# Requirements Analysis & System Modeling

*Online Course Registration System*

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# Fully Detailed Class Descriptions

## Package: user

### 2.1 UserAccount (Superclass)

**Purpose:** General identity and authentication information for all system users.

#### Attributes

- userId : String — Unique identifier for the user

- name : String — Full user name

- email : String — Official contact email

- password : String — Encrypted login password

#### Methods

- login(email:String, password:String) : boolean — Validates user credentials

- logout() : void — Ends the user session

#### Role in System

- Parent class for Student, Instructor, and Administrator

- Avoids duplication of shared data fields

- Supports polymorphism (UserAccount references)

### 2.2 Student (extends UserAccount)

**Purpose:** Represents a student who registers for courses and maintains a schedule.

### Attributes

☐ studentLevel : int — Year/level of the student (e.g., 1, 2, 3, 4)

### Methods

☐ registerForCourse(courseId:String) : boolean — Attempts registration and returns status

☐ dropCourse(courseId:String) : boolean — Removes a registered course

☐ viewSchedule() : Schedule — Retrieves the student's weekly schedule

### Relationships

☐ Has **one Schedule** (composition)

☐ Has **many Registration records**

☐ Receives **Notifications**

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### 2.3 Instructor (extends UserAccount)

**Purpose:** Manages academic course information and views student lists.

### Attributes

☐ department : String — Department responsible for instructor's courses

### Methods

☐ editCourseInfo(courseId:String, data:Map) : boolean — Modify course description, materials, etc.

☐ viewEnrolledStudents(courseId:String) : List<Student> — Retrieves student details

### Relationships

☐ **Teaches multiple courses**

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### 2.4 Administrator (extends UserAccount)

**Purpose:** Manages courses, users, and registration rules for the system.

#### Methods

- addCourse(course:Course) : boolean

- editCourse(courseId:String, data:Map) : boolean

- deleteCourse(courseId:String) : boolean

- manageUser(user:UserAccount) : boolean

#### Relationships

- Interacts with **Course**, **UserAccount**, and system configurations.

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# Package: course

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### 2.5 Course

**Purpose:** Represents an academic course available for registration.

#### Attributes

- courseId : String — Unique course identifier

- title : String — Course name

- description : String — Course summary and content

- capacity : int — Maximum students allowed

- currentEnrollment : int — Current number of enrolled students

#### Methods

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- hasSpace() : boolean — Checks if enrollment < capacity

- incrementEnroll() : void — Increase student count

- decrementEnroll() : void — Decrease student count

### Relationships

- 1 Instructor teaches the course

- 1 Semester defines when it is offered

- 1..* TimeSlots represent when it meets

- 0..* Prerequisites required for registration

- 0..* Registration records link students to the course

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### 2.6 Prerequisite

**Purpose:** Encapsulates course prerequisite information.

### Attributes

- requiredCourseId : String — Course ID that must be completed first

### Relationships

- Multiple prerequisites may exist per course.

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### 2.7 TimeSlot

**Purpose:** Represents the scheduled meeting time(s) of a course.

### Attributes

- day : String — Day of the week

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- startTime : Time — Start time

- endTime : Time — End time

### Relationships

- Aggregated by Course

- Used by Schedule for conflict checking

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### 2.8 Semester

**Purpose:** Identifies the academic term.

### Attributes

- name : String — e.g., "Fall 2025"

- startDate : Date

- endDate : Date

### Relationships

- Each course belongs to exactly one semester

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## Package: registration

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### 2.9 Registration

**Purpose:** Represents an attempt or completion of course registration.

### Attributes

- registrationId : String — Unique registration ID

- studentId : String

- courseId : String

- timestamp : DateTime — When the request was made

- status : RegistrationStatus — Pending, Approved, Rejected

### Methods

- confirm() : void — Sets status to APPROVED

- fail(reason:String) : void — Sets status to REJECTED

### Relationships

- Links Student ↔ Course

- Triggers Notifications

- Logged in the system for auditing

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### 2.10 RegistrationStatus (Enum)

- PENDING

- APPROVED

- REJECTED

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# Package: schedule

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### 2.11 Schedule

**Purpose:** Holds all registered courses for a student.

### Attributes

- studentId : String — The owner of this schedule

### Methods

- addCourse(course:Course) : void

- removeCourse(course:Course) : void

- checkConflict(timeslot:TimeSlot) : boolean — Ensures no overlap

### Relationships

- Composition with Student (Schedule cannot exist without Student)

- Contains many TimeSlots

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# Package: notification

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### 2.12 Notification

**Purpose:** Communicates registration outcomes and updates.

### Attributes

- message : String

- type : String — success, failure, warning

- timeSent : DateTime — Time sent

### Methods

- send(toUserId:String) : void — Delivers the notification

### Relationships

- Created by Registration engine or Admin operations

- Delivered to Student, Instructor, or Admin