Module (Course Syllabus) Catalogue

2022-2023

College/ Institute	College of Erbil Technical Engineering	
Department	Department of Information System Engineering	
Module Name	Computer organization	
Module Code	COR205	
Semester	Second	
Credits	7	
Module type	Prerequisite ☐ Core ■ Assist. ☐	
Weekly hours		Total Workload=(189) hrs
Weekly hours (Theory)	(3)hr Class	(115)hr Workload
Weekly hours (Practical)	(2)hr Class	(74)hr Workload
Lecturer (Theory)	Farah sami khoshaba	
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Lecturer (Practical)	1- (Lecturer) Farah sami khoshaba	
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Course Book

Course Description	**This subject is listed in the first class syllabus as a fundamental term that gives the students the important skills in designing logic gates and understanding the computer states also it gives an introduction to the computer memories and their types and explains how the computer system works.**
Course objectives	**Teach the students how to design and analyse the logic gates.**
Student's obligation	**The students must :** **1 -Attendance the theoretical and practical lectures.** **2- Completion of all tests, exams.** **3-Prepare a report for each practical experiment (4 as minimum).** **4- Presenting a Seminar.** **5- Doing 4 home works as minimum.**
Required Learning Materials	**1- Present the lecture by PowerPoint slides using data show.** **2-Use White board for extra discussion and examples.** **3- Note Book.** **4-give sheets for solved examples.**
Assessment scheme	**16% Mid Term (Theory and practical)** **4% Quiz** **40% Assignment (report, paper, homework, seminar..)** **25% final practical** **15% final theory**
Specific learning outcome:	**1- The student understands some important information about computers and digital systems.** **2- Understand the computer memories and their types and how the computer system works.** **3- Ability to understand the meaning of logic gates.** **4- Ability to design and analyze the logic gates.**
Course References:	**1- Dr.Nasib S. Gill J.B.Dixit, "Digital Design and Computer Organization", 2008.** **2- Morris Mano," Digital Logic and Computer Design".** **3- Internet.**

Course topics (Theory)	Week	Learning Outcome
Introduction to computers and digital systems.	1	
Number systems and Arithmetic operation.	2&3&4	
Logic gates, Boolean algebra and simplification techniques.	5&6&7	
Combination circuits, adder and subtractor.	8	
Decoders and multiplexers.	9&10	
Sequential circuits, Flip-Flops.	11	
Registers and counters.	12&13	
Memory organization and storage system.	14&15	
Microprocessor and CPU.	16	
Course topics (practical)		
Experiment 1: Logic gates operation.	1&2	
Experiment 2: prove De-morgan's theorem with Boolean logic equations.	3&4	
Experiment 3: Binary to gray code conversion.	5	
Experiment 4: gray to binary code conversion.	6	
Experiment 5: binary to Excess-3 conversion.	7	
Experiment 6: Binary adder and subtractor.	8	
Experiment 7: EX-OR gate implementation.	9	
Experiment 8: application of EX-OR gate.	10&11	
Experiment 9: verify the dual nature of logic gates.	12	
Experiment 10: study of flip-flop SR, JK, D and T.	13	

Experiment 11: multiplexer and Dmultiplexer.	14	
Experiment 12: 4 BIT binary up and down counter.	15	
Experiment 13: study of 8 to 3 line encoder.	16	

Questions Example Design

1. Compositional: In this type of exam the questions usually starts with Explain how, What are the reasons for…?, Why…?, How….?
With their typical answers
Examples should be provided

2. True or false type of exams:

In this type of exam a short sentence about a specific subject will be provided, and then students will comment on the trueness or falseness of this particular sentence. Examples should be provided

3. Multiple choices:
In this type of exam there will be a number of phrases next or below a statement, students will match the correct phrase. Examples should be provided.

4- Fill in the blanks : The student must fill the blanks with the correct answer.
5- Draw :Draw some flowcharts, figures ,illustration

Examination model:

Q1/

a- Perform the binary equivalent of (70-55) using the signed 2's complement representation.

b- Subtract (44-65) using 9's complement representation.

c- Use 10's complement representation to subtract (120-70) .

d- Find the following:-

1- $(100111.01)_2$ = ($)_{10}$

2- Multiply 1001110
100 ×

3- Convert $(450)_{10}$ to ($)_2$

4- $(8EF)_{16}$ To ($)_8$

5-

6- Add (1101001) to (1010) and (0111)

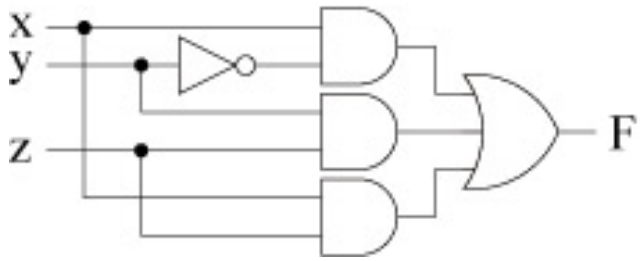
7- = $(4532)_8$ = ($)_{10}$

8- Convert $(210)_{10}$ to ($)_2$ then to EX-3 (10 Marks)

Q2/ Design a code converter that converts from (4-bits) Binary code to **2421** code. Use K-map for your simplification, and then draw the final equivalent circuit diagram.

(10 Marks)

Q3/ Redraw the following circuit by using NOR gates only.



(10 Marks)

Q4/ Construct a (16 X 1) multiplexer by using 5 numbers of (4 x 1) multiplexers. Use block diagrams without truth table.

(10 Marks)

Q5/ Simplify the following Boolean expression to a minimum number of literals:

$F = \bar{A}B(\overline{D}+\bar{C}D)+B(A+\bar{A}CD)$

(10 Marks)

Q6/ **Use a decoder to design an appropriate circuit to display the octal digits on a 7-segment display.**

(10 Marks)

Extra notes:

External Evaluator:

I confirm that the syllabus and content of this course book is sufficient and fulfilment for the lesson of “Computer Organization” for the first stage of department “Information System Engineering” students, and it covers the requirements of students to have enough knowledge in this field.

Signature

Diana Hayder Hussein