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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:** (2316435-3) Advanced Databases
2. **Credits and contact hours:** 3 Credits

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

1. **Instructor’s or course coordinator’s name:** Dr. Youseef Alotaibi
2. **Text books**
3. **Main Text book:** R. Elmasri and S.B. Navathe, Fundamentals of Database Systems, Addison-Wesley, 6th Edition, 2011.
4. **Reference:** T.M. Connolly, C. Begg and A.D. Stroahn, Database Systems: A practical to design, implementation and management, Course Technology, 10th Edition, 2012.
5. **Specific course information**
6. **brief description of the content of the course (Catalog Description):**

This course is intended to provide the student with an understanding of the current theory and practice of advanced database systems. To help him more fully appreciate their nature, the course provides a solid technical overview of advanced database systems such as: object and distributed database systems. In addition to technical concerns, issues that are more general are emphasized. These also include security, recovery, performance, advanced database design, and database administration.

1. **prerequisites or co-requisites:** Fundamentals of Databases (2316412-3)
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. Construct simple and moderately advanced database queries using Structured Query Language (SQL).
2. Describe and discuss selected advanced database topics, such as object and distributed database systems.
3. Understand the concept of a database transaction and related database facilities, including concurrency control, journaling, backup and recovery, and data object locking and protocols
4. Understand and successfully apply advanced database design techniques.
5. Design and implement a database project.

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| *Course*  *Goals* | *Program Outcomes* | | | | | | | | | | |
| SOa | SOb | SOc | SOd | SOe | SOf | SOg | SOh | SOi | SOj | SOk |
| 1 | **🗸** |  | **🗸** |  |  |  |  |  |  |  |  |
| 2 | **🗸** |  |  |  |  |  |  |  |  |  |  |
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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 computing and design to a project* |
| **SOc** | An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs.   * *Students are required to apply indexing and tuning to a database project.* |
| **SOd** | An ability to function effectively on teams to accomplish a common goal.   * *Some course work will be done as team projects.* |
| **SOh** | Recognition of the need for, and an ability to engage in, continuing professional development.   * *The students often must utilize database vendors blogs and open source sites to learn and apply the new technologies that they have chosen in support of their projects.* |
| **SOi** | An ability to use current techniques, skills, and tools necessary for computing practices.   * *Projects use current computing and modeling/design tools.* |
| **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.   * *Students are required to apply their knowledge of computing to design a solution to a problem and to document the solution including the tradeoffs involved in their design choices.* |
| **SOk** | An ability to apply design and development principles in the construction of software systems of varying complexity.   * *The students are required to use standard design and development principles on a significant database project.* |

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

* Relational Calculus
* Relational Database Design by ER and EER-to-Relational Mapping
* Practical Database Design Methodology using UML Diagrams
* XML: Extensible Markup Language
* Object and Object-Relational Databases
* Algorithms for Query Processing and Optimization
* Database Security
* Distributed Databases