

Course Specifications

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

**Computing Department, Community College Dammam
University of Dammam**

**Course Specifications
(CS)**

Database Management Systems

IS220

Database Management Systems

Course Specifications

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|---|-----------------------|
| Institution: University of Dammam | Date of Report |
| College/Department: Dammam-Community College / Computer Science Department | |

A. Course Identification and General Information

| | | | |
|---|-------------------------------------|------------------|----------------------------------|
| 1. Course title and code: Database Management Systems (IS220) | | | |
| 2. Credit hours: 3 (2 Theoretical + 2 Practical) | | | |
| 3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) Information systems tracks | | | |
| 4. Name of faculty member responsible for the course | | | |
| 5. Level/year at which this course is offered: 2 nd Level - Year 1 | | | |
| 6. Pre-requisites for this course (if any): IS120 | | | |
| 7. Co-requisites for this course (if any): | | | |
| 8. Location if not on main campus | | | |
| 9. Mode of Instruction (mark all that apply) | | | |
| a. Traditional classroom | <input checked="" type="checkbox"/> | What percentage? | <input type="text" value="%70"/> |
| b. Blended (traditional and online) | <input type="checkbox"/> | What percentage? | <input type="text"/> |
| c. e-learning | <input checked="" type="checkbox"/> | What percentage? | <input type="text" value="%30"/> |
| d. Correspondence | <input type="checkbox"/> | What percentage? | <input type="text"/> |
| f. Other | <input type="checkbox"/> | What percentage? | <input type="text"/> |
| Comments: | | | |

B Objectives

1. What is the main purpose for this course?

By the end of this course, the student should be able to:

1. Explaining the concepts of records, record types, and files, as well as the different techniques for placing file records on disk.
2. Giving examples of the application of primary, secondary, and clustering indexes.
3. Identifying major DBMS functions and describing their role in a database system.
4. Explaining how the two-phase commit protocol is used to deal with committing a transaction that accesses databases stored on multiple nodes.
5. Explaining how DBMS deals with crash recovery.
6. Explaining the techniques used for data fragmentation, replication, and allocation during the distributed database design process.
7. Evaluating simple strategies for executing a distributed query to select the strategy that minimizes the amount of data transfer.

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

An advanced course familiarizing the student with the Database Management System. Instruction covers database terminology, data structure design, data retrieval and manipulation. Also includes alternative and generic approaches to database design and database management system including relational, object-relational, and object-oriented systems, SQL standards, algebraic query languages, integrity constraints, triggers, functional dependencies, and normal forms. The course will be accompanied by a practical part (lab) in which the students will learn popular Database tools and query language techniques (such as: SQL) and how to use these tools to develop Database Management systems.

1. Topics to be Covered

| List of Topics | No. of Weeks | Contact Hours |
|---|--------------|---------------|
| This course covers the topics including: | | |
| 1. Storing data: disks and files which include the memory hierarchy, RAID, disk space management, buffer management, file and indexes, page formats and record formats; file organization and indexes which introduce cost modeling, comparison of three file organizations, overview of indexes and properties of indexes. | 3 | 6T + 6P |
| 2. Three-structured indexing, hash based indexing and database design security; transaction management | 3 | 6T + 6P |

| | | |
|---|---|-----------|
| which introduce to transactions and schedules, concurrent execution of transaction, lock-based concurrency control and crash recovery. | | |
| 3. Crash recovery includes introduction to ARIES, recovery from a system crash and media recovery. | 2 | 4T + 4 P |
| 4. It also covers advanced topics such as: Parallel and distributed database including architectures for parallel databases, parallel query evaluation and optimization, distributed DBMS architectures, storing data in distributed DBMS, distributed catalog management and query processing, updating distributed data, distributed transactions and concurrency and recovery. | 3 | 6T + 6P |
| 5. More advanced topic is Internet database. | 2 | 4 T + 4 P |
| 6. Students will be trained on some software tools such as: Oracle, Sybase, DB2, and Informix. | 2 | 4 T + 4 P |

2. Course components (total contact hours and credits per semester):

| | Lecture | Tutorial | Laboratory | Practical | Other: | Total |
|---------------|---------|----------|------------|-----------|--------|-------|
| Contact Hours | 30 | | | 30 | | 60 |
| Credit | 30 | | | 15 | | 45 |

3. Additional private study/learning hours expected for students per week.

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4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

| | NQF Learning Domains And Course Learning Outcomes | Course Teaching Strategies | Course Assessment Methods |
|------------|--|---|---|
| 1.0 | Knowledge | | |
| 1.1 | Identify and describe basic concepts of database systems | Lectures, Presentations, Class discussions, Independent Work | Major Exam |
| 1.2 | Describe database constrain and limitation | | |
| 2.0 | Cognitive Skills | | |
| 2.1 | Construct ER diagrams for real-world scenarios | Lectures, Presentations, Class discussions, Independent Work | - Machine problem, Major Exam, Assignment, project |
| 2.2 | Construct relational algebra and SQL queries | | |
| 3.0 | Interpersonal Skills & Responsibility | | |
| 3. | Develop appropriate data relative | Lectures, | Major Exam, |

| | | | |
|-----|---|---|--|
| 1 | queries | Presentations, Class discussions, Independent Work | project |
| 3.2 | Design efficient database using Normalization Techniques. | | |
| 4.0 | Communication, Information Technology, Numerical | | |
| 4.1 | Communicate and present results or information effectively. | Question and answer method, Lecturing | Student presentations, Major Exam, Project |
| 4.2 | Work as a team. | | |
| 5.0 | Psychomotor | | |
| 5.1 | N/A | N/A | N/A |
| 5.2 | | | |

5. Course Learning Outcomes Mapping Matrix

Identify on the table below the Course Outcomes and Relationship to PLOs

| Course Learning Outcomes | Program Learning Outcomes |
|---|---------------------------|
| 1. Knowledge | |
| 1.1 | 1.1 |
| 1.2 | 1.2 |
| 2. Cognitive skills | |
| 2.1 | 2.3 |
| 2.2 | 2.1 , 2.2 |
| 3. Interpersonal Skills and responsibility | |
| 3.1 | 3.1, 3.2 |
| 3.2 | 3.3 |
| 4. Communication IT and Numeral Skills | |
| 4.1 | 4.2, 4.3 |
| 4.2 | 4.1 |
| 5. Psychomotor Skills | |
| 5.1 | N/A |

| 6. Schedule of Assessment Tasks for Students During the Semester | | | |
|---|--|-----------------|---------------------------------------|
| | Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.) | Week Due | Proportion of Total Assessment |
| 1 | First quiz | 3 | %2.5 |
| 2 | Mid-term | 8 | %20 |
| 3 | Second quiz | 10 | %2.5 |
| 4 | Project | 12 | %10 |
| 5 | Lab | 13 | %20 |
| 6 | Attendance/Participation | All weeks | %5 |
| 7 | Final | 17 | %40 |

D. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- Each group of students is assigned to a member of staff who will be available for help and academic guidance office hours at specific 2 hours on daily basis.

E. Learning Resources

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|--|
| 1. List Required Textbooks |
| <ul style="list-style-type: none"> • Raghu Ramakrishnan and Johannes Gehrke, "Database Management Systems", 3rd Edition, 2002. |
| 2. List Essential References Materials (Journals, Reports, etc.) |
| <ul style="list-style-type: none"> • Ramez Elmasri and Shamkant Navathe, "Fundamentals of Database Systems" 6th Edition, 2010. |
| 3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) |
| 4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) |
| <ul style="list-style-type: none"> • Blackboard and Social Media |
| 5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. |
| <ul style="list-style-type: none"> • CDs accompanied with the text book, power point lectures and essential references |

F. Facilities Required

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|---|
| Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.) |
| 1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) Classrooms: <ul style="list-style-type: none"> Furnished with a large central table or multiple small tables that can be grouped into one central table Designed for up to 25 students Size the room allowing 1sq meter per seat Laboratories: 25 PC's (one for each students) |
| 2. Computing resources (AV, data show, Smart Board, software, etc.) <ul style="list-style-type: none"> Smart Board, projector, internet, and whiteboard. |
| 3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) <ul style="list-style-type: none"> No |

G Course Evaluation and Improvement Processes

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|---|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching: <ul style="list-style-type: none"> Student questionnaires to be assessed by independent body. Assessment of course teaching strategies by independent body. |
| 2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor: <ul style="list-style-type: none"> Student questionnaires to be assessed by department. |
| 3 Processes for Improvement of Teaching: <ul style="list-style-type: none"> Attending workshop, reading books, and the searching for e-resources. Revision of course contents, course specifications, and strategies every 5 years. |
| 4 Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) <ul style="list-style-type: none"> Check marking by an independent member of staff of a sample of student work. Periodic exchange and remarking of a sample of assignments with a member of staff in another institution |

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- Reviewing student's feedback.
- Update text books.
- Consulting other top universities course specifications and contents.