الهاشمية الجامعة

The Hashemite University

Deanship of Academic Development and International Outreach

عمادة التطوير الأكاديمي والتواصل الدولي

Syllabus: Digital Logic Design (1910011123)

COURSE INFORMATION

Course Name: Digital Logic Design **Semester:** Second Semester 2021/2022 **Department:** Department of Computer Science and Application **Faculty:** Prince Al-Hussein bin Abdullah II Faculty for Information Technology	**Course Code:** 1910011123 **Section:** 1,2,3 **Core Curriculum**: Mandatory
Day(s) and Time(s): Sunday Tuesday Thursday 1: 10-11, 2: 11-12, 3: 1-2 **Classroom:** 1: مبنى كلية العلوم الصيدلانية صيدلة 113 / 2: مبنى كلية العلوم الصيدلانية صيدلة 113 / 3: مبنى الحسين الباني ح.ب 311	**Credit Hours:** 3 **Prerequisites**: 110101152

COURSE DESCRIPTION

This course introduces the following topics: Digital and numbering systems: conversion methods, binary and complement arithmetic; Boolean algebra; Circuit minimization techniques; Combinational circuits: Adders, Decoders, Encoders, Code Converters; Sequential Circuits: flip-flops, counters, registers, synchronous sequential circuits.

DELIVERY METHODS

The course will be delivered through an active classroom based discussion and online Videos (Blended learning).
The whole material is uploaded on Moodle including slides, assignments, video lectures and extra supportive material.

FACULTY INFORMATION

Name	**Dr. Ahmad Qawasmeh**	
Academic Title:	**Associate Professor**	

	Office Location:	**IT 123**	
	Telephone Number:	**-**	
	Email Address:	**ahmadr@hu.edu.jo**	
	Office Hours:	**Sunday/Tuesday 12-1** *Please send an e-mail (ahmadr@hu.edu.jo) to meet at any other time at the office or online via teams.*	

REFERENCES AND LEARNING RESOURCES

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a) Textbook (s):
1. Morris Mano and Michael D. Ciletti, Digital Design, 5th Edition, Prentice Hall, 2013., ISBN-10: 0131989243; ISBN-13: 978-0131989245
b) Additional References:
1. Digital Logic Design, Fourth Edition by Brian Holdsworth and Clive Woods, 2002.
2. Fundamentals of Logic Design by Charles H and Roth, Jr. West Publishing Company

Useful Web Resources:
https://www.youtube.com/watch?v=y3ZNOaSOySw&list=PLAwv14VhKVabiV420DERMddTzzFiivcTb

STUDENT LEARNING OUTCOMES MATRIX*

Core Curriculum Learning Outcomes	Program Learning Outcomes	Course Objectives	Course Student Learning Outcomes	Assessment Method
	SLO1- Analyze a complex computing problem and to apply principles of computing and	Recognize the numbering systems and digital logic circuits.	SLO2	· Exam

	other relevant disciplines to identify solutions.	Analyze a logic circuit, and identify and define its inputs/outputs	SLO1	· Exam
	SLO2- Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline. SLO3- Communicate effectively in a variety of professional contexts. SLO4- Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles. SLO5- Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.	Analyze and design logic networks using both traditional techniques (such as K-maps and state tables) and modern CAD tools.	SLO2	· Exams
		Design, implement, and evaluate a digital circuit	SLO2	Exam

ACADEMIC SUPPORT

It is The Hashemite University policy to provide educational opportunities that ensure fair, appropriate and reasonable accommodation to students who have disabilities that may affect their ability to participate in course activities or meet course requirements. Students with disabilities are encouraged to contact their Instructor to ensure that their individual needs are

met. The University through its Special Need section will exert all efforts to accommodate for individual's needs.

Special Needs Section:

Tel: 053903333 EXT 5023/4583

Location: (https://hu.edu.jo/facnew/index.aspx?typ=68&unitid=70000000)

Email: (huniv@hu.edu.jo)

COURSE REGULATIONS

Participation

Class participation and attendance are important elements of every student's learning experience at The Hashemite University, and the student is expected to attend all classes. A student should not miss more than 15% of the classes during a semester. *Those exceeding this limit of 15% will receive a failing grade regardless of their performance*. It is a student's responsibility to monitor the frequency of their own absences. **Attendance record begins on the first day of class irrespective of the period allotted to drop/add and late registration. It is a student's responsibility to sign-in; failure to do so will result in a non-attendance being recorded.**

In exceptional cases, the student, with the instructor's prior permission, could be exempted from attending a class provided that the number of such occasions does not exceed the limit allowed by the University. The instructor will determine the acceptability of an absence for being absent. A student who misses more than 25% of classes and has a valid excuse for being absent will be allowed to withdraw from the course.

Plagiarism

Plagiarism is considered a serious academic offence and can result in your work losing marks or being failed. HU expects its students to adopt and abide by the highest standards of conduct in their interaction with their professors, peers, and the wider University community. As such, a student is expected not to engage in behaviours that compromise his/her own integrity as well as that of the Hashemite University.

Plagiarism includes the following examples and it applies to all student assignments or submitted work:

- **Use of the work, ideas, images or words of someone else without his/her permission or reference to them.**
- **Use of someone else's wording, name, phrase, sentence, paragraph or essay without using quotation marks.**
- **Misrepresentation of the sources that were used.**

The instructor has the right to fail the coursework or deduct marks where plagiarism is detected

Late or Missed Assignments

In all cases of assessment, students who fails to attend an exam, class project or deliver a presentation on the scheduled date without prior permission, and/or are unable to provide a medical note, will automatically receive a fail grade for this part of the assessment.

· Submitting a term paper on time is a key part of the assessment process. Students who fail to submit their work by the deadline specified will automatically receive a 10% penalty. Assignments handed in more than 24 hours late will receive a further 10% penalty. Each subsequent 24 hours will result in a further 10% penalty.
· In cases where a student misses an assessment on account of a medical reason or with prior permission; in line with University regulations an incomplete grade for the specific assessment will be awarded and an alternative assessment or extension can be arranged.

Student Complaints Policy

Students at Hashemite University have the right to pursue complaints related to faculty, staff, and other students. The nature of the complaints may be either academic or non academic. For more information about the policy and processes related to this policy, you may refer to the students' handbook.

COURSE ASSESSMENT

Course Calendar and Assessment

Students will be graded through the following means of assessment and their final grade will be calculated from the forms of assessment as listed below with their grade weighting taken into account.

Assessment	Grade Weighting	Deadline Assessment
First Exam	30%	TBD
Second Exam	30%	TBD
Final Exam	40%	TBD
Total	100%	

ASAS

Description of Exams:

Test questions will predominately come from the material presented in the lectures. Semester exams will be conducted during the regularly scheduled lecture period. Exam will consist of a combination of multiple-choice, short answer, match, true and false and/or descriptive questions.

Homework:

Will be given for each chapter, while the chapter in progress you are supposed to work on them continuously and submit in next lecture when I finish the chapter.
You are also expected to work on in-chapter examples, self-tests and representative number of

end of chapter problems. The answers of self-tests and end of chapter exercises are given at the end of the book.

Quizzes: Unannounced quizzes will be given during or/and at the end of each chapter based upon the previous lectures. It will enforce that you come prepared to the class.

No make-up exams, homework, or quizzes will be given. Only documented absences will be considered as per HU guidelines.

Grades are not negotiable and are awarded according to the following criteria*:

Letter Grade	Description	Grade Points
A+	Excellent	4.00
A		3.75
A-		3.50
B+	Very Good	3.25
B		3.00
B-		2.75
C+	Good	2.50
C		2.25
C-		2.00
D+	Pass	1.75
D	Pass	1.50
F	Fail	0.00
I	Incomplete	-

WEEKLY LECTURE SCHEDULE AND CONTENT DISTRIBUTION

Topics Covered					
Topic	**Chapter in Text**	**Week #**	**Lecture**	**Content**	**Delivery Method**
Digital and Numbering Systems	Ch1	Week 1	Lect. 1	Syllabus and Introduction	Face to face
			Lect. 2	Numbering systems conversin (Decimal, Binary)	Face to face
			Lect. 3	Numbering systems conversin (Octal)	Online\ asynchronous video Moodle and

					Youtube Lec 3
Digital and Numbering Systems	Ch1	Week 2	Lect. 1	Numbering systems conversin (Hexadecimal) and revision	Face to face
			Lect. 2	Signed numbers representation mehods	Face to face
			Lect. 3	Binary arithmetic	Online\ asynchronous video Moodle and Youtube Lec 5
Boolean Algebra and Logic gates	Ch2	Week 3	Lect. 1	Basic gates	Face to face
			Lect. 2	Boolean espressions	Face to face
			Lect. 3	Truth tables of Boolean expressions	Online\ asynchronous video Moodle and Youtube Lec 10
		Week 4	Lect. 1	Boolean circuits	Face to face
			Lect. 2	SoP and PoS formats and derivation from truth tables	Face to face
			Lect. 3	Duality and conversin between SoP and PoS	Online\ asynchronous video Moodle and Youtube Lec 13
Boolean Algebra and Logic gates	Ch2	Week 5	Lect. 1	Simplification using Boolean Laws	Face to face
			Lect. 2	Minterm Format	Face to face
			Lect. 3	Maxterm Format	Online\ asynchronous video Moodle and Youtube Lec 15
Gate-Level Minimization	Ch3	Week 6	Lect. 1	Construction of K-Maps	Face to face
			Lect. 2	Rules of K Maps Simplification	Face to face
			Lect. 3	First Exam	Paper-based
		Week 7	Lect. 1	K-Maps Simplification in SoP Format	Face to face
			Lect. 2	K-Map Don't Care and Prime Implicants in SoP	Face to face
			Lect. 3	K-Map Simplification in PoS Format	Online\ asynchronous video Moodle and Youtube Lec 20

		Week 8	Lect. 1	NAND-Only Implementation	Face to face
			Lect. 2	NOR-Only implementation	Face to face
			Lect. 3	Revision for CH3	Online
.Combinational Logic	Ch4	Week 9	Lect. 1	Design procedure-Adder-Subtractor-Multiplier	Face to face
			Lect. 2	Four-bits Parallel Adder-Subtractor	Face to face
			Lect. 3	Design of Full Adder using Half Adders	Online\ asynchronous video Moodle and Youtube Lec 24
		Week 10	Lect. 1	Intro to Multiplexers	Face to face
			Lect. 2	Muktiplexers implementation	Face to face
			Lect. 3	Second Exam	Paper-based
		Week11	Lect. 1	Multiple Multiplexers implementation	Face to face
			Lect. 2	Decoders	Face to face
			Lect. 3	Combination of Decoders and Multiplexers	Online\ asynchronous video Moodle and Youtube Lec 31
Synchronous Sequential Logic	Ch5	Week12	Lect. 1	Intro to sequential logic	Face to face
			Lect. 2	Latches	Face to face
			Lect. 3	Intro to flip-flops	Online\ asynchronous video Moodle and Youtube Lec 32
		Week13	Lect. 1	Flip-Flop types	Face to face
			Lect. 2	Flip-flop timing diagrams	Face to face
			Lect. 3	Sequential and Combinational Example 1	Online\ asynchronous video Moodle and Youtube Lec 34
		Week14	Lect. 1	Flip flop circuits	Face to face
			Lect. 2	Sequential and Combinational	Face to face
			Lect. 3	Sequential and Combinational Example 2	Online\ asynchronous video Moodle and Youtube Lec 35