Instructor name	
Office No	
Office Phone extension number	
Office Hours	
Email	

Course Description *(English/Arabic)*:

English	Numbering system, computer codes, Boolean algebra and logic gates, simplification of Boolean functions, combinational logic, MSI and PLD components, synchronous clocked sequential circuits, asynchronous sequential circuits, and shift registers, memories.
Arabic	أنظمة العد وشيفرات الحاسوب والجبر البولياني والبوابات المنطقية وتبسيط الإقترانات البوليانية والمنطق التركيبي وعناصر الـMSI وPLD والدوائر التتابعية المتزامنة والدوائر التتابعية غير المتزامنة ومسجلات الإزاحة والذواكر.

Textbook: *Author(s), Title, Publisher, Edition, Year, Book website.*

Digital Fundamentals, Floyd, Prentice-Hall, 11th edition, 2015. ISBN 10: 1-292-07598-8 , ISBN 13: 978-1-292-07598-3

References: *Author(s), Title, Publisher, Edition, Year, Book website.*

1. Mano, M. Morris. *Digital logic and computer design*. Pearson Education India, 2017.
2. Digital systems, principles and applications, Tocci, Ronald R.,Prentice-Hall, 10th edition 2006 Discrete and Combinatorial Mathematics: An Applied Introduction, Ralph P. Grimaldi, 5th edition, Addison Wesley, 2003

Course Educational Objectives (CEOs):

1.	Outline the number systems, codes and Boolean algebra to analysis and design of digital logic circuits
2.	Identify, formulate, and solve engineering problems in the area of digital logic circuit design.
3.	Design combinational and sequential circuits to meet certain specifications.
4.	Illustrate function on multi-disciplinary teams through digital circuit experiments and projects (The ability to work in teams).
5.	Apply the techniques, skills, and modern engineering tools for logic design such as computer based ElectronicWorks Bench (EWB), necessary for practice

Intended Learning Outcomes (ILO's):

	Subject Intended learning outcomes (ILOs) describe what students are expected to know and be able to do at the end of the course. These outcomes are related to the knowledge, skill and competence that students acquire:	**Relationship to CEOs**	**Contribution to PLOs**	**Bloom Taxonomy Levels***	**Descriptors****
A	Knowledge and Understanding:				
A1	Explain the knowledge of number systems, codes and Boolean algebra to analysis and design of digital logic circuits.	1,2	a	1	K
A2					
A3					
B	Intellectual skills:				
B1	Identify, formulate, and solve engineering problems in the area of digital logic circuit design	2,3	a, b	2	K
B2	Design combinational and sequential circuits to meet certain specifications	2,3	a, b	2	C
B3					
C	Subject specific skills:				
C1	Employ the functions on multi-disciplinary teams through digital circuit experiments and projects (The ability to work in teams).	4	b, f	3	S
C2	Use the techniques, skills, and modern engineering tools such as computer based ElectronicWorks Bench (EWB), necessary for practice.	5	b, f	4	S

C3					
D	Transferable skills:				
D1	Implement functions on multi-disciplinary teams through digital circuit experiments and projects (The ability to work in teams).	4,5	b, f	4,5,6	C
D2	Use the techniques, skills, and modern engineering tools such as computer based ElectronicWorks Bench (EWB), necessary for practice	3,4,5	b, f	5	S
D3					

***Bloom Taxonomy Levels**

Level #	**1**	**2**	**3**	**4**	**5**	**6**
Level Name	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Evaluation**	**Synthesis**

**** Descriptor (National Qualification Framework Descriptors): K : Knowledge, S: Skill, C: Competency.**

Program Learning Outcome (PLOs):

Program Learning Outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills, and behaviours that students acquire as they progress through the program. A graduate of the (_____) program will demonstrate:	**Descriptors****		
	K	**S**	**C**

a.	**Analyse a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.**	√		
b.	**Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.**		√	
c.	Communicate effectively in a variety of professional contexts.			√
d.	Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.			√
e.	Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.			√
f.	**Applying the principles, methodologies, tools, and best practices in software engineering for building and developing high quality and effective software solutions that meet requirements. [SE]**		√	
g.				
h.				
i.				
j.				
k.				

**** Descriptors according to the national qualifications framework (K: knowledge, S: skill, C: Competency)**

Weekly Schedule *(please choose the type of teaching)*

□ **Face to Face**

√ **Hybrid** *(**2 Lectures** Face – To - Face **+1 Lecture** Asynchronous)*

□ **Hybrid (***1* ***Lectures*** *Face – To - Face* ***+1 Lecture*** *Asynchronous)*

□ **Online** *(**2 Lectures** Synchronous +**1 lecture Asynchronous**)*

Week	First Hour (Synchronous)	Second Hour (Synchronous)	Third Hour (Asynchronous)	Ach. ILOs	Ach. PLOs	DS**
1	Introduction to logic design ***(Acquire+practice)***	Numbering Systems ***Acquire+Discussion***	Boolean algebra, operators of Boolean algebra ***Acquire+Discussion***	A1,C2,D2	a,b, f	K
2	Boolean functions (truth table, implementation of Boolean functions (***Acquire+practice***)	Boolean Algebra: Simplification and complement ***(Acquire)***	***Tutorials*** ***(Discussion+Practice)***	A1,C2,D2	a,b, f	K
3	Boolean Algebra: Standard Forms (Sum of Products, and Product of Sums) (***Acquire+practice)***	Boolean Algebra: Standard Forms (Sum of Products, and Product of Sums ***(Discussion+Practice)***	Practice in the lab use EWB ***(Discussion+Practice)***	A1,C2,D2	a,b, f	S
4	Boolean Algebra: Canonical Forms (sum of minterms, and product of maxterms) (Video) (Acquire+practice)	K-Map: 2-variables, 3-variables, 4-variables. variables and more ***(Discussion+Practice)***	Practice in the lab use EWB ***(Discussion+Practice)***	A1,C2,D2	a,b, f	K S
5	K-Map: Product of sum simplification, Do not care conditions tools (Video) (***Acquire+practice)***	K-Map: Product of sum simplification, Do not care conditions tools (Video) ***(Discussion+Practice)***	Practice in the lab use EWB ***(Discussion+Practice)***	A1,C2,D2	a,b, f	K S
6	NAND and NOR Implementation (Video) (***Acquire+practice)***	XoR Implementation ***(Discussion+Practice)***	Practice in the lab use EWB ***(Discussion+Practice)***	B1, C1,C2,D1, D2	a,b, f	K S
7	Combinational Circuits (***Acquire + practice)***	Combinational Circuits ***(practice)***	Practice in the lab use EWB ***(practice)***	B1, C1,C2,D1, D2	a,b, f	S
8	**Assignment (*practice*)**	Binary Subtractor and Multiplication ***(Discussion+Practice)***	Mid Exam	B1, C1,C2,D1, D2	b	S
9	Decimal Adder **(*practice*)**	comparator ***(Discussion +Practice)***	Practice in the lab use EWB (***Acquire)***	B1, C1,C2,D1, D2	b	S
10	Decoder ***(Video)*** ***(Acquire + practice)***	Encoder ***(Discussion +Practice)***	Practice in the lab use EWB (***Acquire***	B1, C1,C2,D1, D2	B	S
11	**Assignment** ***(practice)***	Multiplexers ***(practice)***	Demultiplexers ***(practice)***	B1, C1,C2,D1, D2	b	S
12	ROM ***(Video)*** ***(Acquire + practice)***	Flip-Flop (***Acquire + practice)***	Analysing Sequential Circuit (***Acquire + practice)***	B1, C1,C2,D1, D2	b	S
13	Assignment (***practice)***	Design Sequential Circuit (***Acquire + practice)***	Practice in the lab use EWB (***Acquire + practice)***	B1, C1,C2,D1, D2	b	S
14	Registers ***(Video)*** (***Acquire + practice)***	Serial adders ***(Discussion)***	Practice in the lab use EWB ***(practice)***	D1	b	S

15	Assignment (***practice)***	***Tutorials- (Discussion)***	***Review for the final exam)***	D1	b	S
16	Final exam					

** **DS (Descriptors) - K: Knowledge, S: Skills, C: Competency**

Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

- Interactive videos
- Practice Labs
- Discussion Forums
- Quizzes
- Other Interactive online activities
- Reports

Course Policies:

A- Attendance policies:

The maximum allowed absences is 15% of the lectures.

B- Absences from exams and handing in assignments on time:

Midterm exam can be retaken based on approval of excuse by the instructor's discretion.

Not handing assignment on time will incur penalties.

C- Academic Health and safety procedures

D- Honesty policy regarding cheating, plagiarism, and misbehaviour:

Cheating, plagiarism, misbehaviour will result in zero grade and further disciplinary actions may be taken.

E- Grading policy:

- All homework is to be posted online through the e-learning system.
- Exams will be marked within 72 hours and the marked exam papers will be handed to the students.
- Online Activities (Course Videos, Practice labs, Discussion Forums, Quizzes) **30%**
- Midterm **20%**
- Final Exam **50%**

F- Available university services that support achievement in the course: **E-Learning Platform, Labs, Library.**

Required equipment:

- **PC / Laptop with webcam and mic**
- **Internet Connection**
- **Access to the IU E-Learning Platform at: https://elearn.iu.edu.jo/**
- **E-learning plan**
- Satisfaction questionnaires for online and face-to-face learning
- Software for e-learning
- Training

Assessment Tools implemented in the course:

- Final Exam
- Midterm Exam
- Quizzes
- Homework
- Practice Labs
- Discussion Forums
- Periodic reports for learning assessment
- Improvement plans for online or face-to-face teaching

- Others:…….

Responsible Persons and their Signatures:

Course Coordinator	**Dr. Faisal Yousef Alzyoud**	**Completed Date**	**5 / 7 / 2022**
		Signature	

Received by (Department Head)	**Dr. Faisal Yousef Alzyoud**	**Completed Date**	**5 / 7 / 2022**
		Signature	