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| المملكة العربية السعودية  وزارة التعليم العالي  **جامعة أم القرى**  الكلية الجامعية بالجموم – قسم الحاسب الآلي |  | Kingdom of Saudi Arabia  Ministry of Higher Education  **Umm Al-Qura University**  University College in Al-Jamoum  Computer Dept. |

Course Specification

1. **Course number and name:** (2316213-3) Logic Analysis and Design
2. **Credits and contact hours:** 3 Credits

(Lecture: 3/week – Practical Session: Non)

1. **Instructor’s or course coordinator’s name:** Dr. Hesham Hamed
2. **Text books**
3. **Main Text book:** Norman Balabnian and Bradley Carlson, Digital Logic Design Principles, Symbol Technologies Inc., John Wiley & Sons Inc. 2001.
4. **Reference:** Morris Mano, Digital Logic Design, Prentice Hall, 4th Edition, 2006.
5. **Specific course information**
6. **brief description of the content of the course (Catalog Description):**

This course gives the student an overview of the numbers and uses electronic, as well as how to represent binary codes, and logic gates.

1. **prerequisites or co-requisites:** Introduction to Computer Science (2316101-3)
2. **indicate whether a required, elective, or selected elective course in the program:** required
3. **Specific goals for the course**

The student will be able to:

1. Apply the knowledge of various number system in conversion and in arithmetic operations.
2. Apply the principles of Boolean Algebra to manipulate and minimize logic expressions and to design simple logic circuits as per requirement.
3. Understand the problem/requirement, do analysis and design, and implement on simulator as per requirement.
4. Demonstrate and carry out the mini project in a group on Simulator.
5. Design working model of combinational and sequential logic circuits and to integrate as per requirement.

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| *Course*  *Goals* | *Program Outcomes* | | | | | | | | | | |
| SOa | SOb | SOc | SOd | SOe | SOf | SOg | SOh | SOi | SOj | SOk |
| 1 | ✓ |  |  |  |  |  |  |  |  |  |  |
| 2 | ✓ | ✓ |  |  |  |  |  |  |  |  |  |
| 3 |  |  | ✓ |  |  | ✓ |  |  |  |  |  |
| 4 |  |  | ✓ |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |  |  | ✓ |  |

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| **Relationship of Course Goals to the Program Student Outcomes** | |
| **SOa** | An ability to apply knowledge of computing and mathematics appropriate to the discipline   * *Students apply knowledge of digital logic to develop circuits. Students apply knowledge of computing to practical computing problems.* |
| **SOb** | An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.   * *Students analyze the Boolean functions and simplify it.* |
| **SOc** | An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs.   * *Students are required to design simple digital circuits (combinational as well as sequential).* |
| **SOf** | An ability to communicate effectively with a range of audiences.   * *The written assignments and class presentation enable students to communicate effectively.* |
| **SOj** | An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.   * *In this course students understand the trade-offs between timing and cost when minimizing digital circuits (using Karnaugh maps and Quine–McCluskey techniques).* |

1. **Brief list of topics to be covered**

* Number System (Decimal, Octal, Hexadecimal)
* Boolean Algebra and Logic gates
* Simplification of Boolean Functions
* Combinational Circuits
* Medium Scale Integrated Circuits
* Sequential Circuits