**Online Course management system**

* **Introduction:**

Welcome to our Educational Management System, a comprehensive platform designed to streamline and enhance the learning experience for both students and instructors. This system encompasses a robust database structure that efficiently manages users, courses, modules, lessons, and related content. By facilitating seamless enrollment processes and grade management, our system ensures a smooth and interactive educational journey. Our goal is to provide an intuitive and user-friendly environment that promotes effective learning and teaching practices. Join us as we explore the capabilities and benefits of this innovative solution.

* **Entities of the Online course Management Systems**
* **User:**

The User entity represents individuals who interact with the CMS. This includes instructors and students. Each user has attributes such as a unique ID, username, password, role (for example instructor, student) ,created\_date and email address.

* **Course:**

The Course entity represents the courses offered within the CMS. It includes attributes such as a unique course ID, title, description, hours,crs\_amount, created\_date ,and the instructor who teaches the course.

* **Module:**

A Module entity represents sections or units within a course. Modules help to organize course content into manageable format. Attributes may include a unique module ID, title, description and the course to which the module belongs (Course\_id).

* **Lesson:**

The Lesson entity refers to individual learning units within a module. It contains attributes such as a unique lesson ID, title, content (for example lecture notes, videos) and the module to which the lesson belongs (Module\_id) .

* **Content:**

Content represents the learning materials associated with lessons. This may include documents, videos, presentations, quizzes and assignments. Attributes could include a unique content ID, title, type (for example document, video),file path and the lesson to which the content belongs(Lesson\_id).

* **Enrollment:**

The Enrollment entity records the enrollment of students in courses. It includes attributes such as a unique enrollment ID, student ID, course ID and enrollment date.

* **Grade:**

The Grade entity stores grades and assessment results for students. It includes attributes such as a unique grade ID, student ID, course ID and the actual grade or assessment result (grade).

* **Message:**

The Message entity represents communication between users within the system. Attributes may include a unique message ID, sender ID, receiver ID, subject, content and timestamp.

* **ERD**

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* **Mapping:**

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* **Topics**
* **Views**
* View StudentsOnly() (to show All students only)
* View InstructorsOnly() (to show All Instructors only)
* View EnrolledCoursesOnly () (to show Enrolled Courses only)
* View NonEnrolledCoursesOnly() (to show Non- Enrolled Courses only)
* View InstructorsWithoutCourses() (to show Instructors Without Courses)
* View StudentsNotEnrolledInCourses() (to show Students Not Enrolled In any Courses)
* **stored procedure (Insert process)**
* Insert User ( insert data to User table)
* InsertCourse (insert data to Course table)
* InsertModule (insert data to Module table)
* InsertLesson (insert data to Lesson table)
* InsertContent (insert data to Content table)
* InsertEnrollment (insert data to Enrollment table)
* InsertGrade (insert data to Grade table)
* InsertMessage (insert data to Message table)
* **stored procedure (Update process)**
* UpdateUser ( update data in User table)
* UpdateCourse ( update data in Course table)
* UpdateModule ( update data in Module table)
* UpdateLesson ( update data in Lesson table)
* UpdateContent ( update data in Content table)
* UpdateEnrollment ( update data in Enrollment table)
* UpdateGrade ( update data in Grade table)
* **stored procedure (Delete process)**
* DeleteUser (delete data from User table)
* DeleteCourse (delete data from Course table)
* DeleteModule (delete data from Module table)
* DeleteLesson (delete data from Lesson table)
* DeleteContent (delete data from Content table)
* DeleteEnrollment (delete data from Enrollment table)
* DeleteGrade (delete data from Grade table)
* DeleteMessage (delete data from Message table)
* **Function:**
* GetTopNCoursesWithHighestSold ( to get Top N Courses With Highest Sold)
* FUNCTION show\_course\_with\_grade (show a specific course with it's grade)
* FUNCTION show\_student\_courses\_and\_grades (show his all courses and his grades)
* **Trigger:**
* Stop\_deleting (stop all the delete process from enrollment table)
* Log\_data (Store all the log information for the insertion on enrollment table)
* FUNCTION show\_instructor\_courses\_and\_enrollment\_count (show all his courses and the count of student enrolled in)
* FUNCTION show\_instructor\_courses\_with\_highest\_enrollment (show all his courses with the highest enrolled)
* FUNCTION show\_instructor\_courses\_with\_no\_enrollments (show all his courses with no enrollments)
* FUNCTION search\_instructors\_by\_name (show all the instrucors name with he searches for)
* FUNCTION show\_instructor\_courses\_and\_student\_count (show all the courses to a spesific instructor)
* FUNCTION search\_courses\_by\_name (Show all courses name with he searches for)
* get\_course\_details (show The Course data , course's modules , course's lessons and course's contents to a specific course)
* **Index: (**Indexes are used to make the search process Faster):
* IDX\_User\_Username (index on username in the User table)
* IDX\_Course\_Title (index on Title in the Course table)
* **Cursor**
* **GetUserAndGradesInCourse** (return all the student names and grades that enrolled in this course)
* **Rule**
* **Create Rule Grade\_Values AS @values IN(‘A’ , ’B’ , ’C’ , ’D’ , ’F’)** (putting a Rule to the Grade to make sure that what we will insert will be a real grade).
* **Constraints**
* **Alter Table [User] ADD CONSTRAINT check\_role CHECK (role IN (‘student’ , ‘instructor’)** (Putting a constraint to make sure that we will have just a student or instructor in the User table )
* **Business questions and answers:**

**Q1) how can we display students who are not enrolled in any courses in the online course system?**

A) we created a view called "StudentsNotEnrolledCourses" that displays username and email when rule is "Student for students who are not enrolled in any courses.

**Q2) how can the system display instructors who do not have any courses assigned to them?**

A) we created a view called "InstructorsWithoutCourses" that displays username and email when rule is " instructor" instructors without any assigned courses.

**Q3) how can the system display all instructors within the online course system?**

A) we created a view called "InstructorsOnly" that displays username and email when rule is " instructor" for all instructors registered in the online course system.

**Q4) how can the system display all students enrolled in the online course system?**

A) we created a view called"StudentsOnly" that displays username and email rule when rule is " Students" for all students enrolled in the online course system.

**Q5) how can the system show courses with the highest n of courses ordered by the count of students enrolled in?**

A) we created a function called " GetTopNCoursesWithHighestSold " that take @TopN as a parameter and return TOP (@TopN) course\_id, title, COUNT (c ourse\_id) To fetches the top N courses with the highest number of students enrolled.

**Q6) how can the system display courses where no students are currently enrolled?**

A) we created a view called " NonEnrolledCoursesOnly " that desplay course\_id, title,and description for courses it fetches all courses where no students are currently registered.

**Q7) how the student will show a specific course with it's grade?**

A) We created function called ‘show\_course\_with\_grade’ that will take the student\_id nd course\_id and will return to you a table contains the course data.

**Q8) how the student will show his all courses and his grades?**

A) we created a function called ‘show\_student\_courses\_and\_grades’ that will take a student\_id and returns a table contain all the courses and grades data.

**Q9) how the instructor will show all his courses and the count of student enrolled in ?**

A) we created a function called 'show\_instructor\_courses\_and\_enrollment\_count’ that will take an instructor\_id and return the table contain the data.

**Q10) how the instructor will show all his courses with the highest enrolled?**

A) we created a function called ‘show\_instructor\_courses\_with\_highest\_enrollment’ that will take an instructor\_id and will return a table contain the data

**Q11) how the instructor will show all his courses with no enrollments?**

A) we created a function called ‘show\_instructor\_courses\_with\_no\_enrollments’ that will take an instructor\_id and return a table contail the data

**Q12) how the search bar will show all the instrucors name with he searches for?**

A) we created a frunction called ‘search\_instructors\_by\_name’ that will take the string that user search with and give it to this fuction to return a table caontain with all the names like his sting to make his search easer.

**Q13) how the instructor will show all the courses to a spesific instructor?**

A) we created a function called ‘show\_instructor\_courses\_and\_student\_count’ that will take an instructor\_id and retuen a table contain the data.

**Q14) how the system will show all courses name with he searches for?**

A) we created a function called ‘search\_courses\_by\_name’ that will take a search\_term and this is a string which user searches with, and then give you a table contain all the similar courses name like the search string.

**Q15) how the system will show The Course data , course's modules , course's lessons and course's contents to a specific course?**

A) we created a Function called ‘get\_course\_details’ that will take the course\_id and return a table contain all the courses , modules, lessons and contain data to this course.