



Course Specification

(Bachelor)

Course Title: **Digital Logic Design I**

Course Code: **CENX 211**

Program: **B.S. in Computer Engineering**

Department: **Department of Computer Engineering**

College: **College of Computer and Information Sciences**

Institution: **King Saud University**

Version: *Course Specification Version Number*

Last Revision Date: *Pick Revision Date.*

Table of Contents

A. General information about the course:	3
B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods	4
C. Course Content	5
D. Students Assessment Activities	5
E. Learning Resources and Facilities	5
F. Assessment of Course Quality	6
G. Specification Approval	6





A. General information about the course:

1. Course Identification

1. Credit hours: (4 (3,1,2) hours)

2. Course type

A. ☐ University ☐ College ☒ Department ☐ Track ☐ Others
B. ☒ Required ☐ Elective

3. Level/year at which this course is offered: (Level 5)

4. Course general Description:

Topics include: number systems, application of Boolean algebra, modular design of combinational logic and basic design of sequential circuits using state diagrams.

5. Pre-requirements for this course (if any):

Discrete Math, Math 151

6. Co-requirements for this course (if any):

7. Course Main Objective(s):

This course provides students with basic knowledge on combinational and sequential circuit design. The course includes a lab component to help students get hands-on experience with the theoretical concepts they take in the course

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	6 hours per week	100%
2	E-learning		
3	Hybrid - Traditional classroom - E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
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1.	Lectures	45
2.	Laboratory/Studio	30
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
Total		90

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Identify number systems including base conversion and arithmetic operations	1	Lectures and Tutorials	Exams and Homework
1.2	Solve Boolean expressions and simplify using Boolean algebra rules and k-maps	1	Lectures and Tutorials	Exams and Homework
1.3	Identify the physical properties of logic gates such as fan-in, fan-out, logic voltages and noise margins.	1	Lectures and Tutorials	Exams and Homework
2.0	Skills			
2.1	Analyze sequential circuits	2	Lectures and Tutorials	Exams and Homework
2.2	Design state diagrams and sequential circuits	2	Lectures and Tutorials	Exams and Homework
3.0	Values, autonomy, and responsibility			
3.1	Design combinational logic circuits and building blocks (decoders, encoder, multiplexers, adders, ...)	6	Lab demonstration	Lab work





C. Course Content

No	List of Topics	Contact Hours
1.	Number systems, base conversion and arithmetic operations.	8
2.	Boolean algebra and their application in logic circuits.	8
3.	Simplification of Boolean expressions.	8
4.	The physical properties of logic gates.	4
5.	Combinational building blocks such as decoders and multiplexers.	8
6.	Basic memory elements such as the SR latch and the D flip-flop.	8
7.	Sequential circuits analysis.	12
8.	Sequential circuits design.	4
Total		60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm Examination (1)	6	15%
2.	Midterm Examination (2)	12	15%
3.	Homework Assignments	Bi-weekly	10%
4.	LAB	Bi-weekly	20%
5.	Final Exam (Laboratory + Theory)	End	40% (4+35)%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Logic and Computer Design Fundamentals, M. Morris Mano & Charles R. Kime, 5th Ed. 2015, Pearson Education.
Supportive References	Tutorial book and Lab book are available in the college print shop.
Electronic Materials	https://lms.ksu.edu.sa
Other Learning Materials	LogSim software, digital logic circuits, experimental equipment.

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room with number of seats enough to accommodate enrolled students.



Items	Resources
Technology equipment (projector, smart board, software)	Overhead projector with required software to facilitate presentations on smart board.
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Department Council	Course reports are evaluated by the Department Council.
Effectiveness of Students assessment	Faculty-Peer Review	Final examination is moderated.
Quality of learning resources	Students	Indirect – Edu-gate survey.
The extent to which CLOs have been achieved	Students	Attainment level of every CLO is measured directly.
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	

