TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Baghdad/Al_Khwarizmi College of Engineering
2. University Department/Centre	Information and Communication Engineering
3. Course title/code	Digital System Design
4. Programme(s) to which itcontributes	This course contributes to the following ABET outcomes: (a) an ability to apply knowledge of mathematics, science, and engineering (b) an ability to design and conduct experiments, as well as to analyze and interpret data (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability (d) an ability to function on multi-disciplinary teams (e) an ability to identify, formulate, and solve engineering problems (f) an understanding of professional and ethical responsibiliy (g) an ability to communicate effectively (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context (i) a recognition of the need for, and an ability to engage in life-long learning

	(j) knowledge of contemporary issues (k) an ability to use the techniques, skills, and modern engineering tools
5. Modes of Attendance offered	attendance is mandatory according to the university rules
6. Semester/Year	Sep 2023
7. Number of hours tuition (total)	45
8. Date of production/revision of this specification	Dec/2017

9. Aims of the Course.

a. The objective of this course is to give the students the theoretical basis & practical skills in modern design of medium size digital systems in various technologies, including standard circuits, Field Programmable Gate Arrays (FPGAs). The design methodology, systematically introduced & used in the course, is based on simulation & synthesis with the hardware description language (VHDL) tools. Topics covered in this course include: review of both combinational and sequential logic circuits, describe combinational and sequential circuits using VHDL. VHDL Code for Moore – The ASM, asynchronous logic circuit analysis and design, memories integrated technology, implementation logic circuit using FPGA, and testing of logic Design

10· Learning Outcomes, Teaching ,Learning and Assessment Method

A- Knowledge and Understanding

At the completion of the course, students will be able to…

A1. an ability to analyze and design using logic gates
A2. an ability to analyze and design combinational logic circuits
A3. an ability to analyze and design sequential logic circuits

A4. an ability to analyze and design computer logic circuits
A5. an ability to realize, test, and debug practical digital circuits,
A6. knowledge and use of hardware description languages simulation
A7. study of different memory structures and technologies,

B. Subject-specific skills

B1. Analysis and design Combinational and sequential circuits.

B2. Ability to draw Mealy and Moore state diagram for specific logic circuits.

B3. Implement logic circuits using FPGA.

B4. analysis and design asynchronous sequential circuits

B5 Analysis and design Registers and Counters

Teaching and Learning Methods

Lectures, Presentations, lab experiments.

Assessment methods

homework 10%
quizzes - 15%
midterm -15%
final - 60%

C. Thinking Skills

C1. Ability to apply knowledge of mathematics, science and engineering.

C2. Ability to identify, formulate and solve engineering problems.

C3. Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

D. General and Transferable Skills (other skills relevant to employability and personal development) D1. Ability to design and conduct experiments. D2. Ability to design a system, component or process to meet desired needs					
1	3		**1.** Introduction- to logic circuit and karnaugh map	Classroom with whiteboard	
2	3		**2.** Introduction to Combinational Logic	Classroom with whiteboard	
3	3		• Binary adder- subtractor • Decimal Adder • Binary Multiplier • Magnitude Comparator	Classroom with whiteboard	
4	3		• Decoder • Encoder • Multiplexer • Demultiplxer	Classroom with whiteboard	Quizzes
5	3		**3.** Synchronous Sequential Circuits • Storage Elements: Latches ➢ SR latch • D latch	Classroom with whiteboard	Quizzes
6	3		• Storage Elements: Flip Flops ➢ Edge-Triggered D Flip-Flop ➢ J-K F F ➢ T F F	Classroom with whiteboard	
7	3		• Analysis of clocked sequential circuits	Classroom with whiteboard	Quizzes
8	3		**4.** Finite State Machine (FSM)	Classroom with whiteboard	
9	3		• State Reduction And Assignment • Design Procedure	Classroom with whiteboard	Quizzes
10	3		• Design Procedure	Classroom with whiteboard	
11	3		**5.** Registers and Counters • Shift Register	Classroom with whiteboard	Quizzes
12	3		• Ripple Counter • Synchronous Counter	Classroom with whiteboard	
13	3		• BCD Counter	Classroom with whiteboard	
14	3		**6.** ALGORITHMIC STATE MACHINES (ASMs)	Classroom with whiteboard	
15	3		• ASM chart • Design Examples	Classroom with whiteboard	Quizzes

13. Infrastructure

Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1) Stephen Brown and Zvonko Vranesic, "Fundamentals of Digital Logic with VHDL" Design, 2nd edition 2) Digital System Design – By Morris Mano- 5th Edition, 2013. 3) Wayne Wolf, "FPGA-Based System Design," Prentice Hall, 2004 4) Digital system Design – By Ramaswamy Palaniappan, 2011.
Special requirements (include for example workshops, periodicals, IT software, websites)	Nil
(include for example, guest Lectures , internship,field studies)	

12. Admissions	
Pre-requisites	Logic Design
Minimum number of students	20
Maximum number of students	50