1.	**Course title**	Database Management Systems
2.	**Course number**	1902224
3.	**Credit hours (theory, practical)**	3 hours
	Contact hours (theory, practical)	3 hours /week
4.	**Prerequisites/corequisites**	Object-Oriented Programming (1902110)
5.	**Program title**	Computer Information Systems
6.	**Program Code**	2
7.	**Awarding institution**	The University of Jordan
8.	**School**	King Abdullah II School for Information Technology
9.	**Level of Course**	Undergraduate
10.	**Year of study and semester (s)**	Second year - all semesters
11.	**Final Qualification**	B.Sc.
12.	**Other department (s) involved in teaching the course**	None
13.	**Language of Instruction**	English
14.	**Teaching methodology**	☐ Blended ☒ Online
15.	**Electronic platform(s)**	☒ Moodle ☒ Microsoft Teams ☐ Skype ☐ Zoom ☒Others: JUExams.com, ExamBuilder
16.	**Date of production/revision**	**2ⁿᵈ Oct 2022**
17.	**Required/ Elective**	**Required**

18. Course Coordinator:

Dr. Marwan Al-Tawil
Office: KASIT, Third floor (322)
m.altawil@ju.edu.jo

19. Other instructors:

Prof. Fawaz Al-Zaghoul
Dr. Reem Al-Fayez

20. Course Description:

The course objectives are to provide students with an overview of database management system architecture and environment, an understanding of the basic database design and implementation techniques, and a practical experience of designing and building a relational database. Other objectives of this course are to make the student able to discuss and explain the importance of the data, the difference between file management and database management systems. Furthermore, it enables applying conceptual design methodologies for databases and learning about the architecture and environments of the database management system (the Ansi-Sparc model). It also enables the student to designand evaluate suitable security and integrity levels for database schemas. This course requires a practical training which is assessed by producing small individual and group projects.

I- Aims:
   The course aims to teach students the basic database design and implementation techniques, and a practical experience of designing and building a relational database. Students will have the opportunity to design and implement real-life examples of database systems.

II- Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to achieve the following learning outcomes:
   A.   Knowledge and understanding:
   A1. Discuss/ explain the importance of data.
   A2. Discuss/ explain the difference between file management and database.
   A3. Design a suitable database components and environments.
   A4. Formulate the major constructs of relational DB language SQL.
   A5. Formulate DB functions, Stored Procedures and Triggers
   A6. Design Oracle Forms and Oracle Reports

   B. Intellectual Skills: with ability to
   B1. Employ analytical skills as appropriate during database design and manipulation process.
   B2. Enhance the per-existing database design, development and manipulation process.
   B3. Design and implement a practical database system. In particular, be able to discuss, explain and apply the relational model and mappings from conceptual designs, in particular, normalizations.
   B4. Identify a range of DB-solutions and critically evaluate them and justify the proposed design and development solutions.
   B5. Analyze a wide range of database design issues and provide solutions through suitable designs, structures, diagrams, and other appropriate design methods.
   B6. Be able to apply and evaluate suitable database security and integrity levels.B7.
   Be able to formulate constructs with relational algebra

   C. Subject Specific Skills: With ability to C1.
   Use appropriate database design structures.
   C2. Use the (DBMSs) scientific literature effectively.
   C3. Give technical database presentations suitable for time, place, and audience. C4.
   Prepare and deliver coherent and structured verbal and written technical reports.
   C5. Be aware of the health and safety of real world computer DB information systems.

C6. Plan and undertake a major small individual/ group projects.

D. Transferable Skills: with ability to

D1. Display an integrated approach to the deployment of communication skills.

D2. Work effectively with database owners and for database users.

D3. Strike the balance between self-reliance and seeking help when necessary.

D4. Display personal responsibility by working for multiple deadlines in relation to the course requirements.

ABET Students Outcomes (SOs):

1- Analyze a complex computing and to apply principles of database design and other relevant technologies to identify and deploy real-life solutions.

2- Design and implement database solutions to meet a given set of system requirements.

Mapping ILOs to ABET SOs

ILOs	ABET SOs
A1, A2, A3, A4, A5	1
B1, B2, B3, B5, B5, B6	2
D1, D2, D3, D4	1

21. Topic Outline and Schedule (based on 14 weeks)

Topic	ILOs	Week	Lecture ID	Lecture Content	TLA
Introduction	**A1, A2**	**1**	**1.1**	Welcome and orientation	**Lectures, Exams**
			1.2	Importance of Database Systems	
			1.3	Database models including the ER model	
Entity Relationship Model and ER-Mapping and Task	**A3, A4, B1, B2, B3, B4 and B5**	**2**	**2.1**	Design phases and approaches, Entity sets, relationship sets.	**Lectures, Exams, and Tasks**
			2.2	Degree of relationship sets, Types of Attributes	
			2.3	Representing Complex Attributes, Weak Entity Sets	
		3	**3.1**	Reduction to Relational Schema	
			3.2	Mapping Regular and weak entities with examples	
			3.3	Mapping Binary and Unary Relationships	
	B5 and B6	**4**	**4.1**	Mapping Enhanced Entity Relationships	**Lectures, Assignment, Exams**
			4.2	Additional ERD Mapping Examples	
			4.3	**Task 1 (5 marks).** Introduce problem statement to students and ask them to draw the ERD and then Map the ERD to relational schema.	
Normalization	**B6, C1, C2 and C3**	**5**	**5.1**	Introduction to Normalization and describe Functional Dependencies	
			5.2	Describe 1st, 2nd and 3rd Normal Forms	
			5.3	Provide several examples on 1st, 2nd, and 3rd normal forms	
Basic SQL	**A3, C4, C5, and C6**	**6**	**6.1**	Download MySQL database Download MySQL and MySQL Workbench	**Lectures, Assignment, Exam**
			6.2	DDL commands with Examples	
			6.3	DML commands with Examples	
		7	**7.1**	Basic Query Structure and the difference between cartesian product and natural join	
			7.2	Renaming of entities and attributes, and String operations	

			7.3	**Task2 (5 marks).** Problem Description, Mapping, DDL and DML commands	
		8	8.1	Set operations, Aggregate Functions	**Practical Tasks, exam**
			8.2	Set Comparison (some, all, not exists)	
			8.3	**Midterm Exam (30 marks)**	
		9	9.1	Nested subqueries, Subqueries in From clause,	
			9.2	Subqueries in where Clause	
			9.3	Revision of Basic SQL Commands	
Intermediate SQL	**A3, C1, D1, D3, D4**	10	10.1	Join Operations	**Practical Tasks, exam**
			10.2	Views, Transactions	
			10.3	Integrity Constraints	
		11	11.1	User Defined Types and Indexes	
			11.2	Authorization	
			11.3	Linking SQL with a programming Languages	
Advanced SQL	**A5, C1, D1, D3, D4**	12	12.1	SQL Functions	**Practical Tasks, exam**
			12.2	SQL Stored Procedures	
			12.3	DB Triggers **Quiz (10 Marks)**	
Relational Algebra	**A3, B7, C4, C5, and C6**	13	13.1	Relational Algebra Part1	**Practical Tasks, exam**
			13.2	Relational Algebra Part2	
			13.3	Oracle Training	
Oracle Training Week	**A6, B7, C4, C5, and C6**	14	14.1	Oracle Forms	**Practical Tasks, exam**
			14.2	Oracle reports	
			14.3	Oracle Practice	

(Please mention instructors per topic if the course topics are being taught by more than one instructor

22. Evaluation Methods and Course Requirements (Optional):

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

30% Midterm exam
30% Tasks/Quizzes
40% Final exam

23. Course Policies:

A- Attendance policies:

Maximum allowable absence 15% of number of Lectures/Semester

B- Absences from exams and handing in assignments on time:

It is the student's responsibility to ensure that he/she is aware of all assignments, announcements and contents of missed sessions. It is the student's responsibility to ensure that he/she is aware of all assignments, announcements and contents of missed sessions. Students who miss the midterm exam session will not be able to retake the exam unless provided with an emergent excuse or a medical problem that can be proved by the hospital papers. Only then, the instructor have the right to accept or refuse the excuse given by the student and hence the procedure will be taken as specified by the university regulations.

C- Health and safety procedures:
  University Regulations

D- Honesty policy regarding cheating, plagiarism, misbehavior:

It is the student's responsibility to ensure that he/she is adhere with cheating, plagiarism, misbehavior

E- Grading policy + Weighting (i.e. weight assigned to exams as well as other student work)

0-44	F	45-49	D-	50-54	D	55-59	D+
60-64	C-	65-69	C	70-74	C+	75-78	B-
79-83	B	84-86	B+	87-89	A-	90-100	A

The grading policy is subject to change at the end of the semester according to the overall performance of students.

F- Available university services that support achievement in the course:
  Computer Labs

G- Statement on Students with disabilities

Students with Disabilities: Students with disabilities who need special accommodations for this class are encouraged to meet with the instructor and/or their academic advisor as soon as possible. In order to receive accommodations for academic work in this course, students must inform the course instructor and/or their academic advisor, preferably in a written format, about their needs no later than the 4th week of classes.

24. Required equipment:

1. Laptop.

2. MySQL Database

3. MySQL Workbench

3. Java or Python

25. References:

A- Required book (s), assigned reading and audio-visuals:
Silberschatz, Korth and Sudarshan, **"Database System Concepts"**, 7**th edition**, McGraw Hill,2019.

B- Recommended books, materials, and media:
1. Elmasri R. and Navanthe S. B., "Fundamentals of Database Systems", 5th edition, ISBN0-201542633), Addison Wesley, 2006.
2. Thomas Connolly et. al., "Database Systems, A Practical Approach to Design, Implementation and Management", Addison Wesley, 1996.
3. Gary Hansen and James Hansen, "Database Management and Design", Prentice Hall, 2nd edition, 1996.

4. Mc Fadden and Hoffer, "Database Management", The Benjamin Cumrnings, 3rd, 1991.
5. Date C.J, "An Introduction to Database System", Addison- Wesley, 6th 1995.
6. David Kroenke, "Database Processing, Fundamentals, Design, and Implementation", Prentice Hall, 6th, 2000.
7. Ralph Island, "Database Management, Developing Application Systems Using ORACLE", Prentice Hall, 1989.
8. Judith et al., "The Practical SQL Handbook", Addison Wesley, 1997.
9. Jeffrey Ullman and Jennifer Widon, "A First Course in Database Systems", Prentice Hall, 1997.
10. Date C. J. and Hugh Darwen, "A Guide to the SQL Standard", 4th edition, Addison Wesley, 1997.
11. Philip Lewis, Arthur Bernstein and Michael Kifer, "Database and Transaction Processing – An Application-Oriented Approach", Addison Wesley, 2002.

26. Additional information:

Date:

Name of Course Coordinator: Dr. Marwan Al-Tawil   Signature: Head

of curriculum committee/Department: ------------------------ Signature: ---------------

Head of Department: ------------------------ Signature: -------------------------------

Head of curriculum committee/Faculty: ------------------------ Signature: ---------------------

Dean: -- -Signature: -------------------------------

Copy to:
Head of Department
Assistant Dean for Quality Assurance
Course File