# SMART CAMPUS MANAGEMENT SYSTEM – STUDENT MODULE DOCUMENTATION

- Main Menu Options When the application starts, the user sees three primary options:

```
---- Smart Campus Management System ----
----------------------------------------
Options :
1. For Student
2. For Teacher
3. For Management
4. Exit
----------------------------------------
Choose an option: |
```

- Selecting Option 1 takes the user into the Student Management, where students can access and manage their academic information.

- **Module : Student Panel –**

   The Student Module is responsible for handling all operations related to students from login and viewing course details to updating profiles and enrolling in new courses.

- Process Flow

   1. ***Student Login -*** If valid, fetch student info and show:

```
----------------------------------------
Options :
1. For Student
2. For Teacher
3. For Management
4. Exit
----------------------------------------
Choose an option: 1
Are you an existing student? (yes/no): yes
Enter your Student ID: 1

♚ Student Details:
ID       : 1
Name     : Alice Johnson
Email    : alice.j@univ.edu
Phone Number   : 9876543210
DOB   : 2002-05-15
Gender   : Female
Department   : CSE
Year of Study   : 2
```

   If student ID doesn't exist, - ask the admin to add the student

```
---- Smart Campus Management System ----
----------------------------------------
Options :
1. For Student
2. For Teacher
3. For Management
4. Exit
----------------------------------------
Choose an option: 1
Are you an existing student? (yes/no): no
Kindly ask Management to Register you as a Student
```

## 2. *Faculty Dashboard Options*

1. **Option 1:  View Enrolled Courses**

   Fetches all course_ids from the enrollment table where student_id = ?

   Uses the course IDs to fetch course details from the course table.

   Shows a list like:

   ```
   Enter your choice: 1

   ⊞ Enrolled Courses:
   - Data Structures | Dept: CSE | Credits: 4
   - Algorithms | Dept: CSE | Credits: 4
   - Digital Circuits | Dept: ECE | Credits: 3
   ```

2. **Option 2: View Assigned Faculty**

   For each enrolled course:Joins course.course_id → faculty.faculty_id

   Retrieves faculty name, email, and department.

   Displays like:

3. **Option 3: View Timetable**

   Joins student → enrollment → course → timetable → faculty

   Builds a weekly timetable (Monday to Friday, 09:00 to 17:00).

   Example cell in timetable:

   ```
   ⊞ Your Weekly Timetable
   Time Slot     | Monday              | Tuesday             | Wednesday           | Thursday            | Friday
   =====================================================================================================================
   09:00 - 10:00 | Data Structures     | -                   | -                   | -                   | Algorithms
                 | ⊞ Dr. Ramesh Kumar  |                     |                     |                     | ⊞ Dr. Rohit Jain
                 | ⚲CSE101             |                     |                     |                     | ⚲CSE505
   ---------------------------------------------------------------------------------------------------------------------
   10:00 - 11:00 | -                   | -                   | -                   | -                   | Digital Circuits
                 |                     |                     |                     |                     | ⊞ Dr. Sneha Singh
                 |                     |                     |                     |                     | ⚲ME303
   ---------------------------------------------------------------------------------------------------------------------
   11:00 - 12:00 | -                   | Digital Circuits    | -                   | -                   | -
                 |                     | ⊞ Dr. Sita Mehra    |                     |                     |
                 |                     | ⚲ECE202             |                     |                     |
   ---------------------------------------------------------------------------------------------------------------------
   12:00 - 13:00 | -                   | -                   | -                   | -                   | -
                 |                     |                     |                     |                     |
                 |                     |                     |                     |                     |
   ---------------------------------------------------------------------------------------------------------------------
   13:00 - 14:00 | -                   | -                   | -                   | -                   | Algorithms
                 |                     |                     |                     |                     | ⊞ Dr. Ramesh Kumar
                 |                     |                     |                     |                     | ⚲CSE402
   ---------------------------------------------------------------------------------------------------------------------
   14:00 - 15:00 | -                   | -                   | -                   | -                   | -
                 |                     |                     |                     |                     |
                 |                     |                     |                     |                     |
   ---------------------------------------------------------------------------------------------------------------------
   15:00 - 16:00 | -                   | -                   | -                   | -                   | -
                 |                     |                     |                     |                     |
                 |                     |                     |                     |                     |
   ---------------------------------------------------------------------------------------------------------------------
   16:00 - 17:00 | Algorithms          | -                   | -                   | -                   | Algorithms
                 | ⊞ Dr. Ramesh Kumar  |                     |                     |                     | ⊞ Dr. Rohit Jain
                 | ⚲DSSGSRGGG          |                     |                     |                     | ⚲CSE208
   ---------------------------------------------------------------------------------------------------------------------
   ```

4. **Option 4: Edit Student Details**

   Prompts to update:

   Email (must match format [xyz@domain.com](xyz@domain.com))

   Phone number (must be exactly 10 digits)

   Shows error for invalid data:

5. **Option 5: Register for a New Course**

   – If non-numeric → Show error

   – If valid and not already enrolled → Add to enrollment table

6. **Option 6: Exit**

   Exits from the **student module** and returns to the main menu.

## SMART CAMPUS MANAGEMENT SYSTEM – FACULTY MODULE DOCUMENTATION

- Main Menu Options When the application starts, the user sees three primary options:

```
---- Smart Campus Management System ----
----------------------------------------
Options :
1. For Student
2. For Teacher
3. For Management
4. Exit
----------------------------------------
Choose an option: |
```

- Selecting Option 2 takes the user into the Faculty Management, where faculty members can manage and view their details.

- **Module: Faculty Panel –**

  This module allows a faculty member to log in and access a personalized dashboard to view and manage course-related information, students they are teaching, their timetable, and edit their own details.

- **Process Flow**

  1. ***Faculty Login***

     a) The system prompts the user to enter their Faculty ID.

     b) The system checks:

        ✓ If the input is not a number, it displays an error:

           ❌ Invalid input! Please enter a number for the Faculty ID.

        ✓ If the input is a number but not found in the database, it displays:

           ❌ Faculty ID not found.

        ✓ If the input matches a valid faculty ID, it fetches and displays the faculty details (name, department, email, designation).

```
Choose an option: 2
Enter your Faculty ID: 101

🏛 Faculty Details:
ID            : 101
Name          : Dr. Ramesh Kumar
Email         : rames@gmail.com
Department    : CSE
Designation   : Professor

🏛 Faculty Menu:
1. View all courses you are teaching
2. View all unique students you're teaching
3. View your timetable
4. Edit your details
5. View student count grouped by year
6. Exit
Choose an option:
```

## 2. Faculty Dashboard Options

a) **Option 1: View All Courses Taught -** Displays a list of courses the faculty member is currently teaching.

b) **Option 2: View All Unique Students** - Shows a deduplicated list of student IDs enrolled in any of the courses taught by the faculty.

c) **Option 3: View Weekly Timetable** - Generates a full weekly timetable for the faculty, including course name, time slot, and room number.



```
📅 Faculty Weekly Timetable
Time Slot       | Monday          | Tuesday      | Wednesday    | Thursday     | Friday
=============================================================================================
09:00 - 10:00   | Data Structures | -            | -            | -            | -
                |  ♀CSE101        |              |              |              |
---------------------------------------------------------------------------------------------
10:00 - 11:00   | -               | -            | -            | -            | -
                |                 |              |              |              |
---------------------------------------------------------------------------------------------
11:00 - 12:00   | -               | -            | -            | -            | -
                |                 |              |              |              |
---------------------------------------------------------------------------------------------
12:00 - 13:00   | -               | -            | -            | -            | -
                |                 |              |              |              |
---------------------------------------------------------------------------------------------
13:00 - 14:00   | -               | -            | -            | -            | Algorithms
                |                 |              |              |              |  ♀CSE402
---------------------------------------------------------------------------------------------
14:00 - 15:00   | -               | -            | -            | -            | -
                |                 |              |              |              |
---------------------------------------------------------------------------------------------
15:00 - 16:00   | -               | -            | -            | -            | -
                |                 |              |              |              |
---------------------------------------------------------------------------------------------
16:00 - 17:00   | Algorithms      | -            | -            | -            | -
                |  ♀DSSGSRGGG     |              |              |              |
```

d) **Option 4: Edit Faculty Details** - Allows the faculty to update their email and designation.

e) **Option 5: View Student- Count Grouped by Year**
   - ✓ Checks all students enrolled in the faculty's courses.
   - ✓ Uses the student table to group these students by year_of_study.
   - ✓ Displays the number of students per year.

```
🏫 Faculty Menu:
1. View all courses you are teaching
2. View all unique students you're teaching
3. View your timetable
4. Edit your details
5. View student count grouped by year
6. Exit
Choose an option: 5

📊 Student Count Grouped by Year of Study:
Year: 1 | Students: 1
Year: 2 | Students: 1
```

f) **Option 6: Exit -** Returns to the main menu of the system.

| Feature | Description |
|---|---|
| Faculty Login | Secure authentication using Faculty ID |
| View Courses | Lists all courses assigned to the faculty |
| Unique Students | Shows students enrolled in any of the faculty's courses |
| Weekly Timetable | Displays a visually formatted week-wise timetable |
| Edit Details | Update email and role (with validation) |
| Grouped Student Count | Analyzes student distribution by year of study |

# SMART CAMPUS MANAGEMENT SYSTEM – MANAGEMENT MODULE DOCUMENTATION

- Main Menu Options When the application starts, the user sees three primary options:

```
---- Smart Campus Management System ----
----------------------------------------
Options :
1. For Student
2. For Teacher
3. For Management
4. Exit
----------------------------------------
Choose an option: |
```

Each section is designed to handle specific roles and responsibilities:

- ✓ **Student Section**: Handles student registration, profile management, course enrollments, etc.
- ✓ **Teacher Section**: Manages faculty details and other operations
- ✓ **Management Section**: Core administrative hub for managing courses, departments, scheduling, and academic infrastructure.

- Selecting Option 3 takes the user into the Management Portal, which is the administrative core of the system.
- This documentation describes the **Management** section of the **Smart Management System**. This portal provides access to manage the three core entities: Courses, Faculty, and Students.

```
※ Management Portal:
1. Manage Courses
2. Manage Faculty
3. Manage Students
4. Exit
Choose an option:
```

Lets divide each core entity into chapters

      A.  Manage Courses
      B.  Manage Faculty
      C.  Manage Students

## A. CHAPTER 1 – MANAGE COURSES

- ### *MODULE OVERVIEW*

  The Course Management section is part of the Management Portal. It allows administrative users to manage course-related operations such as adding, viewing, updating, deleting courses, and simulating student enrollments.

```
🕮 Course Management:
1. Add Course
2. View Courses
3. Update Course
4. Delete Course
5. Simulate Concurrent Enrollments
6. Back
Enter your choice:
```

### a) *Option 1–4: CRUD OPERATIONS ON THE COURSE TABLE*

**Option 1 Add Course Functionality**: Collects and validates input to add a new course to the system.

| Field | Validation | Error Message |
|---|---|---|
| Name | Only letters and spaces | ❌ Name must contain only letters and spaces |
| Credits | Must be an integer | ❌ Invalid number. Try again. |
| Department | Only letters and spaces (e.g., CSE, ECE, AGRI) | ❌ Department must contain only letters and spaces |
| Semester | Must be an integer | ❌ Invalid number. Try again. |
| Faculty ID | Must be an integer | ❌ Invalid number. Try again. |

**Option 2 View Courses Functionality:** Displays a list of all registered courses in the system.

**Option 3: Update Course Functionality:** Allows updating an existing course's name and credit value.

| Field | Validation | Error Message |
|---|---|---|
| Course ID | Must be an integer | ❌ Invalid number. Try again. |
| Name | Only letters and spaces | ❌ Name must contain only letters and spaces |
| Credits | Must be an integer | ❌ Invalid number. Try again. |

**Option 4: Delete Course Functionality:** Deletes a course from the system based on Course ID.

### b) *Option 5: SIMULATES STUDENT ENROLLMENTS TO TEST SEAT AVAILABILITY AND CONCURRENCY*

**Functionality:** Simulates 10 students attempting to enroll in a specific department.

**Process:**

1. Prompt for department (CSE, ECE, AGRI).

2. Validate department:

   ✓ Department not found → Re-prompt.

3. Display available seats.

4. Simulate 10 students trying to enroll.

5. Assign students to available courses within the department.

6. Display:

   ✓ Total applied

   ✓ Successfully enrolled

   ✓ Not enrolled

7. Show course-wise summary and student-to-course mapping

```
Course Management:
1. Add Course
2. View Courses
3. Update Course
4. Delete Course
5. Simulate Concurrent Enrollments
6. Back
Enter your choice: 5
Enter the department (CSE, ECE, AGRI): CSE
 Found 7 students from CSE department.
 Available Seats: 6
 Simulating enrollment...
 Alice Johnson enrolled. Seats left: 5
 Jonathan  enrolled. Seats left: 4
 Jobin  enrolled. Seats left: 3
 mayank enrolled. Seats left: 2
 Rohit  enrolled. Seats left: 1
 Fiona White enrolled. Seats left: 0
 Ethan Black could not enroll. No seats left.

 Department Enrollment Summary for CSE
Total Students Attempted: 7
Successfully Enrolled: 6
Not Enrolled: 1

 Course: Data Structures | Available Seats: 3
 Alice Johnson got into Data Structures
 Rohit  got into Data Structures
 Fiona White got into Data Structures
 mayank could not get into Data Structures
 Jobin  could not get into Data Structures
 Jonathan  could not get into Data Structures
 Summary for Data Structures:
Enrolled: 3
Not Enrolled: 3
```

```
 Final Course Enrollment Map:
 Course: Algorithms -> 3 students
 Course: Data Structures -> 3 students
 Course: Machine Learning -> 3 students
 Course: Java Core -> 3 students

 Student Course Map:
 Fiona White -> Data Structures
 Rohit  -> Data Structures, Algorithms
 Alice Johnson -> Data Structures, Algorithms, Machine Learning, Java Core
 mayank -> Java Core
 Jonathan  -> Machine Learning, Java Core
 Jobin  -> Algorithms, Machine Learning
```

### c) OPTION 6: RETURNS TO THE MANAGEMENT PORTAL

```
Enter your choice: ADFAEFGAED
 Invalid number. Try again.
Enter your choice: 6
 Returning to main menu...
```

## B. CHAPTER 2 - MANAGE FACULTY

- *MODULE OVERVIEW*

  The Faculty Management Module allows system administrators to add, view, update, delete faculty records, and schedule teaching assignments. It ensures proper input validation and provides detailed timetable views and updates.

```
🏛 Faculty Management:
1. Add Faculty
2. View Faculty
3. Update Faculty
4. Delete Faculty
5. Schedule Faculty
6. Back
Enter your choice:
```

### a) 1–4: CRUD OPERATIONS ON FACULTY RECORDS

**Option 1: Add Faculty Functionality:** Registers a new faculty member into the system.

| Field | Validation | Error Message |
|---|---|---|
| **Name** | **Only letters and spaces** | ❌ **Name must contain only letters and spaces** |
| **Email** | **Must follow email format (@, domain)** | ❌ **Invalid email format. Try again.** |
| **Department** | **Only letters and spaces** | ❌ **Department must contain only letters and spaces** |
| **Designation** | **Free text (e.g., Professor, Lecturer)** | **–** |

**Option 2: View Faculty Functionality:** Displays a full list of all faculty in the system.

**Option 3: Update Faculty Functionality:** Updates the email address of a faculty member.

Inputs & Validations:

| Field | Validation | Error Message |
|---|---|---|
| Faculty ID | Must be numeric | ❌ Invalid number. Try again. |
| Email | Must be a valid email | ❌ Invalid email format. Try again. |

**Option 4: Delete Faculty Functionality:** Deletes a faculty record based on their ID.

### b) OPTION 5: FOR ASSIGNING TIME SLOTS OR CLASSES TO FACULTY

**FUNCTIONALITY:**

Allows scheduling a course for a faculty member in a weekly timetable.

**ADD SCHEDULE FLOW**

1. **Enter Faculty ID**

   Must be numeric and exist

   Errors:

   ❌ Invalid Faculty ID. Try again.

   ⚠️ Please enter a valid number.

2. **Course Selection**

   Lists courses available in the faculty's department

   Validates Course ID

   ❌ Invalid Course ID for this department

3. **Enter Day**

   Must be a valid weekday

   ❌ Invalid day. Please enter a valid weekday (Monday to Friday)

4. **Select Time Slot**

   1 to 8 options shown with start and end times

5. **Enter Room Number**

   Free input (e.g., CSE101, ECE204)

```
🗓 Faculty Timetable:

🗓 Smart Campus Weekly Timetable
Time Slot      | Monday            | Tuesday           | Wednesday          | Thursday           | Friday
===================================================================================================================
09:00 - 10:00  | Data Structures   | -                 | -                  | -                  | Algorithms
               | 👤 Dr. Ramesh Kumar |                  |                    |                    | 👤 Dr. Rohit Jain
               | 📍CSE101           |                   |                    |                    | 📍CSE505
-------------------------------------------------------------------------------------------------------------------
10:00 - 11:00  | -                 | -                 | Thermodynamics     | -                  | Digital Circuits
               |                   |                   | 👤 Dr. Arjun Dev    |                    | 👤 Dr. Sneha Singh
               |                   |                   | 📍ME303            |                    | 📍ME303
-------------------------------------------------------------------------------------------------------------------
11:00 - 12:00  | -                 | Digital Circuits  | -                  | -                  | -
               |                   | 👤 Dr. Sita Mehra  |                    |                    |
               |                   | 📍ECE202           |                    |                    |
-------------------------------------------------------------------------------------------------------------------
12:00 - 13:00  | -                 | -                 | -                  | -                  | -
               |                   |                   |                    |                    |
               |                   |                   |                    |                    |
-------------------------------------------------------------------------------------------------------------------
13:00 - 14:00  | -                 | Thermodynamics    | -                  | Power Systems      | Algorithms
               |                   | 👤 Dr. Arjun Dev   |                    | 👤 Dr. Kavita Rao   | 👤 Dr. Ramesh Kumar
               |                   | 📍ME203            |                    | 📍EEE404            | 📍CSE402
-------------------------------------------------------------------------------------------------------------------
14:00 - 15:00  | Embedded Systems  | -                 | -                  | -                  | -
               | 👤 Dr. Sneha Singh |                   |                    |                    |
               | 📍ECE606           |                   |                    |                    |
-------------------------------------------------------------------------------------------------------------------
15:00 - 16:00  | -                 | -                 | Embedded Systems   | -                  | -
               |                   |                   | 👤 Dr. Sita Mehra   |                    |
               |                   |                   | 📍ECE204            |                    |
-------------------------------------------------------------------------------------------------------------------
16:00 - 17:00  | Algorithms        | -                 | -                  | -                  | Algorithms
               | 👤 Dr. Ramesh Kumar |                  |                    |                    | 👤 Dr. Rohit Jain
               | 📍DSSGSRGGG         |                   |                    |                    | 📍CSE208
-------------------------------------------------------------------------------------------------------------------
```

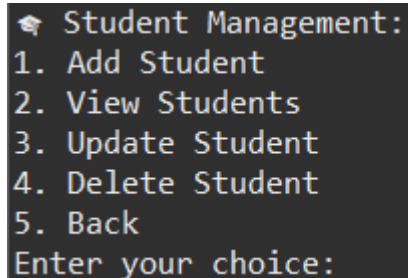### c) OPTION 6: RETURNS TO THE MANAGEMENT PORTAL

**Functionality:**

Returns to the Management Portal.

## C. CHAPTER 3 – MANAGE STUDENTS

- **MODULE OVERVIEW –**

  The Student Management Module allows administrators to manage student information in the system. It includes adding new students, viewing registered students, updating existing records, and deleting student profiles.

  ```
  🎓 Student Management:
  1. Add Student
  2. View Students
  3. Update Student
  4. Delete Student
  5. Back
  Enter your choice:
  ```

  ### a) 1–4: STUDENT RECORD OPERATIONS

  **Option 1 : Add Student Functionality:**

  Registers a new student with validated details.

  **Option 2 :View Students Functionality:**

  Displays a list of all registered students with their key details.

  **Option 3: Update Student**
  - ✓ Prompt for Student ID
  - ✓ Validate input
  - ✓ Allow selective field editing (e.g., email, phone, department)
  - ✓ Show updated confirmation

  **Option 4: Delete Student**
  - ✓ Prompt for Student ID
  - ✓ Validate as numeric
  - ✓ Confirm deletion

  ### b) 5: RETURNS TO THE MANAGEMENT PORTAL

  **Functionality:**

  Returns to the Management Portal.

## FEATURE SUMMARY

| FEATURE | DESCRIPTION |
|---|---|
| Add Student | Adds a student after validating all input fields |
| View Students | Shows all student records (ID, Name, Department) |
| Update Student | (To be implemented / Assumed similar to Faculty) |
| Delete Student | (Assumed similar to other delete operations) |
| Back | Returns to previous management menu |