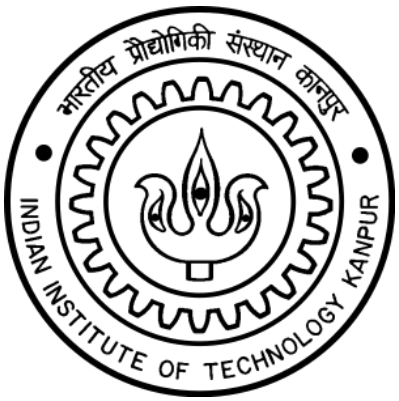
Department of Computer Science and Engineering
Indian institute of technology kanpur



CS315 Project Report

University Management System

GROUP: 13

Submitted by

Roll No	Name and Department
150193	Bishal (CSE)
150269	Harshad Yadav (CSE)
150670	Shikhar Shivraj Jaiswal (ME)
15817693	Shrey Agrawal (MTH)
150801	Vinay Kumar Agarwal (ME)

Under the guidance of
Dr. Arnab Bhattacharya

Contents

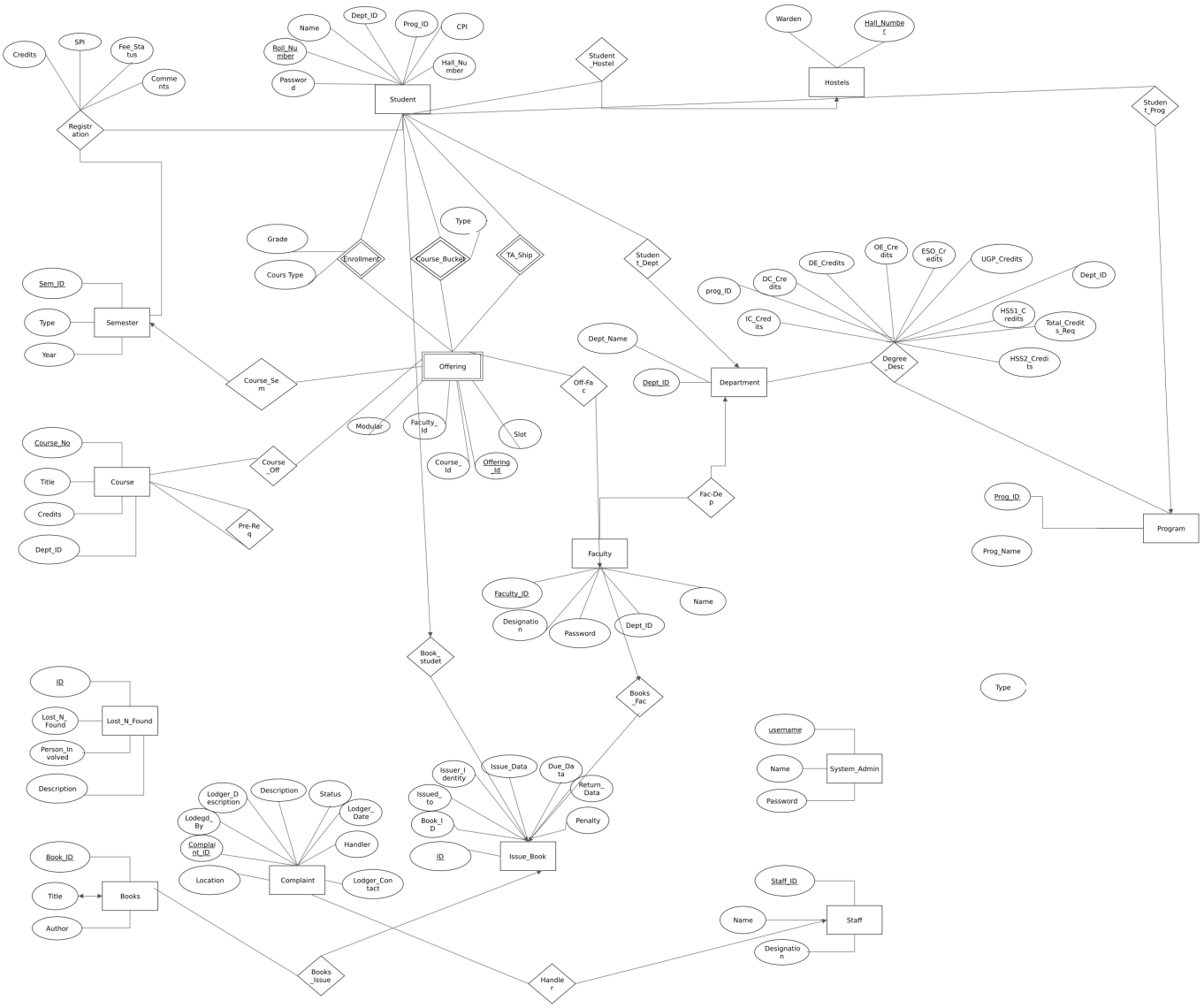
1 Introduction

Our task is to build a University Management System using LAMP. We have mainly focused on the backend of our project rather than the frotend. Our aim is to understand and apply the concepts and methods we learned in our course CS315 to build a robust and well defined model.

2 Database Structure

2.1 ER Diagram

The following is the ER diagram of the database we have used in our model.



2.2 Relational Model

Following is the Relational Model:

1. Semester (Sem_ID, Year, Type)
   It is BCNF as in all functional dependencies $(X) \rightarrow (Y)$, X is a superkey.

2. Student (Roll NO,Name, Dept_ID, Prog_ID,CPI, DOB, Password,Hall_Number)
   It is BCNF as in all functional dependencies $(X) \rightarrow (Y)$, X is a superkey.

3. Department (Dept_ID, Dept_Name)
   It is BCNF as in all functional dependencies $(X) \rightarrow (Y)$, X is a superkey.

4. Faculty (Faculty_ID, Name,Dept_ID, Password,Designation)
   It is BCNF as in all functional dependencies $(X) \rightarrow (Y)$, X is a superkey.

5. Course (Course_No, Credit, Title,Dept_ID)
   It is BCNF as in all functional dependencies $(X) \rightarrow (Y)$, X is a superkey.

6. Program (Prog_ID, Prog_Name)
   It is BCNF as in all functional dependencies $(X) \rightarrow (Y)$, X is a superkey.

7. Offerings (Offering_ID, Sem_ID, Course_ID, Modular, Faculty_ID,Slot)
   It is not BCNF as in functional dependency $(Course\_ID) \rightarrow (Modular)$, X is not a superkey nor it is trivial. It is not also 3NF as $(Y - X)$ is not prime. But it is 2NF.

8. Degree_Desc (Dept_ID, Prog_ID, IC Credits, OE Credits, DE Credits, DC Credits,HSS1 Credits, ESO Credits, HSS2 Credits, Thesis/Project Credits). It is not BCNF as in functional dependency $(Prog\_ID) \rightarrow (ICCredits)$, X is not a superkey nor it is trivial. It is not also 3NF as $(Y - X)$ is not prime. It is not 2NF because Modular is partially dependent on Program.

9. Pre-Req (Course_Code, Course_Code)
   It is BCNF as there are no functional dependencies.

10. Registration (Roll No, Sem_Id, SPI, Credits Taken, Fee Status, Comments)
    It is BCNF as in all functional dependencies $(X) \rightarrow (Y)$, X is a superkey.

11. Enrollment (Off_ID, Roll_Number, Grade, Course_Type)
    It is BCNF as in all functional dependencies $(X) \rightarrow (Y)$, X is a superkey.

12. Course_Bucket (Off_ID, Roll_Number)
    It is BCNF as there are no functional dependencies.

13. TA_Ship (Off_ID, Roll_Number)
    It is BCNF as there are no functional dependencies.

14. Hostel (Hall_Number, Warden_Incharge)
    It is BCNF as in all functional dependencies $(X) \rightarrow (Y)$, X is a superkey.

15. Staff (Staff_ID, Name, Designation)
    It is BCNF as in all functional dependencies $(X) \rightarrow (Y)$, X is a superkey.

16. System_Admin (Staff_ID, Name, Password)
    It is BCNF as in all functional dependencies $(X) \rightarrow (Y)$, X is a superkey.

17. Books (Book_ID, Title, Author)
    It is BCNF as in all functional dependencies $(X) \rightarrow (Y)$, X is a superkey.

18. Book_Issue (ID, Issued_to, Book_ID, Issued_Identity, Issued_Date, Due_Date, Return_Date, Penalty)
    It is BCNF as in all functional dependencies $(X) \rightarrow (Y)$, X is a superkey.

19. Lost_N_Found (ID, Lost_Or_Found, Person_Involved, Description)
    It is BCNF as in all functional dependencies $(X) \rightarrow (Y)$, X is a superkey.

20. Complaint (Complaint_ID, Lodged_By, Lodger_Designation, Description,Lodger_Date, Handler, Due_Date, Location, Status,Lodger_Contact)
    It is BCNF as in all functional dependencies $(X) \rightarrow (Y)$, X is a superkey.

2.3 Features of Database

Following are some of the assumptions and key features which we have incorporated in our database:

1. We have assumed that each student will have only one roll number. Some times when a student migrated to Dual degree or to PHD from master, he gets a new roll number. In our case the previous entity will be updated and all its information will be transferred to the newer one.

2. Department consists of all the departments in the institute. Programs consist of all the possibilities such as Btech, BS, MS, MSc, PHD, Minor, Major, Masters component of the dual.

3. Offering is a weak entity set, with semester as identifying relationship, which basically for each semester consists of all the courses which will be offered in it.

4. A student will take a course by enrolling to an offering and the relationship have attributes like grade and course type which will specify whether student is taking it as DE, OE, DC, HSS, etc.

5. Semester entity in relationship helps us to keep check that a student is not taking more than **65** credits in the semester. It will also have SPI as an attribute.

6. Relationship of courses with itself to maintain pre-requisites.

7. We have treated thesis as courses which will be compulsory for the PHD and Masters students and they will have to take them to complete their degree. They will have to register for them each semester.

8. Modular attribute of the offerings tells us whether a course is modular or not. And slots help us check if there are no timing clashes.

9. Course bucket maintains the list of the course which a student has currently requested for during pre-registration and is waiting for faculty approval.

10. TA_Ship helps us maintain the list of teaching assistants of the courses.

11. Staff consists of all the staff workers currently working in the institute. They can be maintenance workers or can be working in hall offices or institute level offices.

12. System Admin maintains the list of users who will have special privileges like adding courses, adding departments, deleting them.

13. Enrollment helps us store the grades of the the courses and this table is used to keep track of the credits remaining for the completion of the degree.

3 Website Structure

1. On the homepage a user has three options to login. He can login as a student, as a faculty or as a system admin and then he is redirected to their respective pages.

2. After logging in as faculty a faculty will have options to perform multiple tasks like

   - Page to view all the courses he is taking in the current semester.
   - Add any existing student as a TA to any course he is taking.
   - See all the pending course requests and take action(Accept/Reject) on them.
   - Page to view all the students who have registered for the course.
   - If he is a warden of a hall then he can view all the students in the hall.
   - He can lodge a maintenance complaint and see their status.
   - After the completion of the semester he can submit the grades of all the registered students.
   -

3. After logging in as student a student will have options to perform multiple tasks like

   - Page to view Progress report, grade sheet.
   - Page to request available courses.
   - See all the pending course requests and take action(Accept/Reject) on them.
   - Drop courses.

4. After logging in as admin a admin will have options to perform multiple tasks like

   - Add a new student, faculty or admin.
   - Add new department and programs
   - Add new staff members.
   - Edit/Delete rights for most of the pages.

5. Some are general pages which are accessible to all

   - Page to view all the courses offered in the semester.
   - Page to view all the faculty in the institute.
   - Page to view all the books available in the library and to issue them online.
   - Visit Lost and Found Portal.
   - Take a look at all the staff members in the institute.
   - Take a look at all the departments, programs and their respective degree descriptions in the institute.
   - Page to reset the password.

4 Acknowledgement

The completion of this project required guidance throughout, without which the idea would have remained far from success. We are privileged to have received all of it from our instructor Dr. Arnab Bhattacharya. His lectures have helped immensely in gaining the required background knowledge. He was always willing to entertain our doubts and help us in ways he can. We owe our deepest gratitude to him and would like to thank him for all the support.

References

[1] Bhattacharya, A. (2018) CS315: Data Base Management System, class notes [PDF slides]. Retrieved from `https://web.cse.iitk.ac.in/users/ cs315/lectures.php`