Outcome Based Education System

CSE303

Database Management System

FINAL REPORT

Group 5

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Background of the project

The Student Performance Monitoring System focuses on performance monitoring of student's continuous assessment (tests) and examination scores in order to predict their final achievement status upon graduation. The main idea is to evaluate the COs achieved and mapped PLOs achieved by each student in each of the enrolled courses as that would be necessary for monitoring the student performance.

Our project aims to design, build and deliver software that we believe will help universities promote a more productive and effective way of evaluating students. At the very core of our project, we have introduced the idea of Course Outcomes (COs) and Program Learning Outcomes (PLOs), Each CO is mapped to a PLO. Each PLO represents a specific valuable skill that the students are expected to gain or enhance at the end of that course, such as problem analysis, design, implementation of a craft, etc.

To evaluate the students efficiently, the project intends to check whether the PLOs mapped to the COs requirement are fulfilled or not for each student. The faculties then input the COs for each of their students so that the system can map the COs to PLO accordingly.

In addition, our software hopes to benefit the institutional bodies and faculty members, administrative bodies, and departmental bodies to track students' progress and departmental performance and help them distribute and allocate resources better.

Objective of the project

- Our project intends to create an interactive, user-friendly software that will act as a platform for students, faculties and other members of the university to help improve the quality of education and revolutionize the way we integrate technology into our education.
- One of the goals of this Project is to provide insight about how learning might improve in a given program-whether it be online, in a classroom, or happening in another context.
- To provide insight into what students are actually learning in relation to the big ideas of the courses and the program they aim to complete.
- To automate the process of monitoring student performance so as to reduce the manual processing involved in it.
- To analyse how student populations are learning inside of their programs so that the departments can focus more strategically on equity and success.

Scope of the project

Scope of the project is a necessity to ensure the success of a project. As we are changing an existing system, we have to ensure that the proposed system will be more effective than the existing one. The proposed system would include evaluating the COs achieved, mapping the COs with the PLOs achieved and storing them as records, all of these were done manually in the existing system. The records can also be used to generate reports for analysis purpose. The system can be accessed by the instructors, students, BAETE and Higher Management (VC, Deans, Heads). It is very inefficient to maintain detailed records of student's performance, and therefore there is a need of an improved and automated student performance monitoring system. Primarily we focused on IUB as the organization for which we are doing this project but the project has the potential of being useful to other universities as well, and future prospects seems likely to also cater to all universities that conform to OBE regulations.

Chapter 2

System Analysis

I. RICH PICTURE AS-IS

II. SIX ELEMENTS AS IS

III. PROCESS DIAGRAM AS-IS

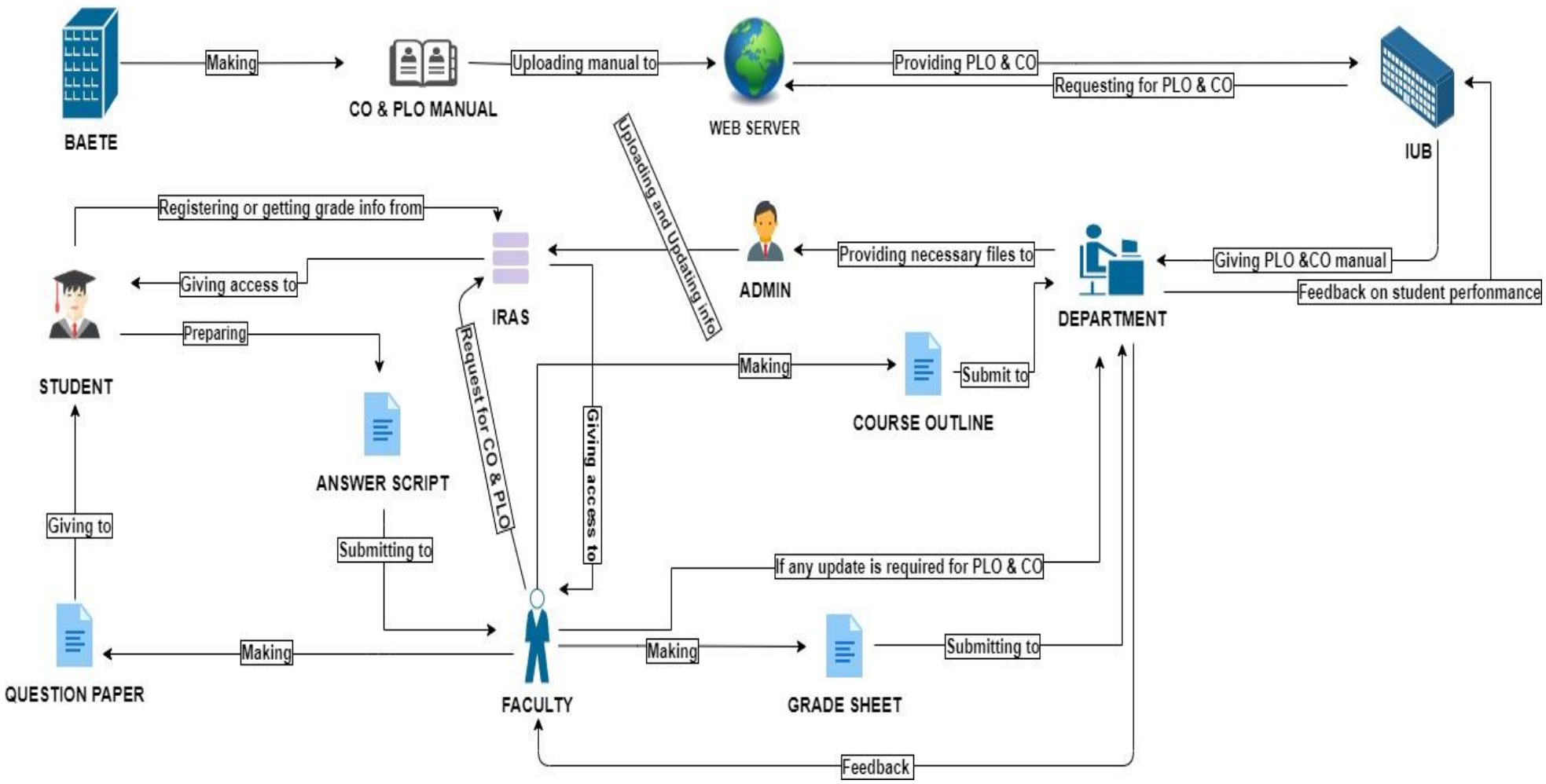
IV. PROBLEM ANALYSIS

V. RICH PICTURE TO-BE

VI. SIX ELEMENTS TO-BE

VII. PROCESS DIAGRAM TO BE

Rich Picture (AS-IS)



Six Element Analysis (AS-IS)

Process	System role					
	Human	**Non-Computing Hardware**	**Computing Hardware**	**Software**	**Database**	**Network & Communication**
1) Checking CO/PLO Manual or OBE document	**A) IUB officials:** 1. Specific IUB department sends request to BAETE to get info on OBE documents. 2. IUB can receives guidelines and feedbacks regarding courses and departments. **B) BAETE officials:** 1. BAETE officials can communicate. 2. BAETE officials make the necessary documents on OBE and provide it to university authority 3. BAETE officials can provide feedbacks and guidelines that should be followed by the departments.	**A) Pen, papers:** All documents are managed by papers. Pen for taking notes and writing purposes.	**A) Digital devices:** Such as computers, laptops, phone may be used to store soft copies for the guidelines. Many other digital devices are used for communication between internal/external parties.	**A) IRAS:** To access necessary information for different individuals such as faculties, students etc.	**A) Manual database:** To store all sort of PLO scores which are stored in documents.	**A) WAN, LAN WIFI, BROADBAND:** Any other communication platform to organize meetings between parties.

Process	System role					
	Human	**Non-Computing Hardware**	**Computing Hardware**	**Software**	**Database**	**Network & Communication**
2)Making course outline and assessment plan	**A) Department:** 1. After receiving the manual from BAETE department will map CO and PLO for each course and then provide the mapped guideline to faculty. 2. Department may receive an update from faculties if there any change need to do with CO and PLO mapping **B) Faculty:** 1. Faculties can plan how each of the CO can be used for questions and assessments tests. 2. He/she will check the mapping of CO and PLO. 3. If any change is necessary about the mapping faculty will contact the department. 3. And finally the course outline is created.	**A) Pen, paper:** Pen, Paper for taking notes and writing purposes.	**A) Computer, Laptop:** These are used to make or edit softcopies of course outline. It is also used for storing softcopies of the course outline and curriculum.	**A) MS Word:** Used for writing soft copies and making changes to them. We can also save softcopies in text format		**A) WAN, LAN WIFI, BROADBAND:** These are the communication platforms to transfer softcopies.

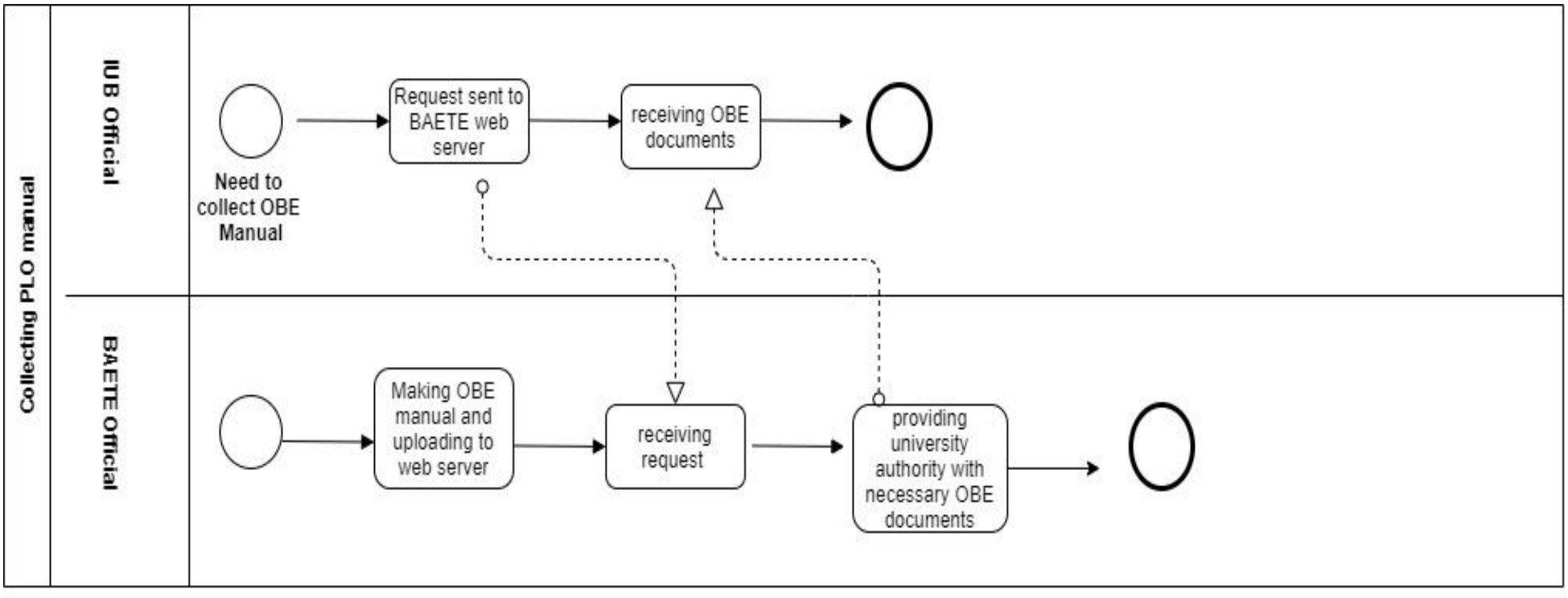
Process	System role					
	Human	**Non-Computing Hardware**	**Computing Hardware**	**Software**	**Database**	**Network & Communication**
3) Assessment phase and grading and attendance	**A) Students:** 1. Initially they participate in a class and sit for certain test on certain date. 2. They may ask to clarify if they have any questions. 3. Once they are done with the exam, they submit their answer script. 4. After checking assessed answer script, student can give a feedback to the faculty if there is any correction needed. **B) Faculties:** 1. They take attendance, prepare assessment papers (take tests online in any emergency situation). 2. They also invigilate or monitor the test given by the students. 3. They often need to clarify the questions asked by the students. 4. They collect the scripts. 5. Each question is connected to a certain CO.	**A) Pen, paper, rubber, pencil:** 1. Paper is supplied to students when the exams are taken in offline. 2. It is also used as an answer sheet. 3. Students need pen, pencil, eraser, ruler to complete the answer script.	**A) Computers, Laptops:** 1. Used to conduct particular test in courses related to computer science. 2. They are used to conduct online classes as well	**A) MS Word, GOOGLE DOC, MS Excel, Google classroom, Google meet:** 1. Google classroom is used for taking classes and conducting exams. 2. Google meet is used for monitoring and gather information about the participants of the exam. 3. MS Word or Google DOCS are used for writing answers. 4. Students submit their answers through the panels in google classroom. 5. MS Excel is used for storing each student marks and final grades. 6. It is also used to evaluate PLO and CO score to store them.	**A) Manual database, CITS:** 1. It is used to keep records of the participants of the test. 2. Used for online classes in case of a crisis situation.	**A) WAN,LAN WIFI,BROADBAND:** 1. Used to allow online examinations to be conducted.

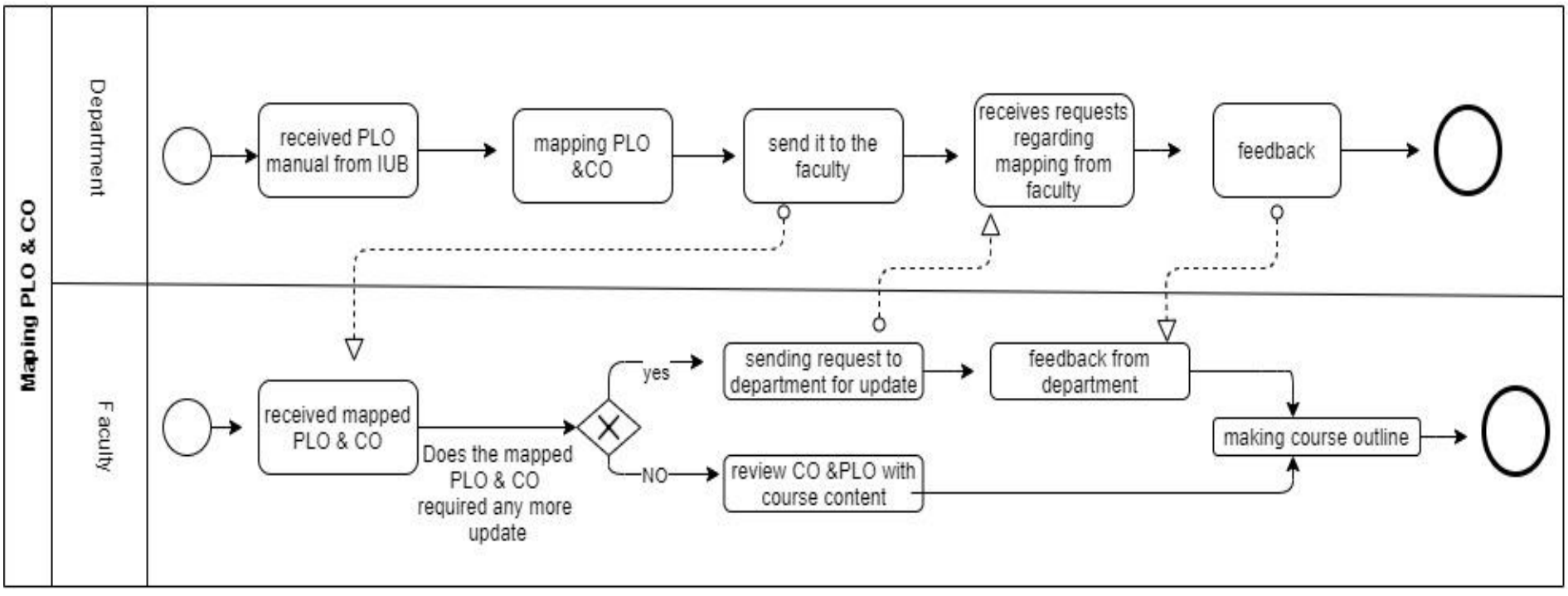
	6. By calculating the CO, PLO scores are also calculated. 7. Show the assessed script to the student. 8. Receive feedback from students about their grades. If any correction is about grades required faculty will do that. 9. Thus the faculties calculate the final grade for the students.					

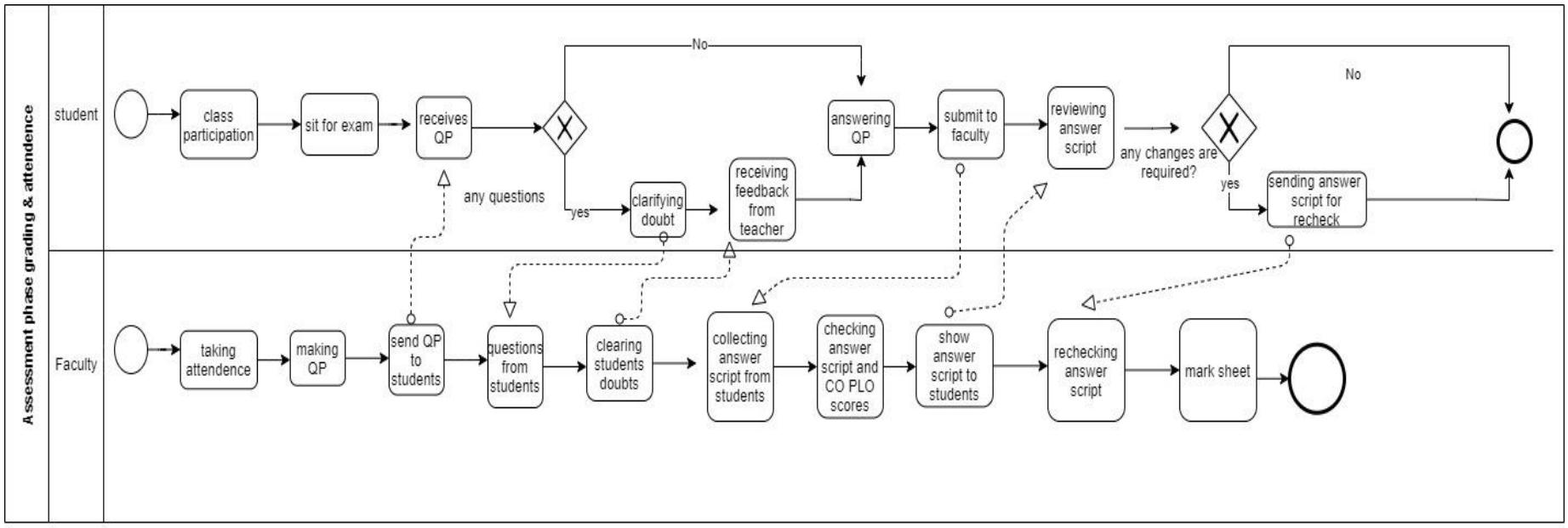
Process	System role					
	Human	**Non-Computing Hardware**	**Computing Hardware**	**Software**	**Database**	**Network & Communication**
4) Grade submission and storage	**A) Faculty:** 1. He/she will upload the grade of the students to the IRAS after log in to IRAS. 2. They also need to submit PLO and CO scores to the department. 3. The admin then avails a form to the faculty and available the changing option. **B) Department:** 1. They receive OBE mark sheet from the faculties. 2. They then store the hard and soft copies.	**A) Paper:** Hard copies of the grade submission and PLO and CO scores.	**A) Computer, Laptops:** 1. Use to store soft copies of the score grade in Excel sheets. 2. They are also use to access IRAS.	**A) MS EXCEL:** It is used to store grades, PLO and CO scores as an Excel Sheet.	**A) Manual database, IRAS:** 1. It is used for faculty to keep records of the students and their grades. 2. IRAS is used for grade submission. 3. It is also used for viewing student's credit, CGPA and all other information.	**A) WAN, LAN WIFI,BROADBAND:** Network is used for transferring excel files.

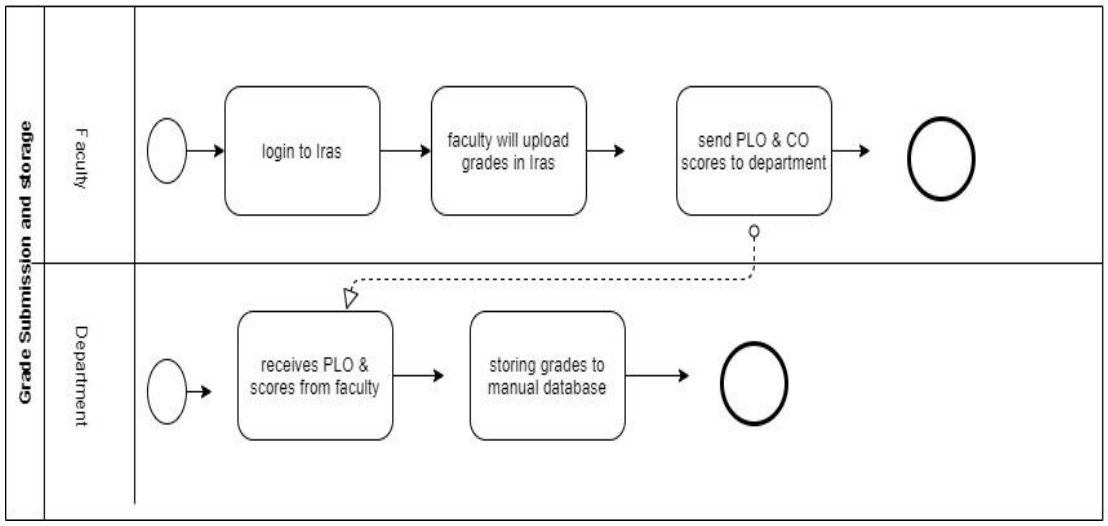
Process	System role					
	Human	**Non-Computing Hardware**	**Computing Hardware**	**Software**	**Database**	**Network & Communication**
5) Viewing grades	**A) Students:** They can login into IRAS to check their grades. **B) Department:** Department can provide OBE mark sheet upon request of IUB officials. **C) IUB officials:** IUB officials access the PLO and Co scores through the department.	**A) Paper:** Hard copies of the grade submission and PLO and CO scores.	**A) Computers, Laptops, Phone:** They are used for accessing IRAS. They are used for storing PLO and CO scores, grades of the students.	**A) Browser (Chrome, Mozilla, Opera):** To access the website of the IRAS.	**A) IRAS:** IRAS is used by the admin, students and other officials with the id and Password.	**A) WAN, LAN WIFI,BROADBAND:** Any network to access IRAS from a digital device such as computer, laptop, mobile.

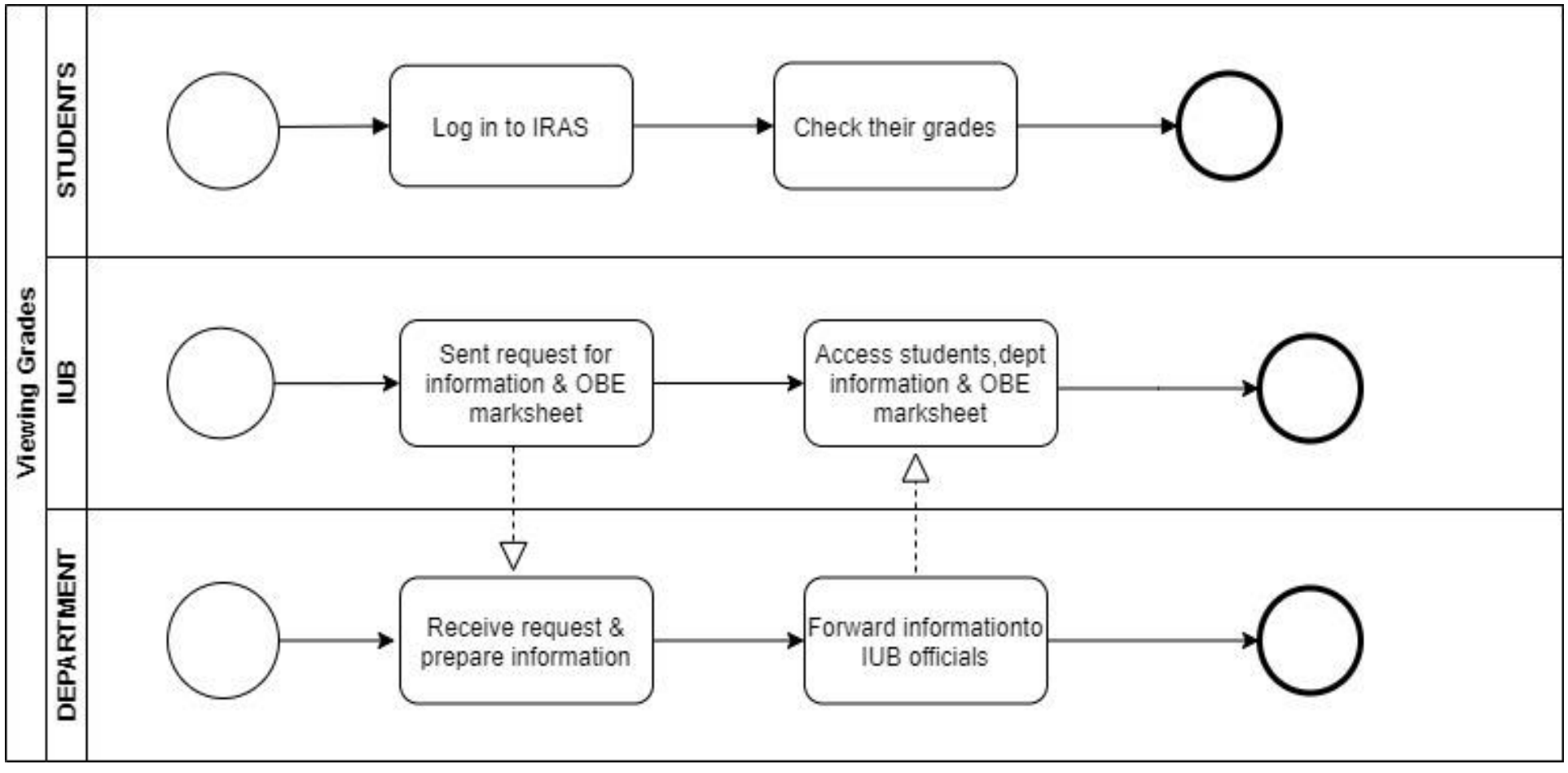
Process Diagram (AS-IS)






Assessment phase grading & attendence
student
Faculty
class participation
sit for exam
receives QP
any questions
No
yes
clarifying doubt
receiving feedback from teacher
answering QP
submit to faculty
reviewing answer script
any changes are required?
yes
No
sending answer script for recheck
taking attendence
making QP
send QP to students
questions from students
clearing students doubts
collecting answer script from students
checking answer script and CO PLO scores
show answer script to students
rechecking answer script
mark sheet


Grade Submission and storage
Faculty
Department
login to Iras
faculty will upload grades in Iras
send PLO & CO scores to department
receives PLO & scores from faculty
storing grades to manual database

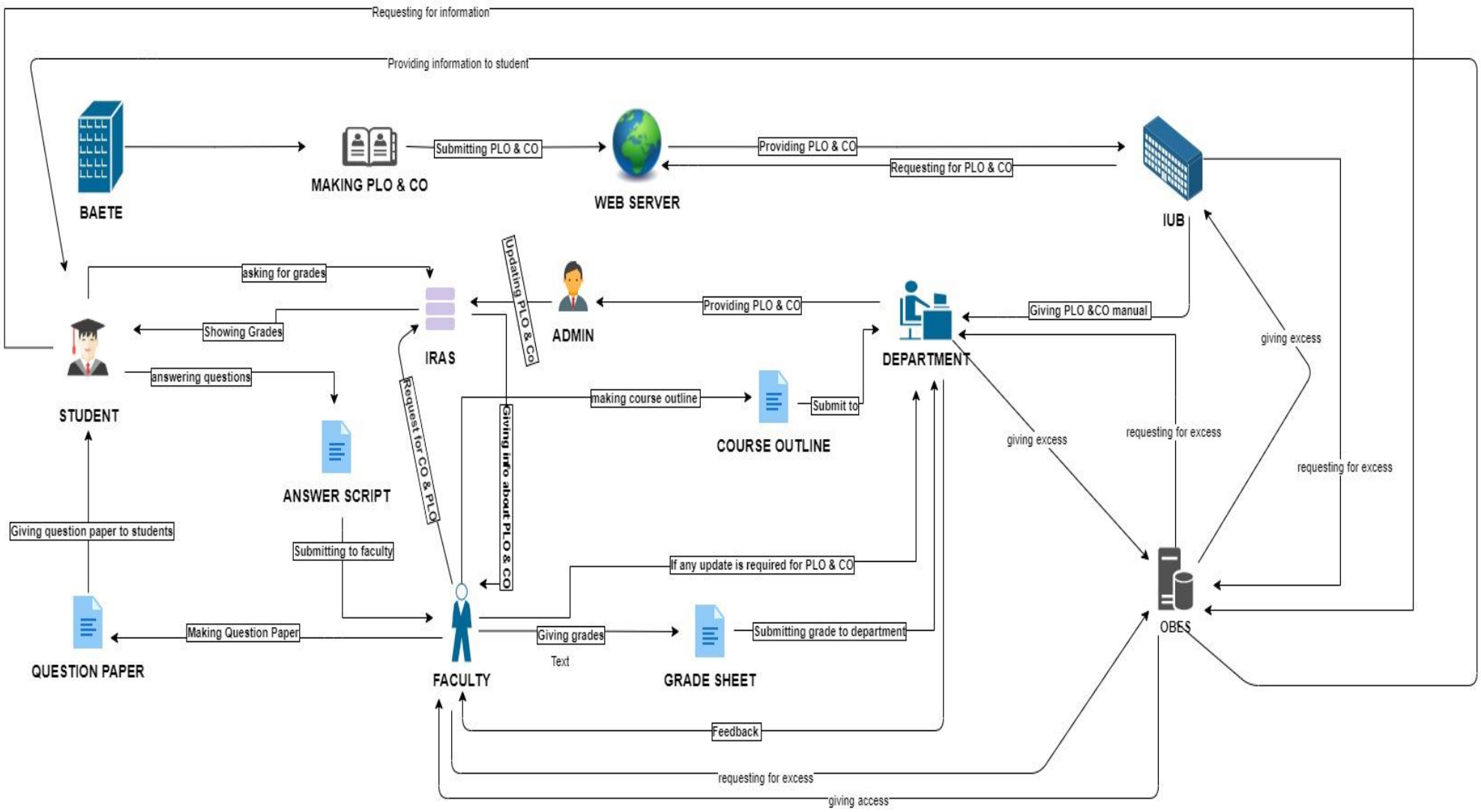

Viewing Grades
STUDENTS
Log in to IRAS
Check their grades
IUB
Sent request for information & OBE marksheet
Access students,dept information & OBE marksheet
DEPARTMENT
Receive request & prepare information
Forward informationto IUB officials

Problem Analysis

PROCESS	STAKEHOLDERS	CONCERNS	ANALYSIS	SOLUTION
CHECKING CO/PLO MANUAL OR OBE DOCUMENTS	1. IUB Officials 2. BAETE Officials	In case of PLO checking, IUB officials may have to dig very deep into documents, which can be difficult and time consuming. Each faculty have to manually prepare the questions based on course outline.	Lacking of a system, where every single data can be stored automatically. They also don't have any proper data Management system / procedure.	A system will track everything individually, for an instance the system will keep track of PLO scores of each student as well as overall performance of each course and all of the courses of the department the IUB officials, department, faculty, students can have their own personal account in the system, so that can log in anytime to track the overall PLO performance of a department or even for an individual student if needed.
MAKING COURSE OUTLINE AND ASSESSMENT PLAN	1. Department 2. Faculty	Department heads/experts have to provide PLO & CO guideline to the faculties manually. Faculties need to wait longer in order to make their course outline, because of the whole PLO & CO procedure. The specific departments have to wait for BAETE officials to provide them the OBE manual.	They don't have direct system where the department faculty members can directly discuss with the BAETE officials. They have to do the plan and store OBE mapped documents into a manual database.	If a system is build where CO/PLO mapping can be stored both department and faculties can keep track of the necessities to make assessment plan for every semester.
ASSESSMENT PHASE AND GRADING AND ATTENDANCE	1.Faculties 2.Students	Calculating PLO & CO scores manually can be difficult and time consuming. Errors might also occur calculating it manually.	They do have a lack of flexibility, in terms of preparing questions for exam.	The faculties can take coordinate exams, so that they can make the questions with ease.
GRADE SUBMISSION AND STORAGE	1.Faculties 2.Department	Faculty members has to send a request to the department to review previous record of a student, and even after requesting they have to manually search all the previous records of that student. This is not an efficient process at all. Faculty has to request the department in terms of any changes, which can be time consuming. Department has to store every grading documents manually which is time consuming.	There are lots of calculation & data entrance happening here, and not having an automatic system; it's very obvious for human error. Having no specific arrangement, where all of the previous and present records can be stored.	The calculation & data entering can be done automatically in the system. They can use the web server to keep the record of each & every student, rather than searching it manually. Faculties should have the direct authority in order to make any changes in final grade.
VIEWING GRADES	1. Students 2. Department 3. IUB Officials	Student can't get any info about their CO/PLO scores. It is difficult and time consuming for a department to arrange all the reports on	There are many reports that a department is making manually. They don't have any system which can produce these reports.	A system can be build where students can check their OBE performance. The system will produce necessary reports according to the given command.

		CO/PLO and hand it over to higher authority.		

Rich Picture (TO-BE)



Six Element Analysis (TO-BE)

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1) Checking CO/PLO Manual or OBE documents	**A) IUB officials:** 1. Specific IUB department sends request to BAETE to get info on OBE documents. 2. They collect the OBE documents from the BAETE web server. 3. IUB can receives guidelines and feedbacks regarding courses and departments. **B) BAETE officials:** 1. BAETE officials can communicate. 2. BAETE officials make the necessary documents on OBE and provide it to university authority 3. BAETE officials can provide feedbacks and guidelines that should be followed by the departments.	**A) Pen, papers:** All documents are managed by papers. Pen for taking notes and writing purposes.	**A) Digital devices:** Such as computers, laptops, phone may be used to store soft copies for the guidelines. Many other digital devices are used for communication between internal/external parties.	**A) IRAS, OBE System:** To access necessary information for different individuals such as faculties, students etc.	**A) Manual database, OBE System:** Manual databases to keep information about students. SPE keeps track of all PLO & CO Reports.	**A) WAN, LAN WIFI, BROADBAND:** Any other communication platform to organize meetings between parties.

Process	System role					
	Human	**Non-Computing Hardware**	**Computing Hardware**	**Software**	**Database**	**Network & Communication**
2)Making course outline and assessment plan	**A) Department:** 1. After receiving the manual from BAETE department will map CO and PLO for each course and then provide the mapped guideline to faculty. 2. Department may receive an update from faculties if there any change need to do with CO and PLO mapping **B) Faculty:** 2. He/she will check the mapping of CO and PLO. 3. If any change is necessary about the mapping faculty will contact the department. 3. And finally the course outline is created.	**A) Pen, paper:** Pen, Paper for taking notes and writing purposes.	**A) Computer, Laptop:** These are used to make or edit softcopies of course outline. It is also used for storing softcopies of the course outline and curriculum.	**A) MS Word:** Used for writing soft copies and making changes to them. We can also save softcopies in text format.	**A) OBE System:** Departments and faculties can check the previous records of CO/PLO mapping.	**A) WAN, LAN WIFI, BROADBAND:** These are the communication platforms to transfer softcopies.

Process	**System role**					
	Human	**Non-Computing Hardware**	**Computing Hardware**	**Software**	**Database**	**Network & Communication**
3) Assessment phase and attendance	**A) Students:** 1. Initially they participate in a class and sit for certain test on certain date. 2. They may ask to clarify if they have any questions. 3. Once they are done with the exam, they submit their answer script. 4. Student will give feedback to the faculty after reviewing their answer script. **B) Faculties:** 1. They take attendance, prepare assessment papers (take tests online in any emergency situation). 2. They also invigilate or monitor the test given by the students. 3. They often need to clarify the questions asked by the students. 4. They collect the scripts.	**A) Pen, paper, rubber, pencil:** 1. Paper is supplied to students when the exams are taken in offline. 2. It is also used as an answer sheet. 3. Students need pen, pencil, eraser, ruler to complete the answer script.	**A) Computers, Laptops:** 1. Used to conduct particular test in courses related to computer science. 2. They are used to conduct online classes as well.	**A) MS Word, GOOGLE DOC, MS Excel, Google classroom, Google meet:** 1. Google classroom is used for taking classes and conducting exams. 2. Google meet is used for monitoring and gather information about the participants of the exam. 3. MS Word or Google DOCS are used for writing answers. 4. Students submit their answers through the panels in google classroom. 5. MS Excel is used for storing each student marks and final grades. 6. It is also used to evaluate PLO and CO score to store them.	**A) Manual database, CITS:** 1. It is used to keep records of the participants of the test. 2. Used for online classes in case of a crisis situation.	**A) WAN,LAN WIFI,BROADBAND:** 1. Used to allow online examinations to be conducted.

	5. They will assess the answer script. Initially they will calculate the marks achieved by a student. 6. They will show the scripts to the students. 7. They will receive updates from students if any correction needed. 8. Then faculty will finalize a mark sheet.					

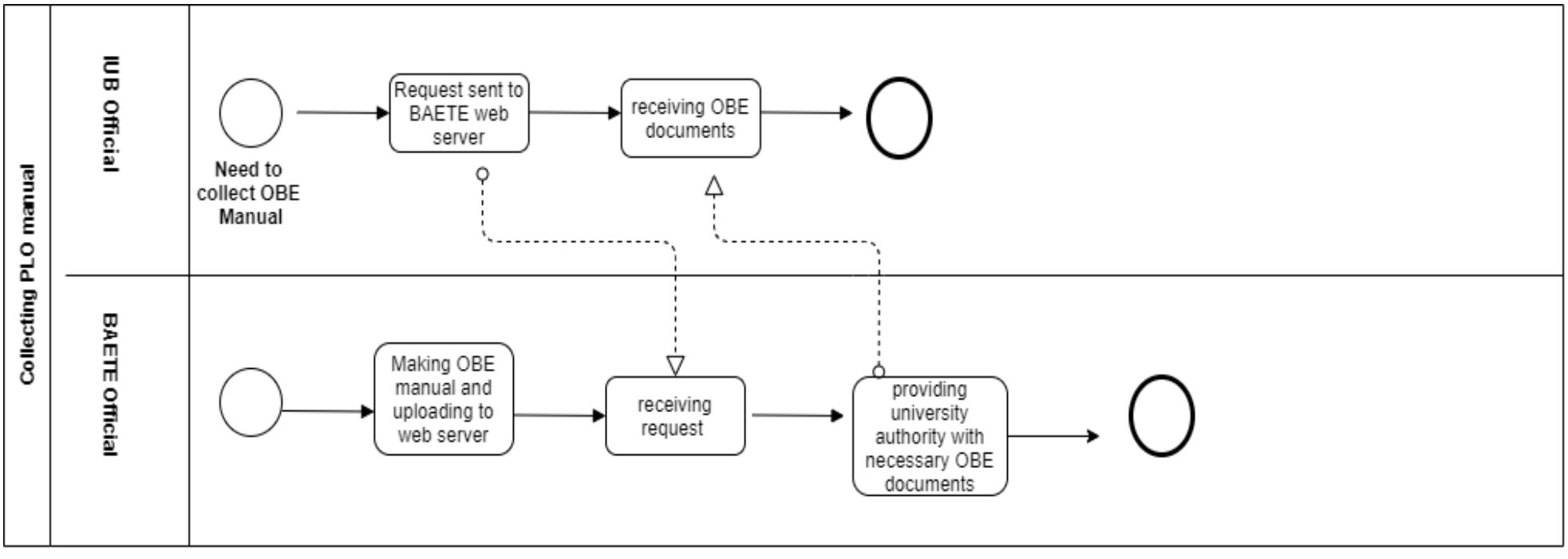
Process	**System role**					
	Human	**Non-Computing Hardware**	**Computing Hardware**	**Software**	**Database**	**Network & Communication**
4) Updating & storing Database system (OBE)	**A) Faculty:** 1. Faculties can plan how each of the CO can be used for questions and assessments tests 2. Mapping each question with certain CO 3. Faculties assess the students for each & every questions on the basis of CO/PLO.	**A) Paper, Pen:** Hard copies of answer scripts. Pen is used for marking scripts	**A) Computers, Laptops:** These devices are used to check the scripts in case of a crisis. Also used to store the answer scripts.	**A) MS Excel, OBE system:** MS Excel is used to enter and store the marks of each student in each question. Also used to enter and store the grades of the students. OBE system is used to evaluate the PLO & CO scores and store them.	**A) OBE system:** This system will be used to keep the records of PLO & CO scores.	**A) WAN, LAN, Wi-Fi, Broadband:** Any communication Or Network used.

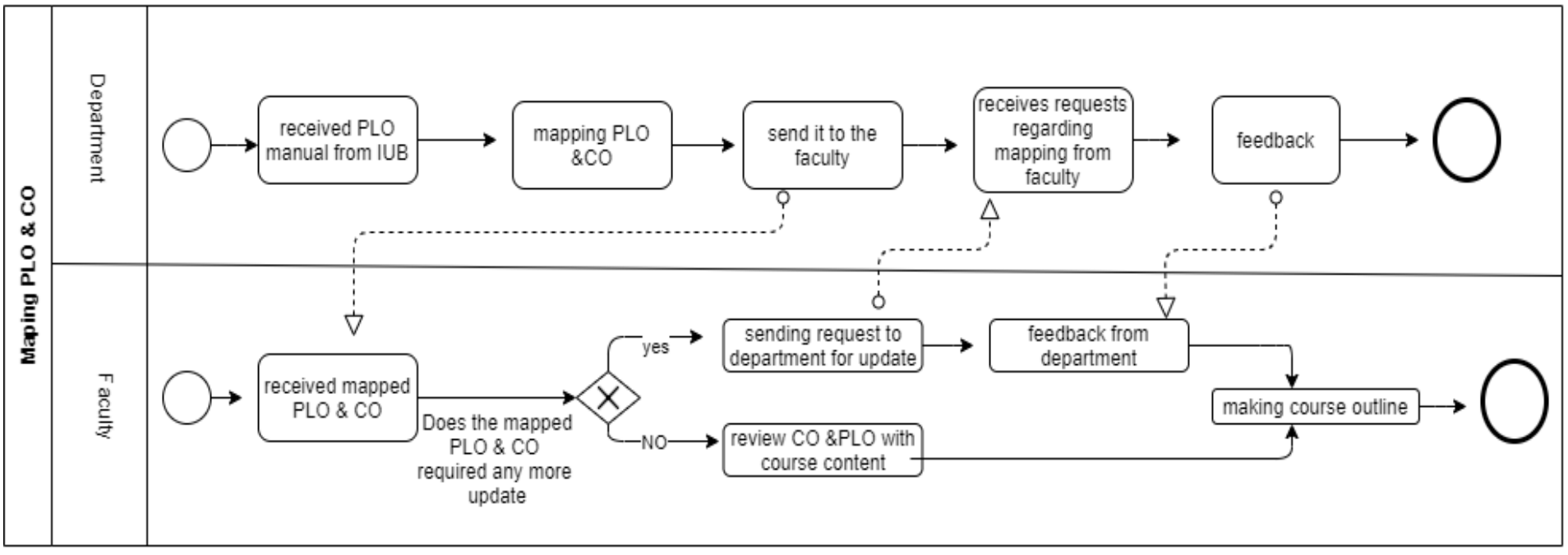
	4. They will submit PLO and CO scores to the department. **B) Department:** 1. receiving students CO & PLO scores 2. department will log in to the system 3. A department data entry operator input all the score received from faculty directly to OBE system. **C) OBE system :** 1. system will receive input 2. storing data in the system 1. Each CO is mapped with certain PLOs. 2. OBE system generates the PLO scores & charts by clicking. 3. End of the semester overall Performance of student, department and course report & verdict will be generated by OBE system.					

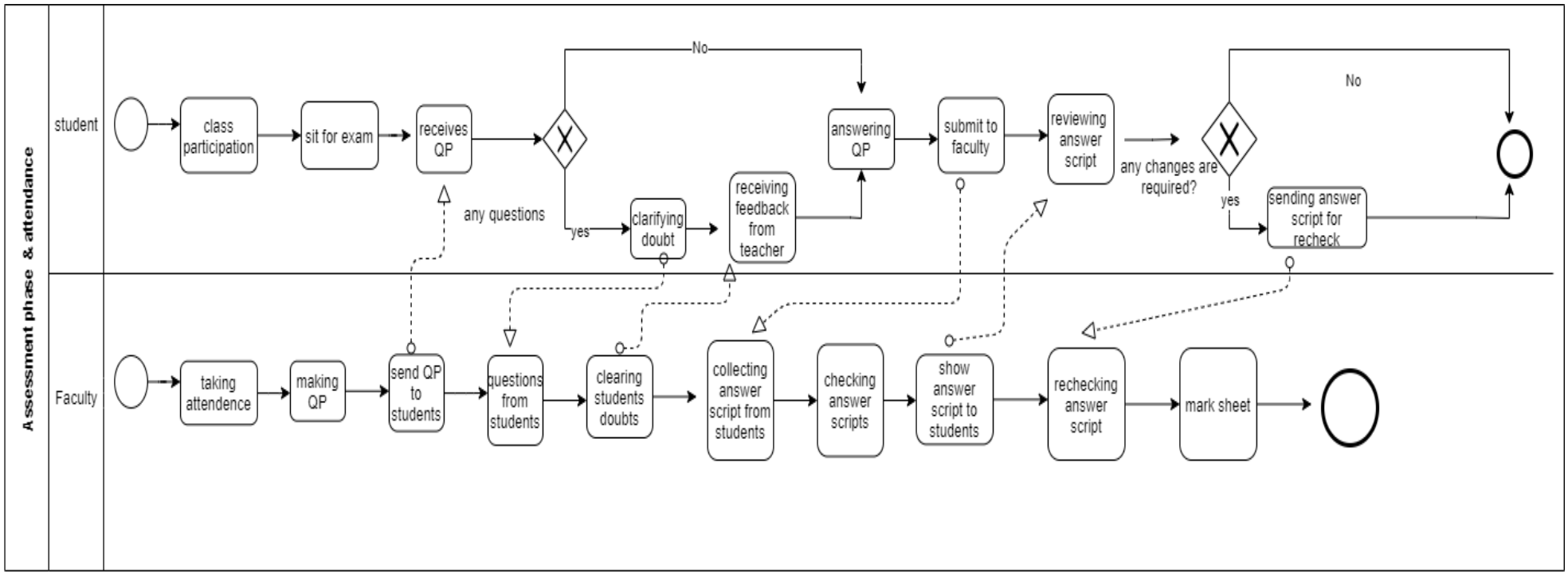
Process	System role					
	Human	**Non-Computing Hardware**	**Computing Hardware**	**Software**	**Database**	**Network & Communication**
5) Grade submission	**A) Faculty:** 1. Faculty will receive permission or dead line for grade submission 2. He/she will upload the grade of the students to the IRAS after log in to IRAS. **B) Department:** 1. Department will inform the faculty about the deadline of grade submission.	**A) Paper:** Hard copies of the grade submission and PLO and CO scores.	**A) Computer, Laptops:** 1. Use to store soft copies of the score grade in Excel sheets. 2. They are also use to access IRAS.	**A) MS EXCEL, IRAS:** Excel sheet is used to storing student marks. Grades will be uploaded to IRAS.	**A) Manual database, IRAS, OBE system:** 1. It is used for faculty to keep records of the students and their grades. 2. IRAS is used for grade submission. 3. It is also used for viewing student's credit, CGPA and all other information. 4. OBE will keep track of student entire performance through-out the semester.	**A) WAN, LAN WIFI,BROADBAND:** Network is used for transferring excel files.

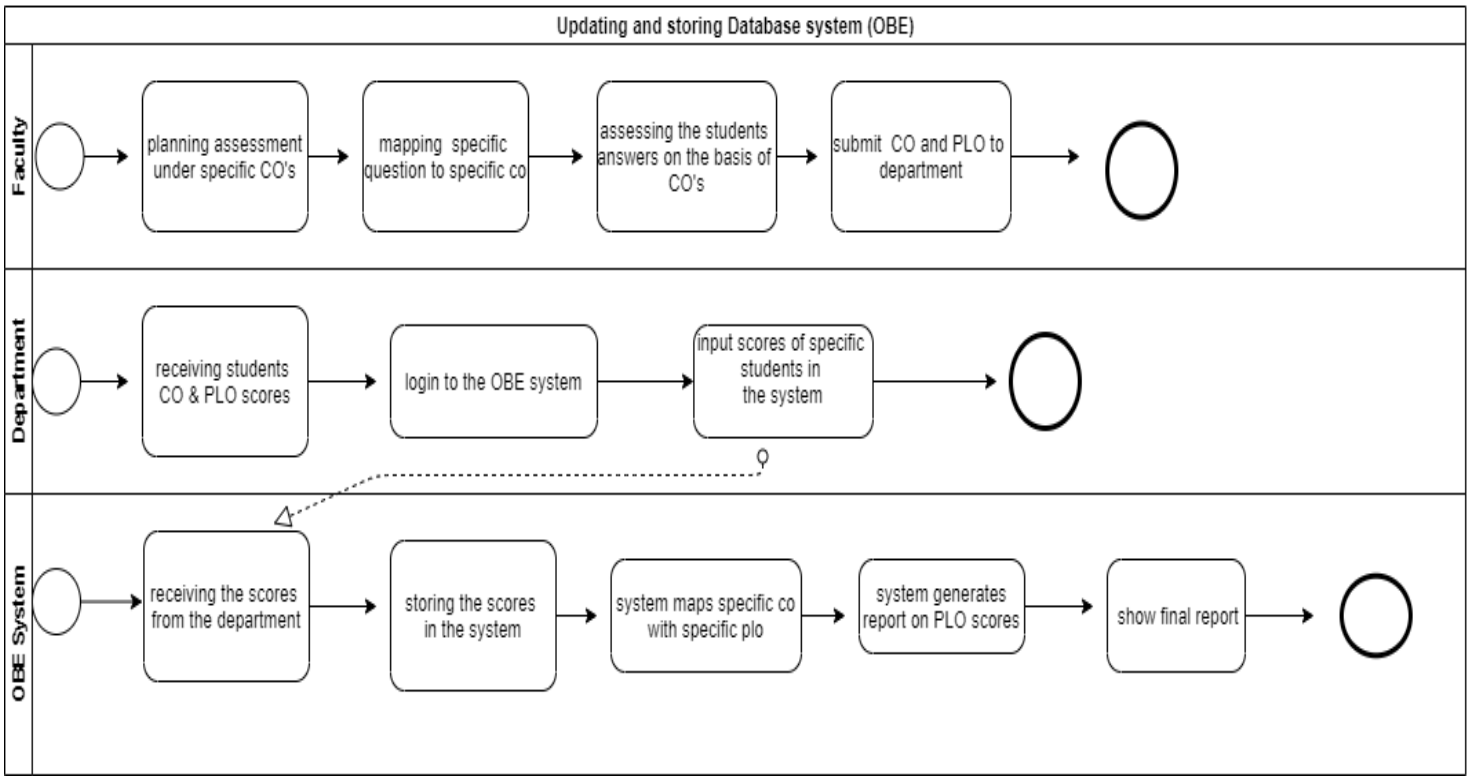
Process	System role					
	Human	**Non-Computing Hardware**	**Computing Hardware**	**Software**	**Database**	**Network & Communication**
6) Viewing grades	**A) Students:** They can login into IRAS to check their grades. They also can log in to OBE system to check their performance. **B) Department:** Department have access to the OBE system. They will monitor student progress. **C) IUB officials:** IUB officials access the OBE system to see PLO and CO scores.	**A) Paper:** Hard copies of the grade submission and PLO and CO scores.	**A) Computers, Laptops, Phone:** They are used for accessing IRAS, OBE. They are used for storing PLO and CO scores, grades of the students.	**A) Browser (Chrome, Mozilla, Opera), IRAS, OBE:** To access the website of the IRAS. IRAS to view grades. OBE to view performance.	**A) IRAS, OBE:** IRAS, OBE system is used by the students and other officials with the id and Password.	**A) WAN, LAN WIFI,BROADBAND:** Any network to access IRAS from a digital device such as computer, laptop, mobile.

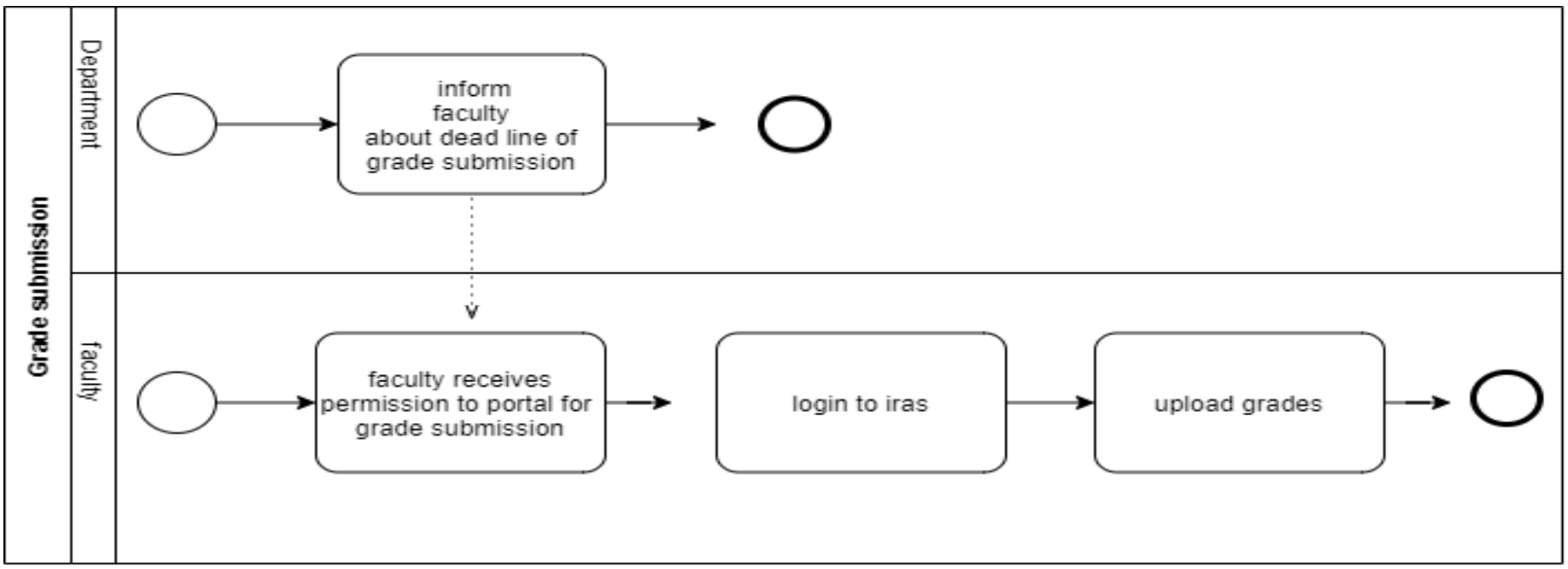
Process Diagram (TO-BE)

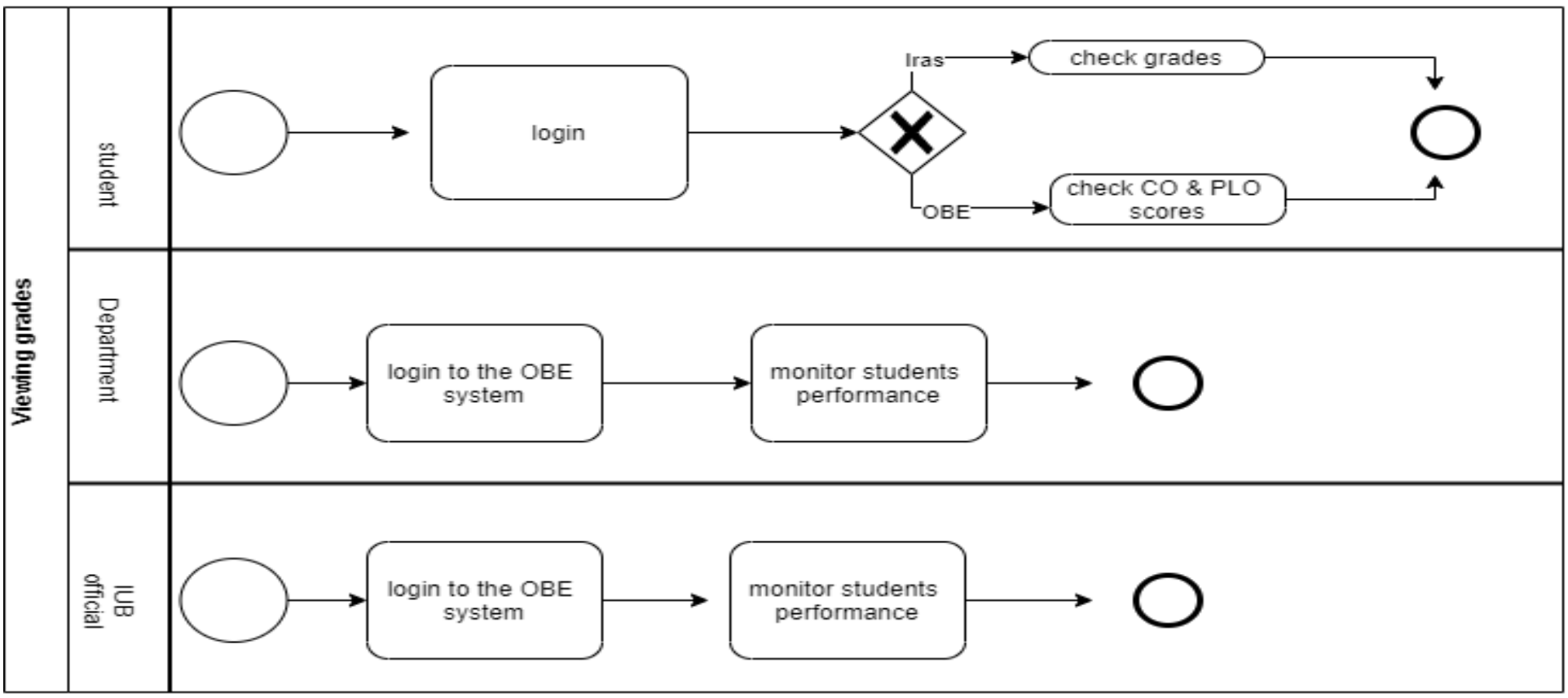





Assessment phase & attendance
student
class participation
sit for exam
receives QP
any questions
No
yes
clarifying doubt
receiving feedback from teacher
answering QP
submit to faculty
reviewing answer script
any changes are required?
No
yes
sending answer script for recheck
Faculty
taking attendence
making QP
send QP to students
questions from students
clearing students doubts
collecting answer script from students
checking answer scripts
show answer script to students
rechecking answer script
mark sheet


Updating and storing Database system (OBE)
Faculty
planning assessment under specific CO's
mapping specific question to specific co
assessing the students answers on the basis of CO's
submit CO and PLO to department
Department
receiving students CO & PLO scores
login to the OBE system
input scores of specific students in the system
OBE System
receiving the scores from the department
storing the scores in the system
system maps specific co with specific plo
system generates report on PLO scores
show final report


Grade submission
Department
inform faculty about dead line of grade submission
faculty
faculty receives permission to portal for grade submission
login to iras
upload grades


Viewing grades
student
login
Iras
check grades
OBE
check CO & PLO scores
Department
login to the OBE system
monitor students performance
IUB official
login to the OBE system
monitor students performance

Chapter 3
SYSTEM DESIGN

I. Business Rule

II. ERD (Entity Relationship Diagram)

III. Relational Schema

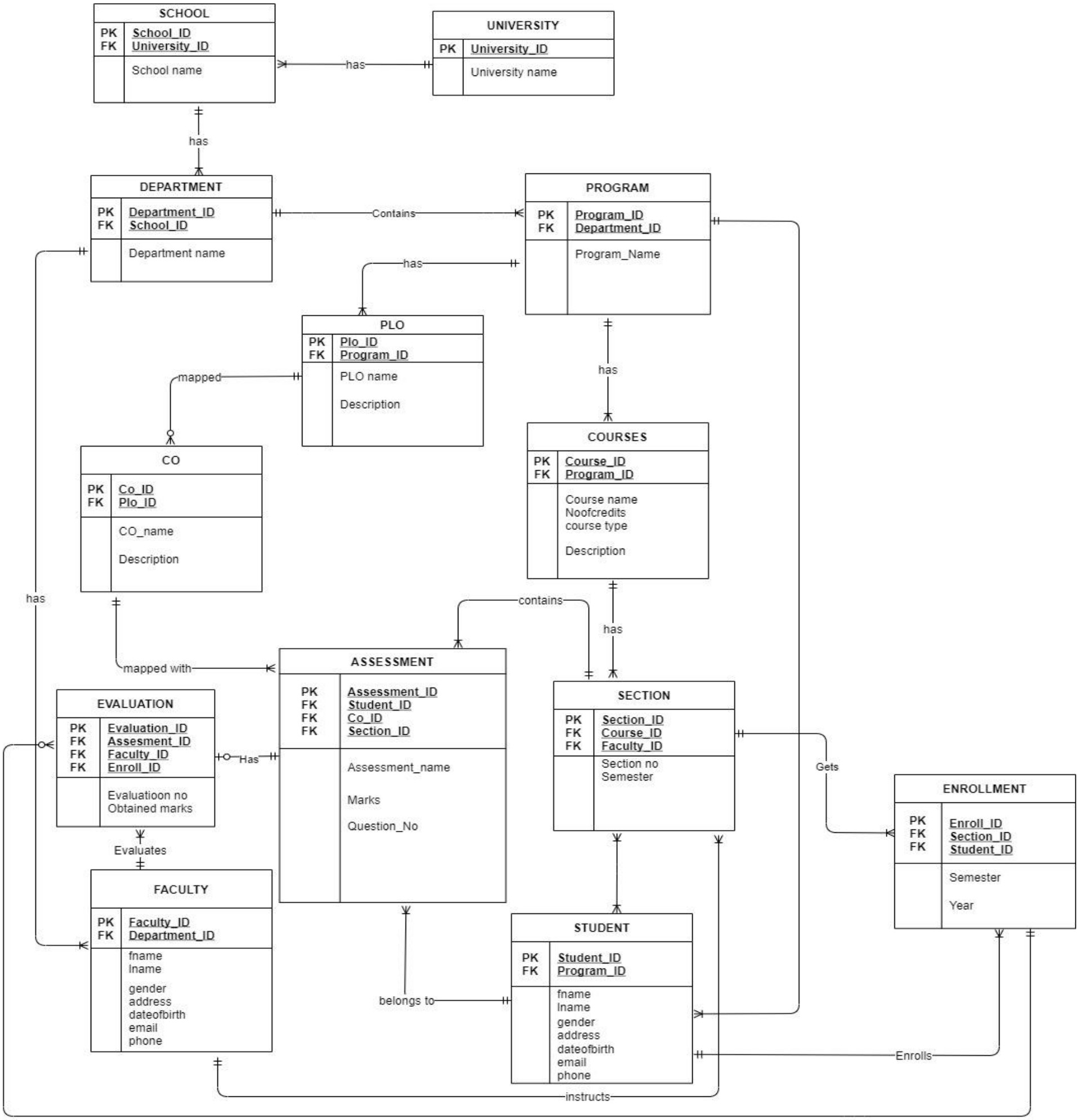
IV. Normalization

V. Data Dictionary

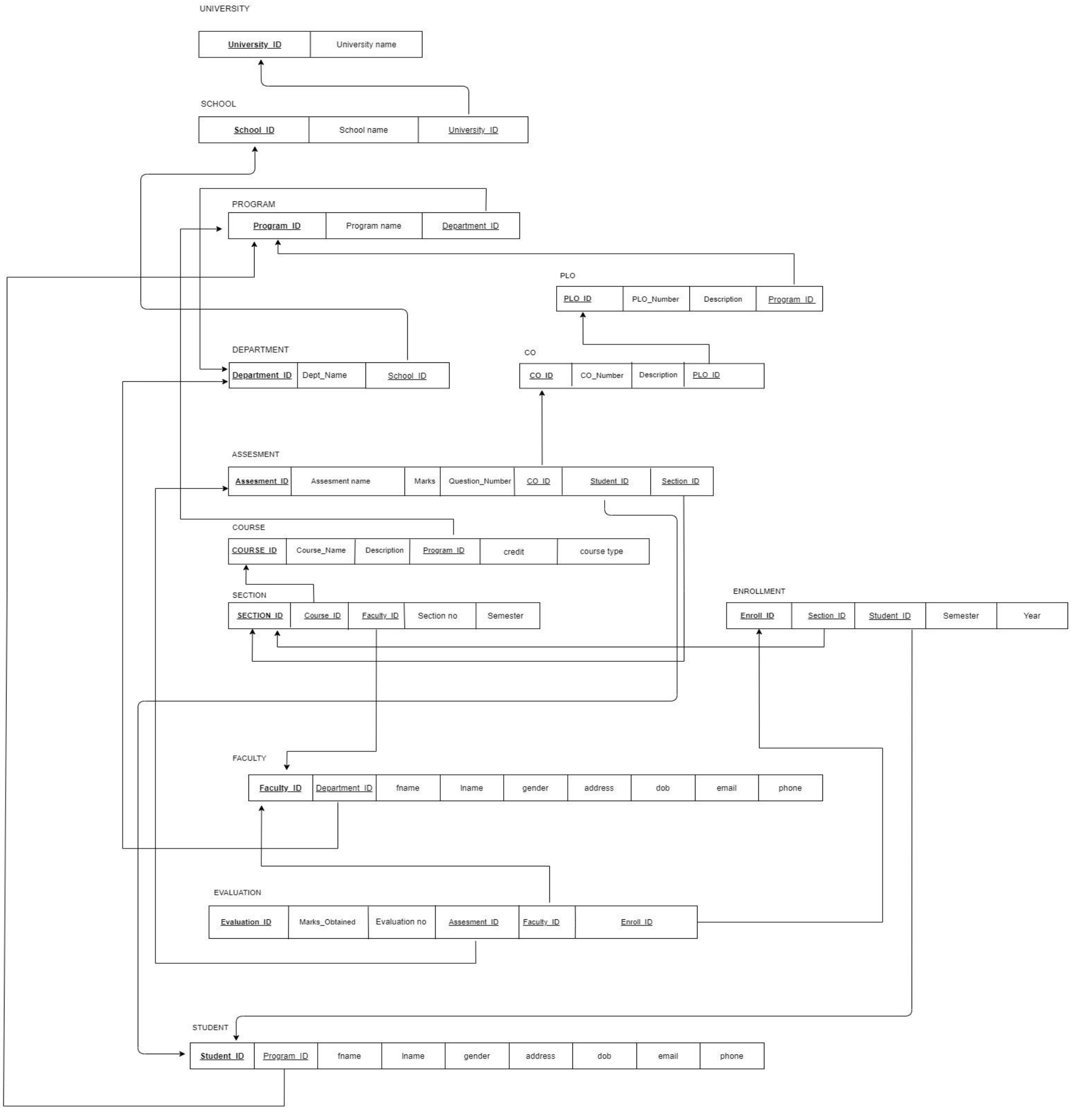
Business Rule

1. A university has unique id and name. There are many schools in a university with id and name. Under each school there are many department with id and name.
2. BAETE makes a standard OBE manual which then uploaded to their website. Each department then gathers information from the BAETE manual/ website.
3. Each of the Degree Programs under which a student gets admitted belongs to a department. A Program has exactly one department. Each program consists of many courses and a course belongs to exactly one program.
4. Under the OBE model for each program there will be a set of program learning outcomes (PLO). A PLO has a PLO id, PLO name and description.
5. A program has many students but a student must have exactly one program. Each of the department and program has a name and id. Each department has a particular faculty as a head. Department offers many courses but a course is offered by exactly one department.
6. To evaluate the students in each course, courses have a set of course outcomes (CO's) that are mapped with the PLO's of the degree program. A CO must be mapped with exactly one PLO. A PLO may be mapped with one or more CO's. The CO's are measured through different assessment techniques (e.g., quiz, mid, final, project, presentation). A CO has a CO id, CO name and description.
7. An assessment is mapped with exactly one CO and a CO is mapped with one or more assessments. Each of the assessments are identified uniquely using an Assessment id. Assessment has an assessment name (Mid Q1, Mid Q2, Final Q1, etc.), COID, Section Number and the total marks that is achievable in that particular assessment. An assessment contains exactly one section. A section must have one or more assessments.
8. Faculties assess the COs achieved and mapped PLOs achieved by each student in a course. An assessment is done by one faculty and a faculty must do many assessment.
9. Faculties have academic qualifications (i.e. highest degree certificate so far), area/s of specialization, job position (e.g. Lecturer, Professor). A faculty has exactly one department and a department has multiple faculties.
10. A Course have a course id that uniquely identifies the course. Course also has a course title. A course can be a prerequisite of one or more courses and a course may have one or more prerequisites. A course may be mapped with many other courses and multiple courses may be mapped with exactly one course.
11. Each course must be taught by at least one faculty. A Faculty may teach multiple courses. Every faculty has a teaching schedule i.e. teaching days and teaching time for a course. There may be multiple sections for each course in a particular semester but a particular section teaches exactly one course.
12. A section has a section number; however, different courses may have sections with the same number assigned to them. Hence, a semester and course id are required along with the section number to identify a section. A section also has a schedule and a maximum capacity. A student may enroll in one or more sections and a section must have many student. There is a registration date for the courses taken by a student in a semester. If a course has no student enrolled, then all of its sections along with the course are removed.

ERD


SCHOOL
PK School_ID
FK University_ID
School name
has
UNIVERSITY
PK University_ID
University name
has
DEPARTMENT
PK Department_ID
FK School_ID
Department name
Contains
PROGRAM
PK Program_ID
FK Department_ID
Program_Name
has
PLO
PK Plo_ID
FK Program_ID
PLO name
Description
mapped
has
CO
PK Co_ID
FK Plo_ID
CO_name
Description
COURSES
PK Course_ID
FK Program_ID
Course name
Noofcredits
course type
Description
has
contains
has
mapped with
ASSESSMENT
PK Assessment_ID
FK Student_ID
FK Co_ID
FK Section_ID
Assessment_name
Marks
Question_No
SECTION
PK Section_ID
FK Course_ID
FK Faculty_ID
Section no
Semester
EVALUATION
PK Evaluation_ID
FK Assesment_ID
FK Faculty_ID
FK Enroll_ID
Evaluatioon no
Obtained marks
Has
Gets
ENROLLMENT
PK Enroll_ID
FK Section_ID
FK Student_ID
Semester
Year
Evaluates
FACULTY
PK Faculty_ID
FK Department_ID
fname
lname
gender
address
dateofbirth
email
phone
belongs to
STUDENT
PK Student_ID
FK Program_ID
fname
lname
gender
address
dateofbirth
email
phone
Enrolls
instructs

Relational Schema



Normalization

UNIVERSITY	**University_ID**	U1	SCHOOL	**School_ID**	S1
	University name	U2		School name	S2
				University_ID	U1
DEPARTMENT	**Department_ID**	D1	PROGRAM	**Program_ID**	P1
	Dept. name	D2		Program name	P2
	School_ID	S1		Department_ID	D1
CO	**CO_ID**	C1	PLO	**PLO_ID**	P11
	CO_Number	C2		PLO_Number	P12
	Description	C3		Description	P13
	PLO_ID	P11		Program_ID	P1
COURSE	**Course_ID**	C11	ASSESSMENT	**Assessment_ID**	A1
	Course name	C12		Assessment name	A2
	Description	C13		Marks	A3
	Credit	C14		Ques. No	A4
	Course type	C15		CO_ID	C1
	Program_ID	P1		Student_ID	S111
				Section_ID	S11
SECTION	**Section_ID**	S11	ENROLLMENT	**Enroll_ID**	E1
	Course_ID	C11		**Section_ID**	S11
	Faculty_ID	F1		Student_ID	S111
	Section no	S12		Semester	E2
	Semester	S13		Year	E3
FACULTY	**Faculty_ID**	F1	STUDENT	**Student_ID**	S111
	Department_ID	D1		Program_ID	P1
	Fname	F2		Fname	S112
	Lname	F3		Lname	S113
	Gender	F4		Gender	S114
	Address	F5		Address	S115
	Date of Birth	F6		Date of birth	S116
	Email	F7		Email	S117
	Phone	F8		Phone	S118
EVALUATION	**Evaluation_ID**	E11			
	Marks obtained	E12			
	Evaluation no	E13			
	Assessment_ID	A1			
	Faculty_ID	F1			
	Enroll_ID	E1			

U1→	U2
S1→	S2, U1
D1→	D2, S1
P1→	P2, D1
C1→	C2, C3, P11
P11→	P12, P13, P1
C11→	C12, C13, C14, C15, P1
S11→	S12, S13, C11, F1
E1→	E2, E3, S11, S111
S111→	S112, S113, S114, S115, S116, S117, S118, P1
F1→	F2, F3, F4, F5, F6, F7, F8, D1
A1→	A2, A3, A4, C1, S111, S11
E11→	E12, E13, A1, F1, E1

University_ID→	University name
School_ID→	School name, University_ID
Department_ID→	Department name, School_ID
Program_id→	Program name, Department_ID
CO_ID→	CO number, Description, PLO_ID
PLO_ID→	PLO number, Description, Program_ID
Course_ID→	Course name, Description, Credit, Course type, Program_ID
Section_ID→	Section no, Semester, Course_ID, Faculty_ID
Enroll_ID→	Semester, Year, Section_ID, Student_ID
Student_ID→	Fname, Lname, Gender, Address, Date of Birth, Email, Phone, Program_ID
Faculty_ID→	Fname, Lname, Gender, Address, Date of Birth, Email, Phone, Department_ID
Assessment_ID→	Assessment name, Marks, Ques. no, CO_ID, Student_ID, Section_ID
Evaluation_ID→	Marks Obtained, Evaluation no, Assessment_ID, Faculty_ID, Enroll_ID

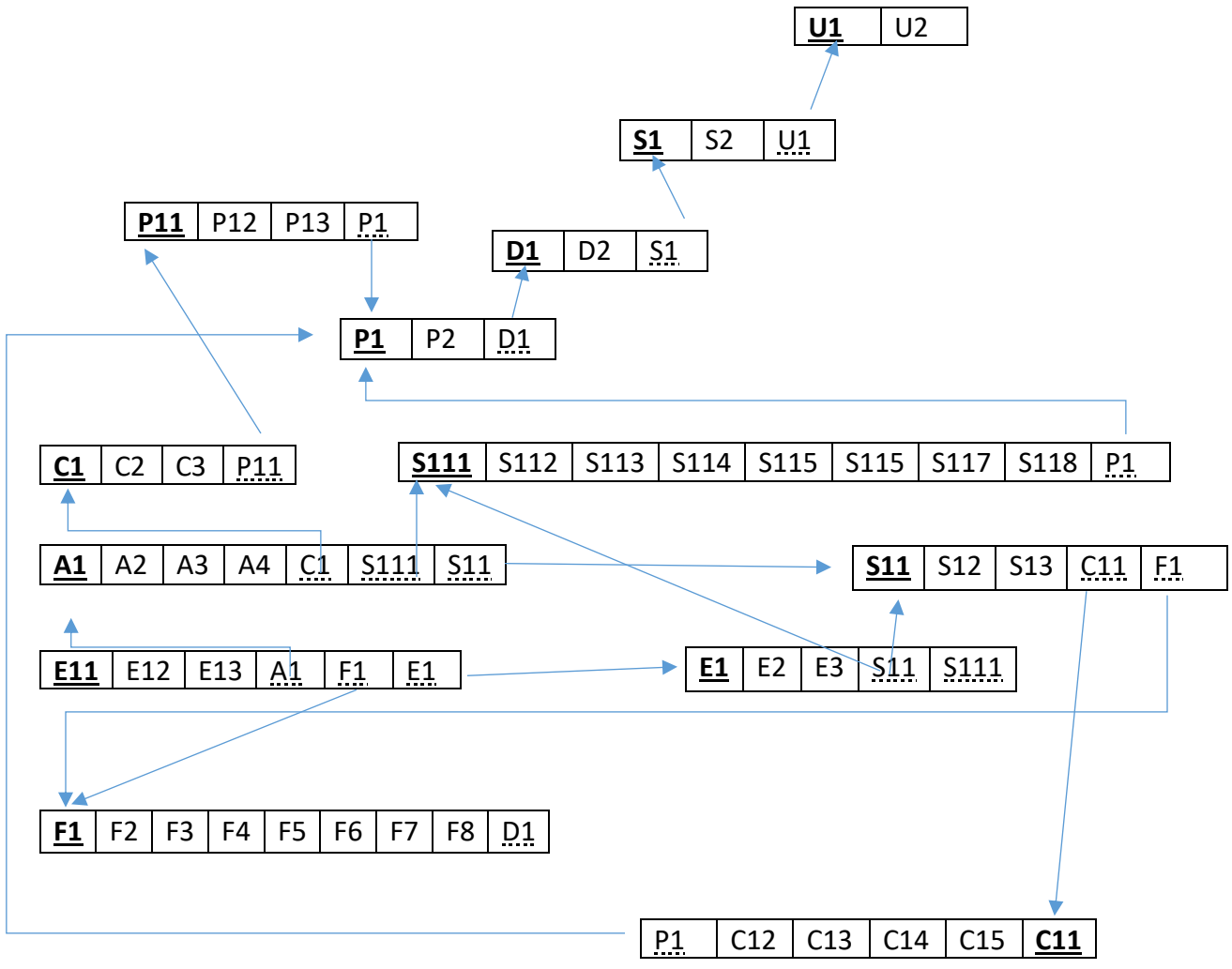
1NF

E11	E12	E13	U1	U2	S1	S2	D1	D2	P1	P2	C1	C2	C3	P11	P12
P13	C11	C12	C13	C14	C15	S11	S12	S13	E1	E2	E3	S111	S112	S113	S114
S115	S116	S117	S118	F1	F2	F2	F4	F5	F6	F7	F8	A1	A2	A3	A4

2NF

The relations are already in 2nf.

3NF



BCNF

No non-key can identify any primary key or part of the primary key. Therefore, all the relations are in BCNF.

Data Dictionary

University_T

Name	Data type	Size	Remarks
cuniversityID	VARCHAR	5	This is the PRIMARY KEY of the University
cuniversityName	VARCHAR	225	This is the name of the University

School_T

Name	Data Type	Size	Remark
cschool_id	VARCHAR	5	This is the PRIMARY KEY of School
cuniversityID	VARCHAR		This is the FOREIGN KEY from University Table
cschoolName	VARCHAR	30	This is the name of the School Example: “School of Engineering and Science”

Department_T

Name	Data Type	Size	Remark
cdepartmentID	VARCHAR	5	This is the PRIMARY KEY of the Department Example: “CSE”
cschool_id	VARCHAR	5	This is the FOREIGN KEY of the School
cdepartmentName	VARCHAR		This the Name of the Department Example: “Computer Science and Engineering”

Program_T

Name	Data Type	Size	Remark
cprogramID	VARCHAR	5	This is the PRIMARY KEY for a program Example: “B.Sc”
cdepartment_id	VARCHAR	5	This is the FOREIGN KEY from the Department table Example: “BS.C”
cprogramName	VARCHAR	30	This is the name of the Degree program Example: “Bachelor of Science”

Course_T

Name	Data Type	Size	Remark
ccourseID	VARCHAR	7	This is the PRIMARY KEY for the course Example: “CSE203”
cprogramID	VARCHAR	5	This is the FOREIGN KEY from the Program Key
ccourseName	VARCHAR	40	This is the name of the course Example: ”Data Base”
nnoOfCredits	integer		This is the number of credits for the course Example: “3”
ccourseType	VARCHAR	10	This is the type of the course Example: Core
cdescription	VARCHAR		This is the description of the course

PLO_T

Name	Data Type	Size	remarks
cploID	VARCHAR	5	This is the PRIMARY KEY of the Program Learning Outcome Example: “PLO1”
cprogram_id	VARCHAR	5	This is the FOREIGN KEY from the Program Table Example: “B.Sc”
cploName	VARCHAR		This is the name of the Program Learning Outcome
cdescription	VARCHAR		This the description of the Program Learning Outcome

CO_T

Name	Data Type	Size	Remarks
ccoID	VARCHAR	5	This is the PRIMARY KEY for the Course Outcome
cplo_id	VARCHAR	5	This is the FOREIGN KEY from the Program Learning Outcome Example: “PLO1”
ccoName	VARCHAR		This is the name of the Course Outcome
cdescription	VARCHAR		This is the name of the Course Outcome

Section_T

Name	Data Type	Size	Remarks
nsectionID	integer		This is the PRIMARY KEY for the section
course_id	VARCHAR	7	This is the FOREIGN KEY for the section Example: " CSE213"
cfaculty_id	VARCHAR		This is the FOREIGN KEY from the faculty table
nsectionNO	INTEGER		This is the section number
csemester	VARCHAR		This is the semester number

Student_T

Name	Data Type	Size	Remarks
cstudentID	VARCHAR	10	This is the PRIMARY KEY for the student Example: "1710237"
cprogram_id	VARCHAR	5	This is the FOREIGN KEY for the student
cfname	VARCHAR	80	This is first name of the student Example: "Mohammad Tasiful"
clname	VARCHAR	20	This is the last name of the student Example: "Amin"
cgender	VARCHAR		This is the gender of the student Example:"M"
caddress	VARCHAR	50	This is the address of the student Example: " College road, Chawkbazar, Chattagram, Keari Elysium"
cdateofbirth	DATE	DD-MM-YYYY	This is the date of birth of the student Example: 02-02-1997
cemail	VARCHAR	30	This is the email of the student Example: "1710575@iub.edu.bd"
cphone	VARCHAR	20	This is the phone number of the student Example: "01819686321"

Enrollment_T

Name	Data Type	Size	Remarks
cenrollID	VARCHAR		This is the PRIMARY KEY for enrollment
nsectionID	INTEGER		This is the FOREIGN KEY for enrollment
cstudent_id	VARCHAR	7	This is the FOREIGN KEY for enrollment Example: “1715437”
csemester	VARCHAR	6	This is the semester of enrollment Example: “Autumn”
cyear	year	yyyy	This is the year of enrollment Example:2019

Faculty_T

Name	Data Type	Size	Remarks
cfacultyID	VARCHAR	4	This is the PRIMARY KEY for faculty Example: “1801”
cdepartment_id	VARCHAR	5	This is the FOREIGN KEY for faculty
cfname	VARCHAR	30	This is first name of the faculty Example: “ Mahady”
clname	VARCHAR	20	This is the last name of the faculty Example: “Hasan”
cgender	VARCHAR	1	This is the gender of the faculty Example: “M”
caddress	VARCHAR	30	This is the address of the faculty Example: “House 1, Road 1, Sector 1, Uttara, Dhaka, Bangladesh”
cdateOfBirth	DATE	DD-MM-YYYY	This is the date of birth of the faculty Example: “15-05-1980
cemail	VARCHAR	30	This is the email of the faculty Example: “mahady@iub.edu.bd”
cphone	VARCHAR	15	This is the phone number of the faculty Example: 01855247992

Assessment_T

Name	Data Type	Size	Remarks
nassessmentID	INTEGER		This is the PRIMARY KEY for assessment
cstudentID	VARCHAR	7	This is the FOREIGN KEY for assessment
nco_id	INTEGER		This is the FOREIGN KEY from Course
nsection_id	Integer		This is the FOREIGN KEY from Section Table
cassessmentName	VARCHAR		This is the name of the assessment
cmarks	VARCHAR	6	This is the marks of the assessment
cquestionNo	VARCHAR		This is the number of question in the assessment

Evaluation_T

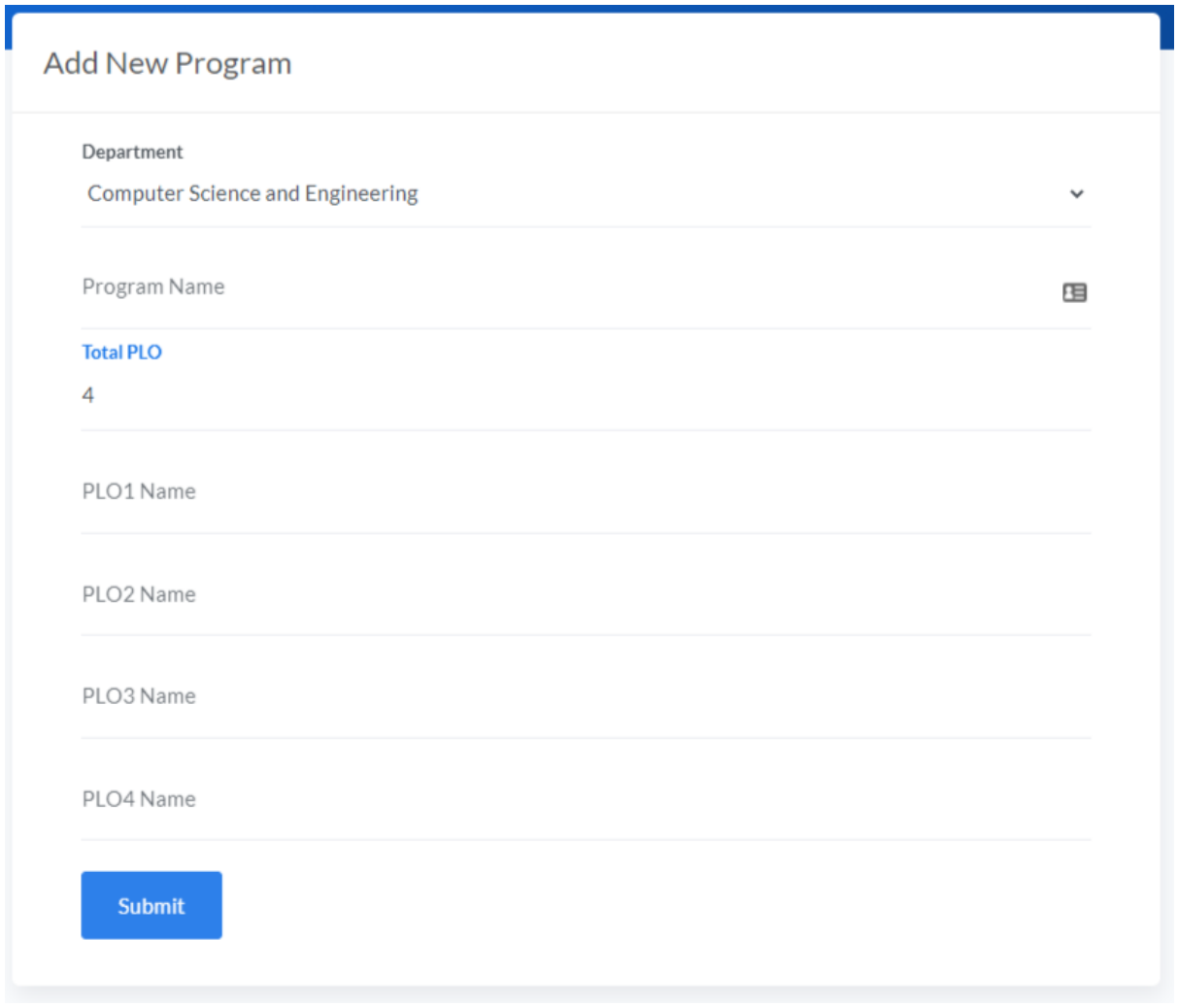
Name	Data Type	Size	Remarks
nevaluationID	INTEGER		This is the PRIMARY KEY for evaluation
nassessment_id	INTEGER		This is the FOREIGN KEY from the assessment table
cfacultyID	VARCHAR	4	This is the FOREIGN KEY from the faculty table Example: “1801”
cenrollID	VARCHAR		This is the FOREIGN KEY from the enrollment table
nevaluationNO	INTEGER		This is the number of evaluations
nobtainedMarks	FLOAT		This is the marks obtained by the student Example: “25.5”

Chapter 4

PHYSICAL SYSTEM DESIGN

I. Input

II. Output




```php
<?php

    include 'mysql.php';


    $program_name = $_POST['program_name'];

    $department_id = $_POST['department_id'];


    $query = "INSERT INTO program (program_name, department_id)

                VALUES ('$program_name', '$department_id')";


    $conn->query($query);

    $program_id = $conn->insert_id;


    $plo_total = $_POST['plo_total'];

    foreach(range(1,$plo_total) as $plo){

        $plo_name = $_POST['plo'.$plo];

        $query = "INSERT INTO plo (plo_num, plo_name, program_id)

                    VALUES($plo, '$plo_name', $program_id)";

        $conn->query($query);
```

```
    }

    header("Location: ../department/add-program.php");

?>
```

Add New Course

Department

BSc in CSE

Course ID

Course Title

Credit

PLO1

PLO2

PLO3

PLO4

PLO5

PLO6

PLO7

PLO8

PLO9

PLO10

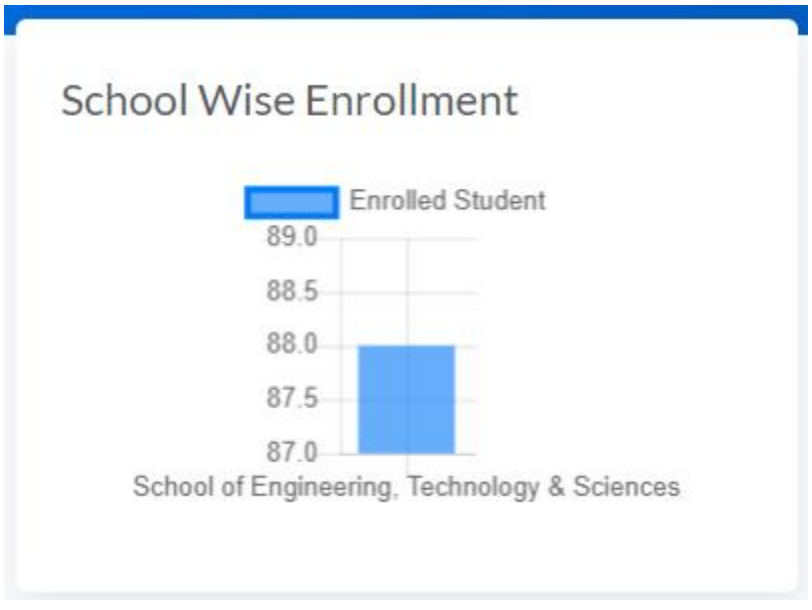
PLO11

PLO12

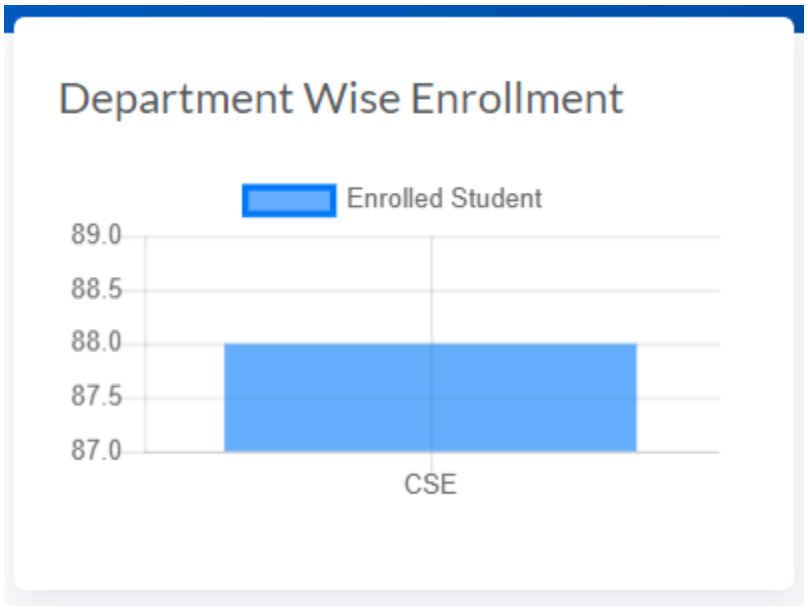
PLO13

Submit

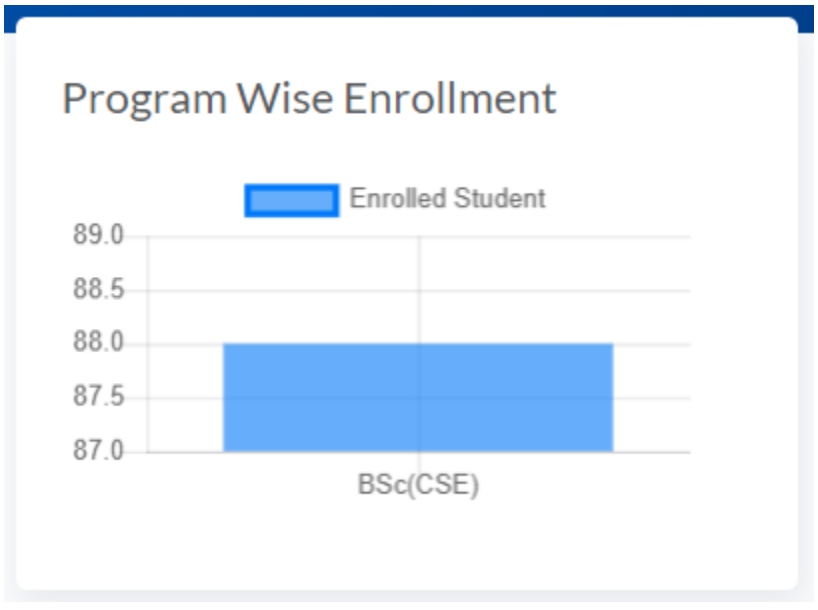
```php
<?php
    include 'mysql.php';

    $course_id = strtolower($_POST['course_id']);
    $course_name = $_POST['course_name'];
    $no_credits = $_POST['no_credits'];
    $program_id = $_POST['program_id'];

    $query = "INSERT INTO course (course_id, course_name, no_credits, program_id)
                VALUES ('$course_id', '$course_name', $no_credits, $program_id)";
    $conn->query($query);

    foreach(range(1, 13) as $plo){
        if ($_POST['plo'.$plo]!=NULL){
            $plo_data = json_decode($_POST['plo'.$plo]);
            foreach($plo_data as $p){
                $query = "SELECT * FROM plo WHERE plo_num = $plo AND program_id = $program_id";
                $plo_id = $conn->query($query)->fetch_assoc()['plo_id'];
                $co = substr($p->value, 2);
                $query = "INSERT INTO co (co_num, plo_id) VALUES ('$co', $plo_id)";
                $conn->query($query);
            }
        }
    }

    header ("Location: ../department/add-course.php");

?>
```



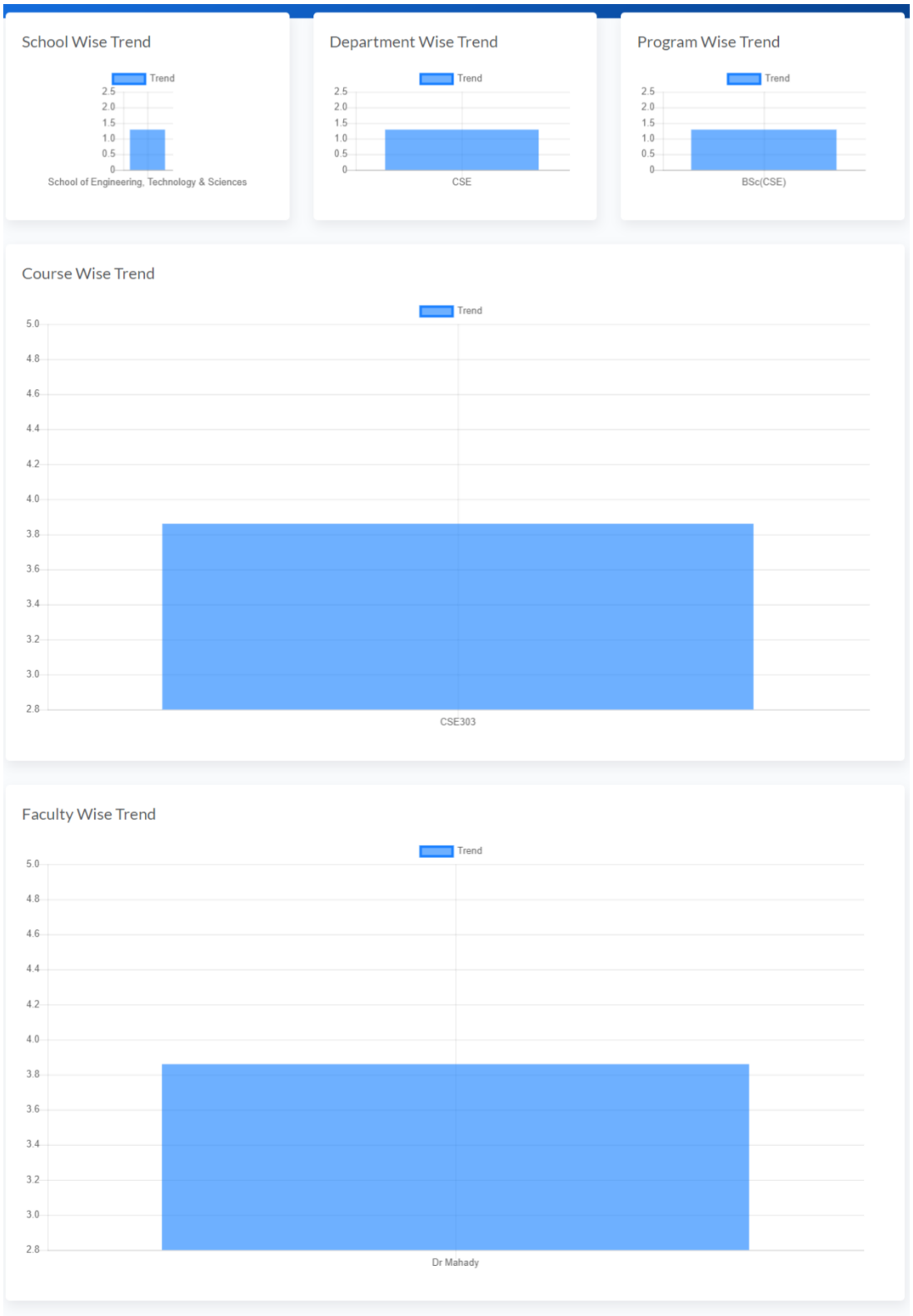

```
$query = "SELECT school.school_name as 'name', COUNT(DISTINCT(enrollment.student_id)) as 'total' FROM school NATURAL LEFT JO
IN department NATURAL LEFT JOIN program NATURAL LEFT JOIN course NATURAL LEFT JOIN section NATURAL LEFT JOIN enrollment GROU
P BY school.school_id";

        $scls = $conn->query($query);
```




```
$query = "SELECT UPPER(department.department_id) as 'name', COUNT(DISTINCT(enrollment.student_id)) as 'total' FROM school NA
TURAL LEFT JOIN department NATURAL LEFT JOIN program NATURAL LEFT JOIN course NATURAL LEFT JOIN section NATURAL LEFT JOIN en
rollment GROUP BY department.department_id";

        $deps = $conn->query($query);
```




```
$query = "SELECT UPPER(department.department_id) as 'dep', program.program_name as 'name', COUNT(DISTINCT(enrollment.student
_id)) as 'total' FROM school NATURAL LEFT JOIN department NATURAL LEFT JOIN program NATURAL LEFT JOIN course NATURAL LEFT JO
IN section NATURAL LEFT JOIN enrollment GROUP BY program.program_id";

        $progs = $conn->query($query);
```



1) SCHOOL WISE STUDENT PEFORMACE TREND BASED ON CGPA
2) DEPARTMENT WISE STUDENT PEFORMACE TREND BASED ON CGPA
3) PROGRAM WISE STUDENT PEFORMACE TREND BASED ON CGPA
4) COURSE WISE STUDENT PEFORMACE TREND BASED ON GPA
5) INSTRUCTOR WISE STUDENT PEFORMACE TREND BASED ON GPA
   code in the next page, for all 4 graphs shown above

```
$semester = $_GET['semester'];

        $query = "SELECT school_name, department_id, program_name,  semester, faculty, course_id, no_credits, student_id, SU
M(marks) as 'marks' FROM (SELECT school.school_name, department.department_id, program.program_name, section.semester, CONCA
T(faculty.fname, ' ', faculty.lname) as 'faculty', course.course_id, course.no_credits, enrollment.student_id, IF(assessment
.assessment_name = 'final', (SUM(evaluation.obtained_marks) / SUM(assessment.marks)) * 40, (SUM(evaluation.obtained_marks) /
 SUM(assessment.marks)) * 30) as 'marks', assessment.assessment_name FROM school NATURAL LEFT JOIN department NATURAL LEFT J
OIN program NATURAL LEFT JOIN course NATURAL LEFT JOIN section NATURAL LEFT JOIN assessment NATURAL LEFT JOIN evaluation NAT
URAL LEFT JOIN faculty LEFT JOIN co ON assessment.co_number = co.co_num AND section.section_id = co.section_id LEFT JOIN plo
 on co.plo_id = plo.plo_id LEFT JOIN enrollment ON enrollment.enroll_id = evaluation.enroll_id WHERE section.semester = LOWE
R('$semester') GROUP BY course.course_id, enrollment.student_id, assessment.assessment_name, course.course_id) as subQuery G
ROUP BY semester, student_id, course_id";

        $data = $conn->query($query);


if($rows !=0 ){

            $scl = array();

            $dep = array();

            $prog = array();

            $crs = array();

            $fac = array();

            foreach($data as $d){

                $school = $d['school_name']; $department = $d['department_id']; $program = $d['program_name']."($department)
"; $course = strtoupper($d['course_id']); $faculty = $d['faculty'];

                if(array_key_exists($school, $scl)==false){

                    $scl[$school] = array();

                }

                if(array_key_exists($department, $dep)==false){

                    $dep[$department] = array();

                }

                if(array_key_exists($program, $prog)==false){

                    $prog[$program] = array();

                }

                if(array_key_exists($course, $crs)==false){

                    $crs[$course] = array();

                    $crs[$course]['gp'] = 0;

                    $crs[$course]['count'] = 0;

                }

                if(array_key_exists($faculty, $fac)==false){

                    $fac[$faculty] = array();

                    $fac[$faculty]['gp'] = 0;
```

```
    $fac[$faculty]['count'] = 0;
}

$student = $d['student_id'];
if(array_key_exists($student, $scl[$school]) == false){
    $scl[$school][$student] = array();
    $scl[$school][$student]['cg'] = 0;
    $scl[$school][$student]['cr'] = 0;
}
if(array_key_exists($student,  $dep[$department]) == false){
    $dep[$department][$student] = array();
    $dep[$department][$student]['cg'] = 0;
    $dep[$department][$student]['cr'] = 0;
}
if(array_key_exists($student,  $prog[$program]) == false){
    $prog[$program][$student] = array();
    $prog[$program][$student]['cg'] = 0;
    $prog[$program][$student]['cr'] = 0;
                }



                $cr = $d['no_credits'];
                $scl[$school][$student]['cr']+=$cr; $dep[$department][$student]['cr']+=$cr; $prog[$program][$student]['cr']+
=$cr; $crs[$course]['count']++; $fac[$faculty]['count']++;
                $cg = 0; $marks = $d['marks'];
                if($marks>=85){
                    $cg =($cr * 4.0);
                }else if($marks>=80){
                    $cg =($cr * 3.7);
                }else if($marks>=75){
                    $cg =($cr * 3.3);
                }else if($marks>=70){
                    $cg =($cr * 3.0);
                }else if($marks>=65){
                    $cg =($cr * 2.7);
                }else if($marks>=60){
```

```
                $cg =($cr * 2.3);
            }else if($marks>=55){
                $cg =($cr * 2.0);
            }else if($marks>=50){
                $cg =($cr * 1.7);
            }else if($marks>=45){
                $cg =($cr * 1.3);
            }else if($marks>=40){
                $cg =($cr * 1.0);
            }
            $scl[$school][$student]['cg']+=$cg; $dep[$department][$student]['cg']+=$cg; $prog[$program][$student]['cr']+
=$cg; $crs[$course]['gp']+=$cg; $fac[$faculty]['gp']+=$cg;
        }
        $scls = array();
        $deps = array();
        $progs = array();
        foreach($scl as $k => $v){
            $total = sizeof($v);
            $sum = 0;
            foreach($v as $m){
                $sum+=($m['cg'] / $m['cr']);
            }
            $scls[$k] = round(($sum / $total), 2);
        }

        foreach($dep as $k => $v){
            $total = sizeof($v);
            $sum = 0;
            foreach($v as $m){
                $sum+=($m['cg'] / $m['cr']);
            }
            $deps[$k] = round(($sum / $total), 2);
        }

        foreach($prog as $k => $v){
            $total = sizeof($v);
```

```
            $sum = 0;
            foreach($v as $m){
                $sum+=($m['cg'] / $m['cr']);
            }
            $progs[$k] = round(($sum / $total), 2);
        }
    }
```

1) PLO TOTAL PERCENTAGE
2) PLO ATTEMPTION COMPARISON

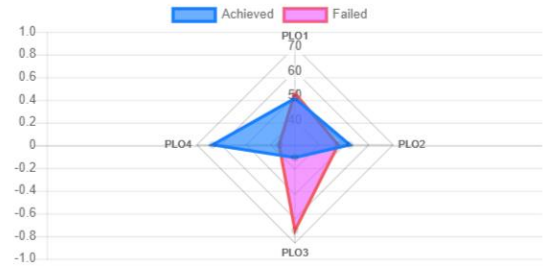
```
$query = "SELECT plo, COUNT(stat) as 'stat' FROM (SELECT plo.plo_num as 'plo', IF(SUM(evaluation.obtained_marks)/SUM(assessment.marks)>=0.40, 1, 0) AS 'stat' FROM section NATURAL LEFT JOIN assessment NATURAL LEFT JOIN evaluation NATURAL LEFT JOIN enrollment LEFT JOIN co ON assessment.co_number = co.co_num AND assessment.section_id = co.section_id LEFT JOIN PLO ON co.plo_id = plo.plo_id GROUP BY enrollment.student_id, section.course_id, plo.plo_num ORDER BY stat DESC, plo ASC) as testQ WHERE stat=1 GROUP BY plo";

    $achieved = $conn->query($query);

    $query = "SELECT plo, COUNT(plo) as 'stat' FROM (SELECT plo.plo_num as 'plo', IF(SUM(evaluation.obtained_marks)/SUM(assessment.marks)>=0.40, 1, 0) AS 'stat' FROM section NATURAL LEFT JOIN assessment NATURAL LEFT JOIN evaluation NATURAL LEFT JOIN enrollment LEFT JOIN co ON assessment.co_number = co.co_num AND assessment.section_id = co.section_id LEFT JOIN PLO ON co.plo_id = plo.plo_id GROUP BY enrollment.student_id, section.course_id, plo.plo_num ORDER BY stat DESC, plo ASC) as testQ GROUP BY plo";
$attempted = $conn->query($query);


$p_perc = array();
foreach($attempted as $a){
    $p_perc[$a['plo']]=array();
    $p_perc[$a['plo']]['achieved'] = 0;
    $p_perc[$a['plo']]['attempted'] = $a['stat'];
}
foreach($achieved as $a){
    $p_perc[$a['plo']]['achieved'] = $a['stat'];
}
```

PLO CO Stats

CO / PLO	Successfully Achieved	Successfully Achieved (%)	Failed to Achieve	Failed to Achieve (%)
CO1	43	48.86%	45	51.14%
CO2	46	52.27%	42	47.73%
CO3	31	35.23%	57	64.77%
CO4	56	63.64%	32	36.36%
PLO2	43	48.86%	45	51.14%
PLO3	46	52.27%	42	47.73%
PLO4	31	35.23%	57	64.77%
PLO6	56	63.64%	32	36.36%

PLO Comparison

CO Comparison



1) CO-PLO ACHIEVEMENT STATS
2) COPMARISON OF PLO ACHIEVEMENT AND FAILURE
3) COPMARISON OF CO ACHIEVEMENT AND FAILURE

```
if($_GET['qt']=='school'){

            $school = $_GET['qs'];

            $query = "SELECT  school, department, program, co, COUNT(stat) as 'stat' FROM (SELECT school.school_name as 'sch
ool', program.department_id as 'department', program.program_name as 'program', co.co_num as 'co', IF(SUM(evaluation.obtaine
d_marks)/SUM(assessment.marks)>=0.40, 1, 0) AS 'stat' FROM school NATURAL LEFT JOIN department NATURAL LEFT JOIN program NAT
URAL LEFT JOIN course NATURAL LEFT JOIN section NATURAL LEFT JOIN assessment NATURAL LEFT JOIN evaluation NATURAL LEFT JOIN
enrollment LEFT JOIN co ON assessment.co_number = co.co_num AND assessment.section_id = co.section_id LEFT JOIN PLO ON co.pl
o_id = plo.plo_id WHERE school.school_name LIKE '%$school%' GROUP BY enrollment.student_id, section.course_id, co.co_num ORD
ER BY stat DESC, co ASC) as testQ WHERE stat = 1 GROUP BY co";

            $achieved = $conn->query($query);

            $query = "SELECT school, department, program, co, COUNT(co) as 'stat' FROM (SELECT school.school_name as 'school
', program.department_id as 'department', program.program_name as 'program', co.co_num as 'co', IF(SUM(evaluation.obtained_m
arks)/SUM(assessment.marks)>=0.40, 1, 0) AS 'stat' FROM school NATURAL LEFT JOIN department NATURAL LEFT JOIN program NATURA
L LEFT JOIN course NATURAL LEFT JOIN section NATURAL LEFT JOIN assessment NATURAL LEFT JOIN evaluation NATURAL LEFT JOIN enr
ollment LEFT JOIN co ON assessment.co_number = co.co_num AND assessment.section_id = co.section_id LEFT JOIN PLO ON co.plo_i
d = plo.plo_id WHERE school.school_name LIKE '%$school%' GROUP BY enrollment.student_id, section.course_id, co.co_num ORDER
BY stat DESC, co ASC) as testQ GROUP BY co";

            $attempted = $conn->query($query);
```

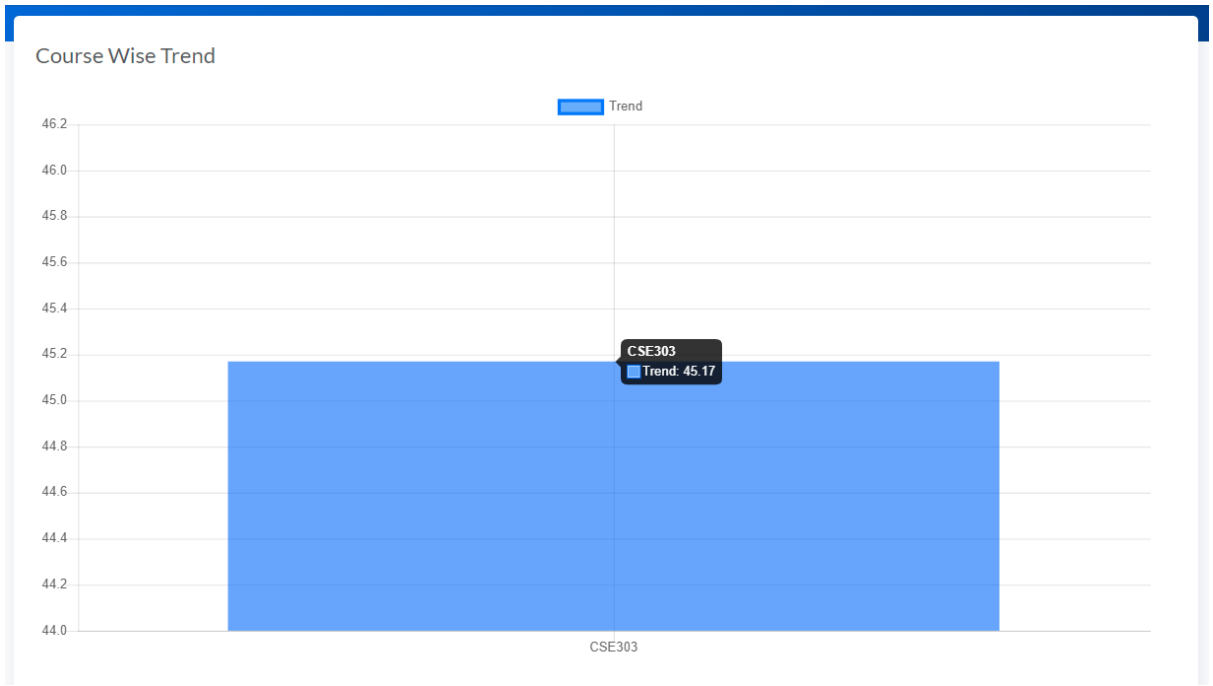
```
        }else if($_GET['qt']=='department'){

            $department = $_GET['qs'];

            $query = "SELECT  school, department, program, co, COUNT(stat) as 'stat' FROM (SELECT school.school_name as 'sch
ool', program.department_id as 'department', program.program_name as 'program', co.co_num as 'co', IF(SUM(evaluation.obtaine
d_marks)/SUM(assessment.marks)>=0.40, 1, 0) AS 'stat' FROM school NATURAL LEFT JOIN department NATURAL LEFT JOIN program NAT
URAL LEFT JOIN course NATURAL LEFT JOIN section NATURAL LEFT JOIN assessment NATURAL LEFT JOIN evaluation NATURAL LEFT JOIN
 enrollment LEFT JOIN co ON assessment.co_number = co.co_num AND assessment.section_id = co.section_id LEFT JOIN PLO ON co.pl
o_id = plo.plo_id WHERE department.department_id LIKE '%$department%' GROUP BY enrollment.student_id, section.course_id, co.
co_num ORDER BY stat DESC, co ASC) as testQ WHERE stat = 1 GROUP BY co";

            $achieved = $conn->query($query);

            $query = "SELECT school, department, program, co, COUNT(co) as 'stat' FROM (SELECT school.school_name as 'school
', program.department_id as 'department', program.program_name as 'program', co.co_num as 'co', IF(SUM(evaluation.obtained_m
arks)/SUM(assessment.marks)>=0.40, 1, 0) AS 'stat' FROM school NATURAL LEFT JOIN department NATURAL LEFT JOIN program NATURA
L LEFT JOIN course NATURAL LEFT JOIN section NATURAL LEFT JOIN assessment NATURAL LEFT JOIN evaluation NATURAL LEFT JOIN enr
ollment LEFT JOIN co ON assessment.co_number = co.co_num AND assessment.section_id = co.section_id LEFT JOIN PLO ON co.plo_i
d = plo.plo_id WHERE department.department_id LIKE '%$department%' GROUP BY enrollment.student_id, section.course_id, co.co_
num ORDER BY stat DESC, co ASC) as testQ GROUP BY co";

            $attempted = $conn->query($query);

        }else if($_GET['qt']=='program'){

            $program = $_GET['qs'];

            $query = "SELECT  school, department, program, co, COUNT(stat) as 'stat' FROM (SELECT school.school_name as 'sch
ool', program.department_id as 'department', program.program_name as 'program', co.co_num as 'co', IF(SUM(evaluation.obtaine
d_marks)/SUM(assessment.marks)>=0.40, 1, 0) AS 'stat' FROM school NATURAL LEFT JOIN department NATURAL LEFT JOIN program NAT
URAL LEFT JOIN course NATURAL LEFT JOIN section NATURAL LEFT JOIN assessment NATURAL LEFT JOIN evaluation NATURAL LEFT JOIN
 enrollment LEFT JOIN co ON assessment.co_number = co.co_num AND assessment.section_id = co.section_id LEFT JOIN PLO ON co.pl
o_id = plo.plo_id WHERE program.program_name LIKE '%$program%' GROUP BY enrollment.student_id, section.course_id, co.co_num
 ORDER BY stat DESC, co ASC) as testQ WHERE stat = 1 GROUP BY co";

            $achieved = $conn->query($query);

            $query = "SELECT school, department, program, co, COUNT(co) as 'stat' FROM (SELECT school.school_name as 'school
', program.department_id as 'department', program.program_name as 'program', co.co_num as 'co', IF(SUM(evaluation.obtained_m
arks)/SUM(assessment.marks)>=0.40, 1, 0) AS 'stat' FROM school NATURAL LEFT JOIN department NATURAL LEFT JOIN program NATURA
L LEFT JOIN course NATURAL LEFT JOIN section NATURAL LEFT JOIN assessment NATURAL LEFT JOIN evaluation NATURAL LEFT JOIN enr
ollment LEFT JOIN co ON assessment.co_number = co.co_num AND assessment.section_id = co.section_id LEFT JOIN PLO ON co.plo_i
d = plo.plo_id WHERE program.program_name LIKE '%$program%' GROUP BY enrollment.student_id, section.course_id, co.co_num ORD
ER BY stat DESC, co ASC) as testQ GROUP BY co";

            $attempted = $conn->query($query);

        }else if($_GET['qt']=='course'){

            $course = $_GET['qs'];

            $query = "SELECT  school, department, program, co, COUNT(stat) as 'stat' FROM (SELECT school.school_name as 'sch
ool', program.department_id as 'department', program.program_name as 'program', co.co_num as 'co', IF(SUM(evaluation.obtaine
d_marks)/SUM(assessment.marks)>=0.40, 1, 0) AS 'stat' FROM school NATURAL LEFT JOIN department NATURAL LEFT JOIN program NAT
URAL LEFT JOIN course NATURAL LEFT JOIN section NATURAL LEFT JOIN assessment NATURAL LEFT JOIN evaluation NATURAL LEFT JOIN
 enrollment LEFT JOIN co ON assessment.co_number = co.co_num AND assessment.section_id = co.section_id LEFT JOIN PLO ON co.pl
o_id = plo.plo_id WHERE course.course_id LIKE '%$course%' GROUP BY enrollment.student_id, section.course_id, co.co_num ORDER
 BY stat DESC, co ASC) as testQ WHERE stat = 1 GROUP BY co";

            $achieved = $conn->query($query);
```

```
            $query = "SELECT school, department, program, co, COUNT(co) as 'stat' FROM (SELECT school.school_name as 'school
', program.department_id as 'department', program.program_name as 'program', co.co_num as 'co', IF(SUM(evaluation.obtained_m
arks)/SUM(assessment.marks)>=0.40, 1, 0) AS 'stat' FROM school NATURAL LEFT JOIN department NATURAL LEFT JOIN program NATURA
L LEFT JOIN course NATURAL LEFT JOIN section NATURAL LEFT JOIN assessment NATURAL LEFT JOIN evaluation NATURAL LEFT JOIN enr
ollment LEFT JOIN co ON assessment.co_number = co.co_num AND assessment.section_id = co.section_id LEFT JOIN PLO ON co.plo_i
d = plo.plo_id WHERE course.course_id LIKE '%$course%' GROUP BY enrollment.student_id, section.course_id, co.co_num ORDER BY
 stat DESC, co ASC) as testQ GROUP BY co";

            $attempted = $conn->query($query);

        }



        $c_stat = array();

        foreach($attempted as $a){

            $c_stat[$a['co']]=array();

            $c_stat[$a['co']]['achieved'] = 0;

            $c_stat[$a['co']]['attempted'] = $a['stat'];

        }

        foreach($achieved as $a){

            $c_stat[$a['co']]['achieved'] = $a['stat'];

        }
```

1) PLO PERCENTAGE ACHIEVED FROM EACH CO
2) PLO SCORE ACHIEVED FROM ASSOCIATED CO

```
if($_GET['qt']=='school'){
            $bas = 'school';
            $qs = $_GET['qs'];
            $query = "SELECT school.school_name AS 'school', department.department_id AS 'department', program.program_name AS 'program', plo.plo_num as 'plo', co.co_num as 'co', SUM(evaluation.obtained_marks) as 'mark',  SUM(assessment.marks) as 'total' FROM school NATURAL LEFT JOIN department NATURAL LEFT JOIN program NATURAL LEFT JOIN course NATURAL LEFT JOIN section  NATURAL LEFT JOIN assessment NATURAL LEFT JOIN evaluation NATURAL LEFT JOIN faculty LEFT JOIN co ON assessment.co_number = co.co_num AND section.section_id = co.section_id LEFT JOIN plo on co.plo_id = plo.plo_id WHERE school.school_name LIKE '%$qs%' GROUP BY school.school_name, plo.plo_num, co.co_num";
            $res = $conn->query($query);
        }else if($_GET['qt']=='department'){
            $bas = 'department';
            $qs = $_GET['qs'];
            $query = "SELECT school.school_name AS 'school', department.department_id AS 'department', program.program_name AS 'program', plo.plo_num as 'plo', co.co_num as 'co', SUM(evaluation.obtained_marks) as 'mark',  SUM(assessment.marks) as 'total' FROM school NATURAL LEFT JOIN department NATURAL LEFT JOIN program NATURAL LEFT JOIN course NATURAL LEFT JOIN section  NATURAL LEFT JOIN assessment NATURAL LEFT JOIN evaluation NATURAL LEFT JOIN faculty LEFT JOIN co ON assessment.co_number = co.co_num AND section.section_id = co.section_id LEFT JOIN plo on co.plo_id = plo.plo_id WHERE department.department_id LIKE '%$qs%' GROUP BY department.department_id, plo.plo_num, co.co_num";
            $res = $conn->query($query);
        }else if($_GET['qt']=='program'){
            $bas = 'program';
            $qs = $_GET['qs'];
            $qs = $_GET['qs'];
            $query = "SELECT school.school_name AS 'school', department.department_id AS 'department', program.program_name AS 'program', plo.plo_num as 'plo', co.co_num as 'co', SUM(evaluation.obtained_marks) as 'mark',  SUM(assessment.marks) as 'total' FROM school NATURAL LEFT JOIN department NATURAL LEFT JOIN program NATURAL LEFT JOIN course NATURAL LEFT JOIN section  NATURAL LEFT JOIN assessment NATURAL LEFT JOIN evaluation NATURAL LEFT JOIN faculty LEFT JOIN co ON assessment.co_number = co.co_num AND section.section_id = co.section_id LEFT JOIN plo on co.plo_id = plo.plo_id WHERE program.program_name LIKE '%$qs%' GROUP BY program.program_id, plo.plo_num, co.co_num";
            $res = $conn->query($query);
```

```
}

$data = array();

foreach($res as $r){
    $base = $r[$bas];
    if(!array_key_exists($base, $data)){
        $data[$base] = array();
        $data[$base]['p'] = array();
        $data[$base]['c'] = array();
    }

    if(!array_key_exists($r['plo'], $data[$base]['p'])){
        $data[$base]['p'][$r['plo']] = array();
        $data[$base]['p'][$r['plo']]['m'] = 0;
        $data[$base]['p'][$r['plo']]['t'] = 0;
    }
    $data[$base]['p'][$r['plo']]['m'] += $r['mark'];
    $data[$base]['p'][$r['plo']]['t'] += $r['total'];

    if(!array_key_exists($r['co'], $data[$base]['c'])){
        $data[$base]['c'][$r['co']] = array();
    }

    if(!array_key_exists($r['plo'], $data[$base]['c'][$r['co']])){
        $data[$base]['c'][$r['co']][$r['plo']] = 0;
    }

    $data[$base]['c'][$r['co']][$r['plo']] += $r['mark'];

}
```



1) COURSE WISE STUDENT PERFORMANCE TREND UNDER INSTRUCTOR

```
$query = "SELECT UPPER(course_id) as 'course', SUM(marks) as 'marks', COUNT(marks)*100 as 'student' FROM (SELECT school_name
, department_id, program_name,  semester, faculty, course_id, no_credits, student_id, SUM(marks) as 'marks' FROM (SELECT sch
ool.school_name, department.department_id, program.program_name, section.semester, CONCAT(faculty.fname, ' ', faculty.lname)
 as 'faculty', course.course_id, course.no_credits, enrollment.student_id, IF(assessment.assessment_name = 'final', (SUM(eva
luation.obtained_marks) / SUM(assessment.marks)) * 40, (SUM(evaluation.obtained_marks) / SUM(assessment.marks)) * 30) as 'ma
rks', assessment.assessment_name FROM school NATURAL LEFT JOIN department NATURAL LEFT JOIN program NATURAL LEFT JOIN course
 NATURAL LEFT JOIN section NATURAL LEFT JOIN assessment NATURAL LEFT JOIN evaluation NATURAL LEFT JOIN faculty LEFT JOIN co
ON assessment.co_number = co.co_num AND section.section_id = co.section_id LEFT JOIN plo on co.plo_id = plo.plo_id LEFT JOIN
 enrollment ON enrollment.enroll_id = evaluation.enroll_id WHERE section.faculty_id = $id GROUP BY course.course_id, enrollm
ent.student_id, assessment.assessment_name, course.course_id) as subQuery GROUP BY semester, student_id, course_id) as query
2 GROUP BY course";

    $data = $conn->query($query);
```

1) STUDENT WISE PLO ACHIEVEMENT COMPARISON

```
$id = $_SESSION['id'];

    $query = "SELECT course, COUNT(stat) as 'passed' FROM (SELECT UPPER(section.course_id) as 'course', section.faculty_id a
s 'faculty',  plo.plo_num as 'plo', IF(SUM(evaluation.obtained_marks)/SUM(assessment.marks)>=0.40, 1, 0) AS 'stat' FROM sect
ion NATURAL LEFT JOIN assessment NATURAL LEFT JOIN evaluation NATURAL LEFT JOIN enrollment LEFT JOIN co ON assessment.co_num
ber = co.co_num AND assessment.section_id = co.section_id LEFT JOIN PLO ON co.plo_id = plo.plo_id WHERE enrollment.student_i
d = $id GROUP BY section.course_id, enrollment.student_id, section.course_id, plo.plo_num) as sQuery WHERE stat = 1 GROUP BY
 course ORDER BY course";

    $pls = $conn->query($query);

    $query = "SELECT course, COUNT(stat) as 'passed' FROM (SELECT UPPER(section.course_id) as 'course', section.faculty_id a
s 'faculty',  plo.plo_num as 'plo', IF(SUM(evaluation.obtained_marks)/SUM(assessment.marks)>=0.40, 1, 0) AS 'stat' FROM sect
ion NATURAL LEFT JOIN assessment NATURAL LEFT JOIN evaluation NATURAL LEFT JOIN enrollment LEFT JOIN co ON assessment.co_num
ber = co.co_num AND assessment.section_id = co.section_id LEFT JOIN PLO ON co.plo_id = plo.plo_id WHERE enrollment.student_i
d = $id GROUP BY section.course_id, enrollment.student_id, section.course_id, plo.plo_num) as sQuery WHERE stat = 0 GROUP BY
 course ORDER BY course";

    $mns = $conn->query($query);
```

Chapter 5
CONCLUSION

I. Problems & Solution

II. Additional Features & Future Development

III. Conclusion & Recommendation

Problems & Solutions

There were some problems that we have faced while creating the Student Performance Monitoring System. The major issue was we had lack of knowledge on the languages such as (PHP, CSS, JAVASCRIPT, HTML, MYSQL) that we must use while creating the system.

We came across this problem by seeking help from our faculty members through email or by doing problem solving sessions, who were experienced enough to guide us in creating the system.

We had issues on using Github which was a new platform for us. So we tried doing some internet searches and gaining information ourselves and using it properly.

Additional Features & Future Development

The current proposed system does not include a process with which we can track a failed PLO that were previously achieved in a particular course. Moreover, the system can be made more secured by adding two-factor authentication so that only specific users can access the data stored in the application. An additional AI feature can be included to make it more ease in inputting the data by giving voice input rather than typing.

Conclusion & Recommendation

This Student Performance Monitoring System would provide an insight about how learning might improve in a given program. We have created the system through which a user can automatically store and retrieve data that were previously done manually. It is more user friendly as gathering and collecting data manually was a tiresome task and it required more manpower. Now, these things can be done with ease. Primarily, we have focused on IUB as the organization for which we have done this project but the project has the potential of being useful to other universities as well.