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1)System overview and objectives

1.1 System overview :

Many educational institutions, such as universities, face several problems with manual course registration, such as identifying the available courses, tracking the number of students enrolled in each course, and determining the remaining seats in each class. Instructors also face challenges, such as monitoring the students registered in their courses, evaluating grades, and tracking attendance. Administrative staff encounter difficulties in organizing schedules based on each student's registered courses, assigning lecture and lab timings, managing courses, handling user accounts, and managing registration and drop rules.

Therefore, a Course Registration System provides an effective solution to most, if not all, of these problems. The system enables registration processes, information organization, and rule enforcement to be carried out smoothly, accurately, and with minimal human intervention, resulting in a fast and well-structured response.

1.2 System Goals :

1. Fast and easy course registration.
2. Identifying available and fully booked courses.
3. Tracking the number of students enrolled in each course.
4. Determining the number of remaining seats in each course.
5. Monitoring the students registered in each course.
6. Managing grade evaluation and attendance tracking.
7. Organizing class schedules based on each student's registered courses.
8. Assigning lecture, lab, and tutorial timings.
9. Determining the locations of lectures, labs, and tutorial sessions.
10. Managing courses, instructor accounts, and registration rules.
11. Minimizing potential human errors.
12. Reducing the need for human resources.

2)Actors and their roles (Rana Ahmed 202300784)

1. Student:

Students can browse available courses, view schedules, and register for courses within allowed limits.

Roles & Responsibilities:

- View list of available courses.
- View course details (credits, instructor, capacity).
- Register for a course if it is allowed.
- Drop a registered course if it is allowed.
- View their schedule of registered courses.
- Receive notifications about successful or failed registrations.
- Receive alerts about schedule conflicts, prerequisites..
- Submit registration requests for instructor approval if he need to take approval .

2. Instructor

Instructors can manage course details, view registered students, and approve special requests.

Roles & Responsibilities:

- View courses they are teaching.
- View the list of students registered in their courses.
- Approve or reject student special registration requests.
- mange course details (capacity , time)
- Receive notifications about student requests or registration updates.

3. Administrator

Administrators can manage course offerings, academic terms, user accounts, and registration rules.

Roles & Responsibilities:

- Add, edit, or delete courses and their details.

- Create new course offerings
- Manage user accounts like students and instructors.
- Update registration rules (max credits per student, conflict rules).
- Open or close registration periods for each semester..
- Handle special requests like overload.

3)Functional and non-functional requirements (Rana Ahmed 202300784)

1. Functional Requirements

- The system needs to allow students to log in.
- The system needs to allow students to browse all available courses.
- The system needs to display detailed course information like instructor, schedule, credits, capacity, and prerequisites.
- The system should allow students to register for a course if there is available capacity, prerequisites are done and no schedule conflict is there.
- The system needs tol notify students if registration fails due to conflicts, prerequisites, limits, or closed registration periods.
- The system needs to allow students to drop registered courses during the allowed drop period.
- The system needs to allow students to view their schedule of registered courses.
- The systemneeds to display available seats for each course in real time.
- The system needs to allow instructors to view the list of courses they teach.
- The system needs to allow instructors to view the list of students enrolled in each course.
- The system needs to allow instructors to approve or reject special registration requests submitted by students.
- The system needs to allow administrators to add, edit, or remove courses.
- The system needs toallow administrators to create course offerings for each semester with schedule, capacity, and instructors teaching it.
- The system needs to allow administrators to manage user accounts add, remove or edit students and instructors.
- The system needs to allow administrators to put system rules like maximum allowed credits per student and the prerequisites of each course.

- The system needs to allow administrators to open or close registration periods for each semester.

2. Non-Functional Requirements

1. **Usability requirements**
    - The system should be easy to use so that new students can register for courses in less than 5 steps.
    - All buttons, forms, and pages should be consistent so users don't get confused.
2. **Performance Requirements**
    - Under normal load the system should display course search results in 2 seconds.
    - Registration of a course should be completed in 1 second after registeration.
3. **Reliability Requirements**
    - The system must save and update data correctly
    - The system should work almost all the time at least 99% uptime especially during registration period
4. **Security Requirements**
    - User passwords must be saved in encrypted format.
    - Only users with permission should access the features allowed to them like the admins he is the only one have access to add courses.

4)System constraints and assumptions

4.1 System Constraints:

- The system requires an internet connection.
- The system supports desktop and mobile devices.
- Only authorized staff members can access administrative system functionalities.
- The system supports three main user roles: Student, Instructor, and Administrator.
- The system complies with the university's policies and privacy regulations.

- The system relies on accurate and up-to-date data entered only by authorized administrators.
- All registration and modification operations must occur within predefined time periods according to university policy.
- The system must provide an adequate level of security, such as two-factor authentication or data encryption.
- The system must handle a large number of users simultaneously without impacting performance.

4.2 System Assumptions:

- All users have active accounts that are created and approved by the designated administrator.
- Course data — including prerequisites, schedules, and instructors — is entered and updated by authorized staff to ensure accuracy.
- The system assumes that students are fully aware of all academic policies, including add/drop deadlines and maximum credit limits.
- The system operates within a single university environment, where all data belongs to one unified academic institution.
- All entities within the system (courses, users, semesters, etc.) have unique identifiers to prevent data duplication.
- The system assumes that users enter correct and valid information during registration and modification processes.
- All registration and update actions must occur within the official time periods defined by the Educational institution.
- The system assumes that all users have a stable internet connection while accessing the platform.
- Technical support is available to assist users in case they encounter issues while using the system.
- All permissions granted to users match their assigned roles and are predefined by the administration.

5)Use Case List and Descriptions

5.1 Use Case list

A) Student Use Cases:

1. Login
2. Browse Available Courses
3. View Course Details
4. Register for a Course
5. Drop a Course
6. View Schedule
7. Submit Special Registration Request
8. Receive Notifications

B) Instructor Use Cases:

1. Login
2. View Assigned Courses
3. View Registered Students
4. Approve or Reject Special Requests
5. Manage Course Details

C) Administrator Use Casses:

1. Login
2. Manage Courses(Add/Edit/Delete)
3. Create Course Offering
4. Manage User Accounts
5. Set Registration Rules
6. Open/Close Registration Period

5.2 Use Case Description

Login:

Actors: Student / Instructor / Admintrator
Description: The user enters their data(username, password) then, the system will validate the credentials and allow access according to the user role.

Browse Available Course:

Actor: Student
Description: The available courses are displayed by the system for the current semester also, students can search or filter the course list.

View Course Details:

Actor: Student
Description: The student can view the information and details about a course like: instructor, credits, capacity, schedule, and prerequisites.

Register for a Course:

Actor: Student
Description: The students try to register for a course, the system checks seat availability, schedule conflicts, prerequisites then confirming or rejecting the registration.

Drop a Course:

Actor: Student
Description: During the allowed drop period the student removes a previously registered course.

View Schedule:

Actor: Student
Description: The student views a weekly schedule containing all registered courses(classes)

Submit Special Registration Request:

Actor: Student
Description: The student submits a special request like: course override, prerequisite override for instructor approval.

Receive Notifications:

Actor: Student
Description: The student receives notification about successful registration, failed attempts, instructor responses to special requests.

View Assigned Courses:

Actor: Instructor
Description: The instructor views all courses they are assigned to him.

View Registered Students:

Actor: Instructor
Description: The instructor views the list of students registered in each of their courses.

Approve or Reject Special Requests:

Actor: Instructor
Description: The instructor reviews and approves or rejects students' special registration requests.

Manage Course Details:

Actor: Instructor
Description: The instructor updates course information like capacity or schedule.

Manage Courses:

Actor: Administrator
Description: The administrator adds, edits or deletes course information.

Create Course Offering:

Actor: Administrator
Description: The administrator creates a course offering for a specific semester and assigns an instructor, capacity, and schedule.

Manage User Accounts:

Actor: Administrator
Description: The administrator creates, updates, or deletes user accounts for students and instructors.

Set Registration Rules:

Actor: Administrator
Description: The administrator configures rules like: maximum credit limits, prerequisites, and conflict policies.

Open/Close Registration Period:

Actor: Administrator
Description: The administrator opens or closes the registration period for a specific semester.

6)UML Use Case Diagram