



Course Specifications

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|----------------------|---|
| Course Title: | Fundamentals of Database Systems |
| Course Code: | 342CIS-3 |
| Program: | Computer Science |
| Department: | Computer Science |
| College: | Computer Science and information systems |
| Institution: | Najran University |

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A. Course Identification

| |
|---|
| 1. Credit hours: 3 (2, 1, 0) |
| 2. Course type a. University <input type="checkbox"/> College <input checked="" type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/> b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/> |
| 3. Level/year at which this course is offered: 7 th level/ 3 th year |
| 4. Pre-requisites for this course (if any): NA |
| 5. Co-requisites for this course (if any): NA |

6. Mode of Instruction (mark all that apply)

| No | Mode of Instruction | Contact Hours | Percentage |
|----|-----------------------|---------------|------------|
| 1 | Traditional classroom | 50 | 100 |
| 2 | Blended | | |
| 3 | E-learning | | |
| 4 | Distance learning | | |
| 5 | Other | | |

7. Contact Hours (based on academic semester)

| No | Activity | Contact Hours |
|----|-------------------|---------------|
| 1 | Lecture | 20 |
| 2 | Laboratory/Studio | 20 |
| 3 | Tutorial | 10 |
| 4 | Others (specify) | |
| | Total | 50 |

B. Course Objectives and Learning Outcomes

| |
|--|
| <p>1. Course Description Study of fundamentals concepts of Databases, architecture of Database Management Systems (DBMS), and database design and database programming language. Topics include: different database design models such as entity relationship and Object-Oriented data model; relational database theories including normalization, functional dependencies and conversion of E/R data model to relational databases; theoretical database programming language such as relational algebra and calculus; Structured Query Language (SQL) including Data Definition Language (DDL) and Data Manipulation Language (DML); advanced SQL covers sub-queries and views, triggers</p> |
| <p>2. Course Main Objective After successful completion of this course students should be able to:</p> |

1. Explain the general concepts of database, database system, data, DBMS, database design, database programming languages
2. Design the best E/R diagram data model for a realistic application
3. Construct an Object-Oriented data model for simple application
4. Create a normalized, well-structured relational data model by using database theories such as the conversion from E/R to set of relational tables and functional dependencies, canonical covers, decomposition and normalization techniques
5. Execute the SQL statements of data definition and data manipulation
6. Solve simple queries by using the operations (selection, projection, join, Cartesian product) of the theoretical database language Relational Algebra
7. Accomplish a task assigned in a course group project
8. Present effectively the project work assigned as a team/member to range of audience

3. Course Learning Outcomes

| CLOs | | Aligned PLOs |
|----------|---|--------------|
| 1 | Knowledge and Understanding | |
| 1.1 | Explain the general concepts of database, database system, data, DBMS, database design, database programming languages | K1 |
| 1.2 | | |
| 1.3 | | |
| 1... | | |
| 2 | Skills : | |
| 2.1 | Design the best E/R diagram data model for a realistic application | S2 |
| 2.2 | Construct an Object-Oriented data model for simple application | S2 |
| 2.3 | Create a normalized, well-structured relational data model using theories (normalization, etc.) of relational database | S4 |
| 2.4 | Execute the SQL statements of data definition and data manipulation | S2,S4 |
| 2.5 | Solve simple queries by using the operations (selection, projection, join, Cartesian product) of the theoretical database language Relational Algebra | S2,S4 |
| 3 | Values: | |
| 3.1 | Accomplish a task assigned in a course group project | V1 |
| 3.2 | Present effectively the project work assigned as a team/member to range of audience | V2 |
| 3.3 | | |
| 3... | | |

C. Course Content

| No | List of Topics | Contact Hours |
|--------------|---|---------------|
| 1 | Introduction to Databases and DBMS | 10 |
| 2 | Structured Query Language Statements(SQL) | 4 |
| 3 | Data Modeling Using Entity Relationship Model (E/R) | 8 |
| 4 | Relational Data Model and Relational Database Constraint | 4 |
| 5 | Relation database design by ER and EE/R- to- Relation mapping | 4 |
| 6 | Functional Dependencies | 2 |
| 7 | Normalization | 6 |
| 8 | The Relational Algebra and Relational Calculus | 4 |
| 9 | Object Oriented Database | 2 |
| 10 | Advanced SQL | 4 |
| 11 | Project | 2 |
| Total | | 50 |

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

| Code | Course Learning Outcomes | Teaching Strategies | Assessment Methods |
|------------|---|--|--|
| 1.0 | Knowledge and Understanding | | |
| 1.1 | Explain the general concepts of database, database system, data, DBMS, database design, database programming languages | Lectures | Quiz Assignments Midterm Examination Final Examination |
| 1.2 | | | |
| ... | | | |
| 2.0 | Skills | | |
| 2.1 | Design the best E/R diagram data model for a realistic application | Lectures, small group work, small group discussion | Quiz Assignments Midterm Examination Final Examination, Course project |
| 2.2 | Construct an Object-Oriented data model for simple application | Lectures, small group work, small group discussion | Quiz, Assignments Final Examination |
| 2.3 | Create a normalized, well-structured relational data model using theories (normalization, etc.) of relational database | Lectures, small group work, small group discussion | Quiz Assignments Final Examination |
| 2.4 | Execute the SQL statements of data definition and data manipulation | Lab Lectures, small group work, small group discussion | Lab Assignments, Midterm Examination, Mini Project |
| 2.5 | Solve simple queries by using the operations (selection, projection, join, Cartesian product) of the theoretical database language Relational Algebra | Lectures, small group work, small group discussion | Final Examination |
| 3.0 | Values | | |

| Code | Course Learning Outcomes | Teaching Strategies | Assessment Methods |
|------|---|--|---------------------|
| 3.1 | Accomplish a task assigned in a course group project | small group work, small group discussion | Course Mini Project |
| 3.2 | Present effectively the project work assigned as a team/member to range of audience | small group work, small group discussion | Course Mini Project |
| ... | | | |

2. Assessment Tasks for Students

| # | Assessment task* | Week Due | Percentage of Total Assessment Score |
|---|------------------|-----------------------|--------------------------------------|
| 1 | Quiz | 2 rd week | 10% |
| 2 | Midterm | 6 th week | 20% |
| 3 | Lab assessment | 5 th week | 5% |
| 4 | Assignments | 5 th week | 5% |
| 5 | Project | 4 th week | 10% |
| 6 | Final lab exam | 12 th week | 10% |
| 7 | Final Exam | 13 th week | 40% |

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

- weekly office hours + appointments
- weekly academic advising hours
- Extra weekly 2 office hours prior to exams.
- Tutorials are also provided to the students

F. Learning Resources and Facilities

1. Learning Resources

| | |
|---------------------------------------|---|
| Required Textbooks | Elmasri, Ramez and Navathe, Shamkant. Fundamentals of Database Systems. Boston: 7th Edition, 2016 |
| Essential References Materials | Silberschatz, Korth, Sydarshan , Database System Concepts. McGraw-Hill. Either 5th edition 2005 or 4th edition, 2002. |
| Electronic Materials | https://www.w3schools.com/sql/ |
| Other Learning Materials | CDs accompanied with the text book, power point lectures and essential references Use SQL for Lab |

2. Facilities Required

| Item | Resources |
|--|---|
| Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) | Room B-58 Laboratory A-16L |
| Technology Resources (AV, data show, Smart Board, software, etc.) | Data show, PCs. |
| Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list) | <ul style="list-style-type: none"> • Printer is important in the lab to print reports and some snapshots. • Projector and PC for the lab instructor is required |

G. Course Quality Evaluation

| Evaluation Areas/Issues | Evaluators | Evaluation Methods |
|---|------------|--------------------|
| Online course survey | Students | Indirect |
| Focus group discussion with small groups of students. | Instructor | Direct |
| Extent of achievement of course learning outcomes | instructor | Direct |
| | | |
| | | |
| | | |

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

| | |
|----------------------------|---------------------------------------|
| Council / Committee | Computer Science Departmental Council |
| Reference No. | 14440203-0185-00002 |
| Date | 1st Sep, 2022 |