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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:** (2316210-3) Discrete Structures
2. **Credits and contact hours:** 3 Credits

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

1. **Instructor’s or course coordinator’s name:** Dr. Abdel-Rahman Hedar
2. **Text books**
3. **Main Text book:**  Susanna S. Epp, Introduction to Discrete Structures with Applications, Cengage Learning, 4th Edition, 2010.
4. **Reference:** Bernard Kolman, Robert Busby and Sharon C. Ross, Discrete Mathematical Structures, Pearson, 6th Edition, 2008.
5. **Specific course information**
6. **brief description of the content of the course (Catalog Description):**

Upon completing this course the student will have learned, through appropriate classroom and laboratory experiences, the fundamental mathematical methods for characterizing and analyzing discrete systems. In addition, he should understand the modern algebraic concepts, logic theory, set theory, algorithms, and the graph theory.

1. **prerequisites or co-requisites:** Introduction to Group Theory (2304251-4).
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. Demonstrate basic knowledge and understanding of a core of analysis, algebra and applied mathematics.
2. Identify appropriate methods of problem modelling and solving.
3. Identify a range of solutions and critically evaluate and justify proposed design solutions.
4. Solve computer science related problems using sets, sequences, probabilities, logic and graphs.

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

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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 will be able to analyze computational processes.* |
| **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.   * *This course provides the foundation for algorithms and theory of computing. Hence, the students will be able to apply methods learned in this course to analyze and reason mathematically about the tradeoffs involved in design choices. Furthermore, this course will enable students to model many systems using discrete structures.* |

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

* The Mathematical Logic
* Sequences, Induction and Recursion
* Sets, Functions and Relations
* Counting and Probabilities
* Graphs and Trees
* Analysis of Algorithms