Course Description and Outcome Form
Department of Computer Science and Engineering
School of Engineering and Computer Science
Brac University

A. Course General Information:

Course Code:	CSE260
Course Title:	Digital Logic Design
Credit Hours (Theory+Lab):	3 + 0
Contact Hours (Theory+Lab):	3 + 3
Category:	Program Core
Type:	Required, Engineering, Lecture + Laboratory
Prerequisites:	None
Co-requisites:	None

B. Course Catalog Description (Content):

This course provides an introduction to digital systems such as computer, communication and information systems. Firstly, the course will cover Boolean algebra, digital logic gates, combinational logic circuits, decoders, encoders, multiplexers and demultiplexers. The course will then cover sequential circuits: asynchronous and synchronous counters, registers, flip-flops. An introduction to memory elements and registers will also be provided. Hands-on experience will be provided through lab works and lab project. The course includes a compulsory 3-hour laboratory work each week.

C. Course Objective:

The objectives of this course are to

a. Familiarization with different number systems and conversion
b. Introduce Boolean logic operation and teach students how to use Boolean Algebra and K-maps to realize two-level minimal/optimal combinational circuits
c. Teach students other Boolean simplification methods such as Tabulation
d. Expose students in the introductory design process of combinational circuits including MSI circuits
e. Teach basic operation and analysis of sequential circuits using latches, flip-flops, counters, registers and memory elements.

D. Course Outcomes (COs):

Upon successful completion of this course, students will be able to

Sl.	CO Description	Weightage (%)
CO1	**Use** the knowledge of Number systems and Boolean algebra to perform arithmetic and boolean calculations and build circuits	10%
CO2	**Use** the knowledge of minimization techniques such as Karnaugh map and tabulation method to realize minimal/optimal combinational circuits along with calculating SOP and POS	35%
CO3	**Design** and **analyze** different combinational and sequential circuits such as adder, comparator, encoder, decoder, multiplexer, demultiplexer, counter, register, memory, etc.	40%
CO4	**Operate** laboratory equipment build, and troubleshoot simple combinational and sequential circuits.	15%
CO5	**Work** in a team and communicate effectively	5%

E. Mapping of CO-PO-Taxonomy Domain & Level- Delivery-Assessment Tool:

Sl.	CO Description	POs	Bloom's taxonomy domain/level	Delivery methods and activities	Assessment tools
CO1	**Use** the knowledge of Number systems and Boolean algebra to perform arithmetic and boolean calculations and build circuits	**c**	Cognitive	Lectures, notes, lab class	Quiz, Exam
CO2	**Use** the knowledge of minimization techniques such as Karnaugh map and tabulation method to realize minimal/optimal combinational circuits along with calculating SOP and POS	**c**	Cognitive	Lectures, notes, lab class	Quiz, Exam
CO3	**Design** and **analyze** different combinational and sequential circuits such as adder, comparator, encoder, decoder, multiplexer, demultiplexer, counter, register, memory.	**c**	Cognitive	Lectures, notes, lab class	Quiz, Exam, Design Project
CO4	**Operate** laboratory equipment build, and troubleshoot simple combinational and sequential circuits	**e**	Psychomotor	Lab Class	Lab Work, Design Project
CO5	**Work** in a team and communicate effectively	**I,j**	Affective	Lab Class	Lab work, Design Project

F. Course Materials:

i. Text and Reference Books:

Sl.	Title	Author(s)	Publication Year	Edition	Publisher	ISBN
1	Digital Design	M Morris Mano & M D Ciletti	2012	5th ed.	Pearson Education	ISBN-13: 978-0-13-277420-8
2	Digital Design: Principles and Practices	J F Wakerly	2005	4th ed.	Prentice Hall	ISBN-13: 978-0131 863897

ii. Other materials (if any)

a. Lecture notes and presentation slides
b. Lab hand-outs
c. Lab usage manual

G. Lesson Plan:

No	Topic	Week/Lecture#	Related CO (if any)
	Introduction, review of number systems, and binary arithmetic	Lecture 1-3	CO1
	Introduction to boolean algebra and simplification	Lecture 4-5	CO1
	SOP, POS and boolean functions minimization techniques (K-map, Tabulation)	Lecture 6-9	CO2
	Review	Lecture 10	
Midterm			
	Combinational circuit design process using adder and subtractor, comparator	Lecture 12-13	CO3
	Combinational circuit design using Decoder, Encoder, Multiplexer	Lecture 14-15	CO3
	Introduction to sequential circuit design process (Flip Flop)	Lecture 16-17	CO3
	Sequential circuit analysis, counters	Lecture 18-20	CO3
	Register and Memory	Lecture 21-22	CO3
	Review	Lecture 23	
Final Exam			

(** Please insert separate table of lesson plan for lab component if there is any)

H. Assessment Tools:

Assessment Tools	Weightage (%)
Attendance	5
Assignment	10
Quizzes	15
Midterm Exam	20
Final Exam	30
Project work	5

Lab work (Hardware)	15

I. CO Assessment Plan:

Assessment Tools	Course Outcomes				
	CO1	CO2	CO3	CO4	CO5
Quizzes (Q)	x	x	x		
Assignments	x	x	x		
Midterm exam	x	x			
Final Exam			x		
Project work					x
H/W Lab work				x	

J. CO Attainment Policy:

As per Department of CSE Course Outcome Attainment Policy

K. Grading policy:

As per Brac University grading policy

L. Course Coordinator: Dewan Ziaul Karim (DZK)