# **CHAPTER 1**

# INTRODUCTION

- BACKGROUND OF THE PROJECT
- OBJECTIVE OF THE PROJECT
- SCOPE OF THE PROJECT

### **BACKGROUND OF THE PROJECT**

The academic process of higher education must achieve something that improves the learning process. To make this happen, universities must monitor and evaluate the results of the teaching process by looking at student performance. We are going to design, create and deliver software that will help universities promote a more productive and effective way to assess students everywhere and that is the goal of our project. Performance monitoring includes assessments that play an important role in providing students, teachers, administrators, and policymakers with the information they need to make decisions. If we talk about the main part of our project, here is the concept of Course Outcome (CO) and Program Learning Outcomes (PLO), each CO is mapped to a PLO, and through each PLO students are expected to learn from the course 'problem analysis, design, Skill implementation, etc. 'will be known. The system allows input from IEB to determine PLO requirements. The project will evaluate to see if the COS mapped PLOs are met for each student to assess student proficiency. Faculties then input COs for each of their students so that the system can map the COs to the PLO accordingly. PLOs are carefully and specially selected to ensure that students achieve the most in a course so that students can monitor their progress in each sector and pinpoint the areas where self-improvement and self-development are needed. We are hopeful that our software will help institutional students' progress, departmental performance and assist in the distribution and allocation of their improved resources.

### **OBJECTIVE OF THE PROJECT**

Student progress monitoring is a practice that helps teachers continually evaluate the effectiveness of their learning and use student performance data to make more significant instructional decisions. If the rate at which a particular student is learning seems inadequate, the teacher can adjust the instruction. Our project seeks to create user-friendly software that will serve as a platform for many to improve the quality of education of students, faculty, and other members of the university and in advanced technology in the field of education. We believe that the information we have collected, evaluated, and equipped will lead to opportunities for greater advances in our education and will also make a significant contribution to computer science.

#### SCOPE OF THE PROJECT

This CHAPTER will discuss falls within the scope of the system. To recognize the importance or quality of the scope, we are to contemplate what the system will accomplish i.e. The purpose of the system and the desired requirements that are to be met.

The main purpose of implementing such a system is to improve and digitalize the old inefficient way. In the exciting system, there exists several human roles (e.g., faculty, students) that are to get the work done manually, not by computers. Therefore, the existing system takes more time to achieve the goals while compared to the newly proposed system. The new system accomplishes this by reducing the human roles of the system and making a computer which helps us to run the system and do the work of organizing, storing and instantly querying the essential data.

- · Storing useful data
- Securing the data by restricting access to the system.
- Instantly insert/ update/ delete data from the database
- Generate dynamic charts from the data using defined or dynamic parameters.
- Reporting
- Project management

# **CHAPTER 2**

# REQUIREMENT ANALYSIS

- RICH PICTURE AS-IS
- SIX ELEMENTS AS IS
- PROCESS DIAGRAM AS-IS
- PROBLEM ANALYSIS
- RICH PICTURE TO-BE
- SIX ELEMENTS TO-BE
- PROCESS DIAGRAM TO BE

# RICH PICTURE (AS-IS)

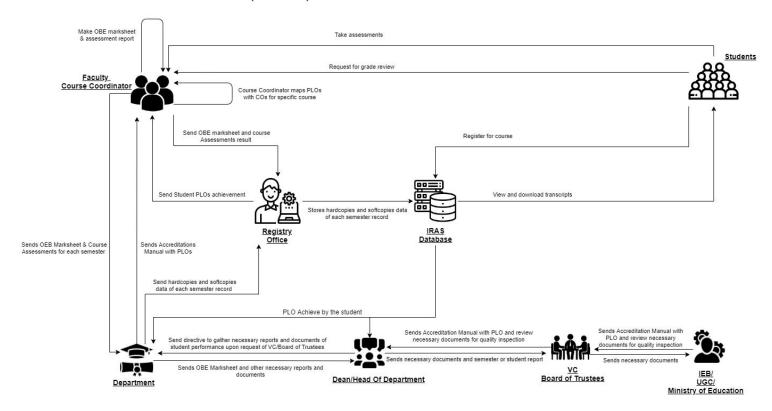


Figure 2.1: Rich Picture (As-Is)

# SIX ELEMENTS (AS-IS)

	System Roles					
Process	Human	Non-	Computing	Software	Databas	Network &
FIUCESS		Comp	Hardware		е	Communicati
		Hardware				on
Map	IEB/UGC/	Pen and	Computer: 1. Course	MS Word:	IRAS Detabas	1. Use the
Course	Ministry of	paper:	_		Databas	internet and
Outcom	Education: 1. Send	Is used for noting	Coordinator s use	1. Course	e server:	emails to
es (COs) to	Accreditation	down	computers	Coordina	1. IRAS	communicate
Program	Manual	intermedia	to make	tors use	uses a	with
Learning	with PLOs	te	softcopies of	MS Word	databas	UGC/IEB or
Outcom	defined to VC/	brainstorm	Course	to make	e server	other
es	Board Of	ing ideas.	Outcomes	а	to	stakeholders
(PLOs)	trusties.	Board	(COs) of	detailed	store	to discuss
	VC/ Board Of	and	the specific	course	and	important
	trusties	marker:	courses	outline	maintain	topics related
	Receive     Accreditation	1. Is used	they are	and	student	to
	Manual	for noting down	experts in.  Printer:	Course Assessm	grades' informati	mapping Course
	from IEB.	intermedia	1. To print	ent	on.	Outcomes to
	2. Send the	te	out	Reports	OH.	Program
	Accreditation	brainstorm	hardcopies	with		Learning
	manual	ing ideas.	of Course	Course		Outcomes.
	to Department	· ·	Outcomes	Outcome		Others:
	Staff.		(COs).	s		1. Use phones
	Head of			(COs)		or physical
	Department /			mapping		means with
	Dean of			to		stakeholders
	School: 1. Send the			Program Learning		to discuss
	Accreditation			Outcome		important
	manual			s (PLOs).		topics
	to Department			Excel		related to
	Staff.			Sheet:		mapping
	2. Direct			1. Excel		Course
	Department			Sheet is		Outcomes to
	Staff to tell			used by		Program
	Course			Course		Learning
	Instructors			Coordina tors to		Outcomes.
	and Coordinators			map		
	to design			specific		
	Course			questions		
	Outline and			in the		
	Course			Midterm,		
	Assessment			Final		
	Reports.			exams		
	Department:			and		
	1. Send Course			Project work to		
	Instructors the			specific		
	Accreditation			Course		
	Manual with			Outcome		
	defined PLOs.			S		
	Course			(COs).		
	Instructor:					
	1.Check if					
	previous					

	course content is present form register office,					
	otherwise make new course content.					
	2. List COs. 3. Map Course Content to Course					
	Outcomes (COs). 4. Map COs to PLOs.					
	5. Map COs to specific questions of Mid-term, Final Exams					
	questions and Project Work. 6. Starting to design course					
	assessment report using course outline,					
	Course Content and COs.  Register					
	Office: 1.Send course content to					
	course instructor if available otherwise					
	send negative message.					
Check Number of student enrollme	Student: 1. Student enroll in a specific Degree	Pen and Paper 1. Sheet of number of	Computer/ Phone: 1. Uses computers to	Coded Excel sheet: 1.Depar ment	Depart ment Storage :	Internet/Mail: 1. An Online platform (such as Google
nt in a departm ent	program. 2. Student information is sent to	students in a departme nt is made	make softcopies of report or sheet of	head or dean uses automate	Records of students	Sheets) may be used for processing the student
	register's office.  Register Office:	along with student's informatio n.	student information in departments	d excel sheets to calculate the number	enrollme nt in the departm ent.	information data spreadsheet.

	1.Gather all the new student's information. 2. Assign the data in sheet of student information of designated departments. 3.Send the new update data to each department.  Department: 1.Recieve the data of new student. 2.Update it in		Printer: 1. Print hardcopies of report and sheet	student's in the departme nt.  MS Word: 1. Used to make report softcopie s.	Registr ar's Office Storage: 1. Records of students, enrollme nt for all the departm ents.	
	the existing database 3. Send the data to department heads or deans for further inspection  Department Head/Dean: 1.Recieve the data from department. 2.Make calculation of					
	number of new student enrollment comparing to previous cases. 3. Make calculation number of categorize students, such as merit base, physical aid and others					
Register for course	Student: 1. Login to IRAS 2. Student enroll in specific courses if all the pre requisite	Pen and Paper 1. Sheet of number of students enrolled for the course.	Computer/ Phone: 1. Uses computers to make softcopies of report or sheet of	Coded Excel sheet: 1.Instruct or uses automate d excel sheets for the	Depart ment Storage: 1. Records of students	Internet/Mail: 1. An Online platform (such as Google Sheets) may be used for processing the student

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	courses are		student	semester	enrollme	information
	completed		information	OEB	nt in the	data
	otherwise		enrolled for	markshe	course.	spreadsheet.
	can't process		the course.	et.		
	end.		Printer:	MS	Registr	
	<ol><li>Request for</li></ol>		1. Print	Word:	ar's	
	bill		hardcopies	1. Used	Office	
	4. Receive for		of report	to make	Storage	
	bill		and sheet	report	:	
	<ol><li>Pay the bill</li></ol>			softcopie	1.	
	<b>-</b>			S.	Records	
	Register				of	
	Office:				students	
	1.Store					
	request asked				enrollme	
	by the student and send the				nt in the	
	billing date				course.	
	2. Receive					
	billing data					
	3. If bill paid					
	stored data is					
	updated to					
	database					
	otherwise					
	process end					
	and student					
	had to drop					
	the course.					
	4. Send					
	student					
	information to					
	Department.					
	Department:					
	1.Recieve the					
	data of enroll					
	student.					
	2. Send the					
	data of enroll					
	student to					
	course					
	instructor.					
	Instructor					
	1. Receive					
	data of					
	enrolled					
	student.					
	2. Allocate					
	space for the					
	new student					
	data in OEB					
	marksheet.					
Record	Faculty/	Pen &	Computer:	Excel	Depart	Internet:
Student	Course	Paper:	1. Creating	Sheet:	ment	1. The Internet
Assess	Coordinator:	1. Use	softcopies of	1.	Storage	is used to
ment	1. Assign	pen &	records	Record	:	communicate
Data	project work	paper to	of all	necessar	1.	with IRAS to
	and	record	assessment	у	Records	store final

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	9. Upload					
	students' final					
	grades on					
	ĬRAS.					
	10. Send the					
	Marksheet to					
	the					
	Department.					
	11. Send the					
	Marksheet to					
	admin to store					
	in the					
	database					
Produce	Faculty:	Pen and	Computer/	Coded	Depart	Internet/Mail:
OBE	1. Calculate	Paper	Phone:	Excel	ment	1. An Online
Markshe	total marks	1. OBE	1. Uses	sheet:	Storage	platform (such
et &	received for	marksheet	computers	1.Faculty	:	as
Course	each CO by	stored in	to	/Course	1.	Google
Assess	calculating the marks	hardcopy. Additional	make	Coordina	Records of	Sheets) may be used
ment	received for	markings	softcopies of the OBE	tor uses automate	students	for processing
Report	questions	may be	Marksheet	d excel	,	the OBE
	and/or other	made to	and Course	sheets to	assess	assessment
	assessments	further	Assessment	calculate	ment	data
	mapped to	separate	Reports.	the	data	spreadsheet.
	COs.	between	Printer:	student's	and final	
	2. Calculate	students.	1. Print	success/	grades	
	total		hardcopies	failure in	will be	
	percentages		of	achieving	saved in	
	received		final	PLOs.	the	
	for each COs		versions of	MS	departm	
	on the OBE		the	Word:	ent for	
	Marksheet.		OBE	1. Used	future	
	3. Declare if a		Marksheets	to make	referenc	
	student has		and	Course	e.	
	achieved a		Course	Assessm	Registr	
	specific CO (if		Assessment	ent	ar's	
	CO		Reports.	Report	Office	
	percentage is			softcopie	Storage	
	greater than			S.	:	
	or equal to				1. OBE	
	40). 4. Declare if a				Markshe ets,	
	student has				Course	
	received a				Assess	
	PLO for a				ment	
	related CO.				Reports	
	5. Make a				and	
	table giving				other	
	the verdict				docume	
	and				nts	
	analysis of				submitte	

		1	1		
	how many			d by the	
	students were			departm	
	able to			ent is	
	receive a			stored	
	certain CO			for	
	and PLO			future	
	and other			referenc	
	documents			e.	
	containing			· ·	
	-				
	necessary				
	information				
	and data.				
	6. Design				
	Course				
	Assessment				
	Report				
	using Course				
	Outline,				
	Course				
	Content				
	and Course				
	Outcomes.				
	7. Send the				
	final version				
	of the OBE				
	Marksheet to				
	the Dept.				
	Office.				
	Department				
	Office:				
	<ol> <li>Send the</li> </ol>				
	OBE				
	marksheet,				
	Course				
	Assessment				
	Report and				
	others to the				
	Registrar's				
	Office.				
	2. Store the				
	OBE				
	Marksheet				
	and				
	Course				
	Assessment				
	Report in the				
	department.				
	Registry				
	Office:				
	1. Stores the				
	OBE				
	Marksheet				
	and				
	Course				
	Assessment				
	Reports and				
	other				
	documents				
	and reports in				
	the				
<u> </u>	0	1	l		

	Dogistus-J-					
	Registrar's Office.					
View	Students:	Pen and	Computer/	IRAS:	Registr	Internet/
grades	1. Log into	Paper	Phone:	1.	ar's	Email
and	IRAS.	1.	1. Used for	Store's	Office	1. The
downloa	2. Search	Tabulated	accessing	letter	Storage	Internet is
d	semester wise	transcripts	IRAS.	grades of	: •	used to
Transcri	result	may be	Printer:	each	1.	communicate
pts	for intended	printed	1. Used to	complete	Student	with IRAS to
	semester.	onto	print the	d course	informati	store final
	3. See grades	paper.	tabulated	2.	on is	grades of
	for specific	Hardcopy	transcript.	Provides	kept	students.
	semesters. 4. Download	is used as the	Prints tabulated	the online	in admin	2. Softcopies
	transcript	rne primary	transcripts.	user	in hardcopi	may be mailed.
	through	source of	i.a.iooiipio.	interface	es for	aa
	browser into	truth		for	future	
	hard disk.	during		viewing	referenc	
		applicatio		grades	e.	
	Dean/DOH:	ns and		and	IRAS	
	1. Log into	other		transcript	Databas	
	IRAS.	paperwork		S.	e Com.com	
	2. Search semester wise	•			Server:	
	result				Databas	
	for intended				е	
	semester for a				Manage	
	specific				ment	
	student.				Service	
	3. See grades				is used	
	for specific				to	
	semesters.				store,	
	4. Download				maintain	
	transcript through				, edit and	
	browser into				receive	
	hard disk.				student	
					grades	
	Faculty/High				informati	
	er Officials:				on in	
	1. Request				IRAS.	
	register office				Web	
	for transcript				Server:	
	of particular				1. User	
	student or semester of a				interface and	
	particular				and website	
	course.				pages	
	2. Receive				are	
	transcript of				served	
	particular				using a	
	student or				remote	
	semester of a				web	
	particular				server.	
	course.					
	Registry					
	Office:				ļ	
	1. Access					
	IRAS.					

				ı		-
	2. View					
	students'					
	grades if and					
	when it's					
	necessary.					
	3. Download					
	their					
	transcripts.					
	4. Send					
	transcript					
View	IEB/ UGC:	Pen and	Computer:		Depart	The internet:
Records	1. Inform the	Paper:	1. Used to		ment	1. OBE
OBE	VC of a	1. May be	display		Record	marksheets
Markshe	deadline	used for	OBE		s	and course
ets,	within which	noting/mar	Marksheet		1.	assessment
Course	OBE	king down	and		Retrieva	reports may
Assess	Marksheets,	key points	Course		l of	be
ment	Course	of the	Assessment		OBE	mailed online.
Reports	Assessment	report.	Report		markshe	2. Online
over a	Reports and	2.	softcopies.		ets	platforms such
time	other	Hardcopie	2. Send		and	as
period	documents	s of	OBE and		Course	Google
for	are needed	reports	Course		Assess	Docs/Sheets
inspectio	for quality	may be	Assessment		ment	display
n and	inspection to	used.	Reports to		reports	reports of
analysis	make		other		when	softcopies.
of	necessary		computers.		needed.	
student	improvements				2.	
perform	to degree				Stores	
ance	programs.				records	
trend	2. Inform the				on	
	university				stakehol	
	head if govt.				ders'	
	official will				interpret	
	visit the				ation of	
	campus.				student	
	3. Visit				perform	
	university and				ance	
	relevant depts				trends.	
	to					
	receive the					
	necessary					
	documents					
	and					
	reports.					
	Head of					
	Dept/Dean of					
	School:					
	1. Request to					
	view records					
	of OBE					
	Marksheets,					
	Assessment					
	Reports to					
	analyze students'					
	performance trends.					
	Direct     Department					
	Debarringur			<u> </u>		

Staff to gather necessary documents, OBE Marksheets, Assessment report for a given time-period specified by govt. officials. 3. Receive the necessary documents gathered by the dept. 4. Evaluate the need to change/ improve the department's educational resources based on students' performance trends.  VC/Board of Trustees: 1. Request to view records of OBE Marksheets, Assessment Reports to
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performance trends.  VC/Board of Trustees:  1. Request to view records of OBE Marksheets, Assessment Reports to
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VC/Board of Trustees: 1. Request to view records of OBE Marksheets, Assessment Reports to
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Marksheets, Assessment Reports to
Assessment Reports to
Assessment Reports to
Reports to
analyza
analyze
students'
performance
trends.
Departmental
Departmental
1. Gather
necessary
OBE
Marksheets,
Assessment
Reports &
other
documents.
2. Provide all
the necessary
documents to
govt. officials.
Faculty/High
er Officials:
1. Request
register office

	for OBE					
	marksheet semester of a					
	particular					
	course. 2. Receive					
	OBE					
	marksheet					
	semester of a particular					
	course.					
	Registry					
	Office: 1. Access					
	IRAS.					
	2. Gather					
	OBE marksheet					
	from					
	database.					
	3. Send OBE marksheet.					
Request	Students:	Pen and	Computer/	IRAS:	IRAS	Internet:
for	1. Request for	Paper:	Phone: 1. Used for	1. Used by the	server:	1. Email is
review and	grade change and	1. May be used to	communicati	admin for	Update	primarily used for
change	review to	note down	ng with	changing	student	communicatio
of	faculty.	key points or marks	the faculty.	the	grade data.	n. <b>Phone:</b>
grades	Faculty/ Course	on the		grade.	Depart	1. May be
	Coordinator:	students'			ment	used for
	Check     exam papers	answer sheets.			Storage	communicatio n.
	and other	Silects.			1.	11.
	assessments				Update	
	upon request.  2. If change				student grade	
	needs to be				data.	
	made,				Registr	
	send a grade change				ar's Office	
	request of a				Storage	
	specific				:	
	student to register office.				1. Update	
	If not, end the				student	
	process.				grade	
	Register Office:				data.	
	1. Receive a					
	request to					
	change the grade of a					
	specific					
	student.					
	2. Change grade of					
	student based					
	on Faculty					

reguest			
request.			

# PROCESS DIAGRAM (AS-IS)

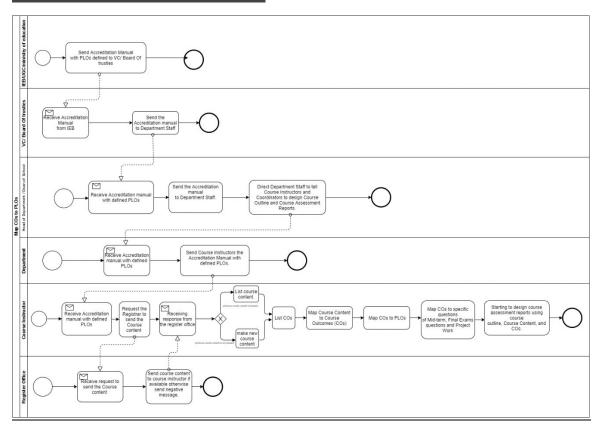


Figure 2.3: Process Diagram for Map COs to PLOs

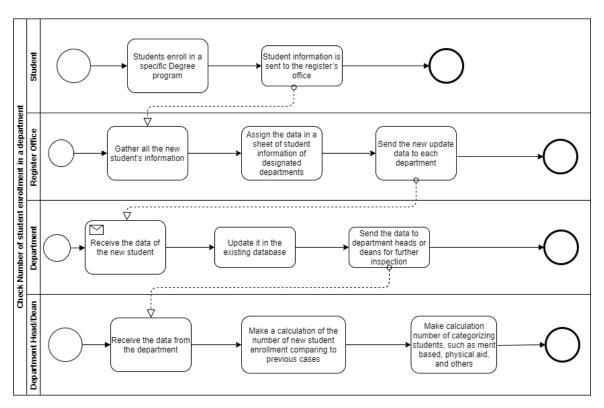


Figure 2.4: Process Diagram for Check Number of student enrollment in a department

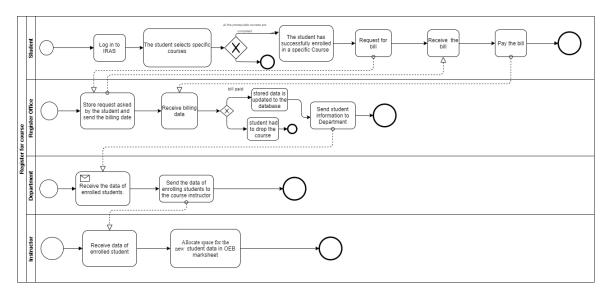


Figure 2.5: Process Diagram for Register for course

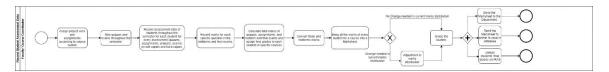


Figure 2.6: Process Diagram for Record Student Assessment Data

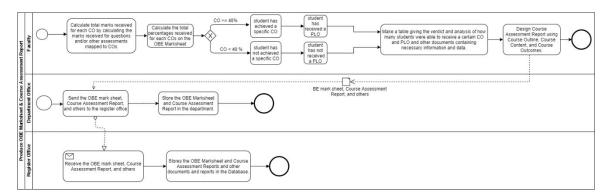


Figure 2.7: Process Diagram for Produce OBE Marksheet & Course Assessment Report

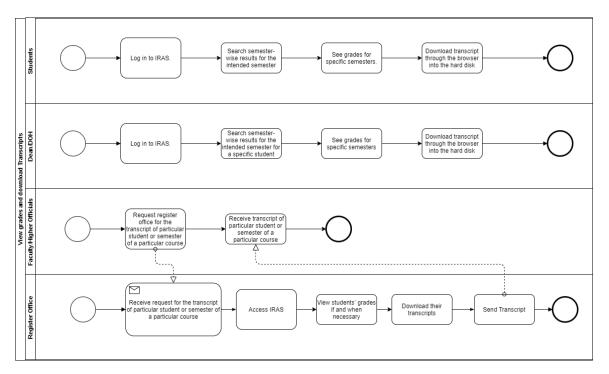


Figure 2.8: Process Diagram for View grades and download Transcripts

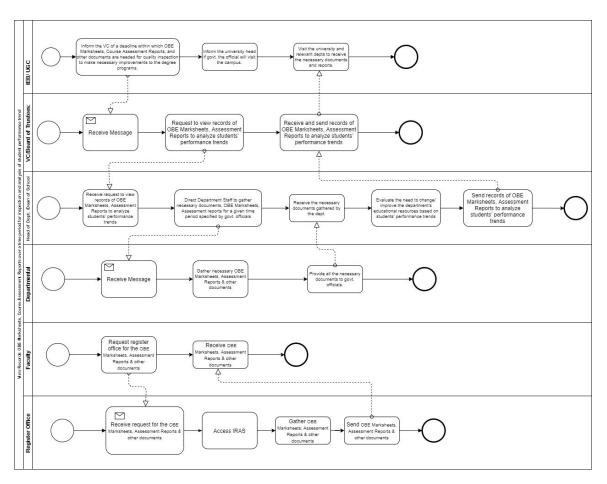


Figure 2.9: Process Diagram for View Records OBE Marksheets, Course Assessment Reports over a time period for inspection and analysis of student performance trend

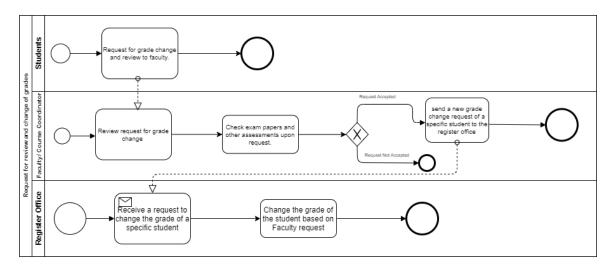


Figure 2.10: Process Diagram for Request for review and change of grades

# PROBLEM ANALYSIS

Process	Stakeholders	Concerns	Analysis	Proposed
Name		(Problems)	(reason of the	solution
		,	problem)	
Map course outcomes (COs) to program Learning Outcomes (PLOs)	1.Faculties	1.VC has to collect and send CO and PLO data to the Dean. 2.Dean sends data to department head and then it is passed to department. 3.Course instructor implements CO and PLO in their course	The process is very complicated and time consuming as faculties must wait for other non-essential stakeholders to implement PLO and CO in their courses.	We can eliminate the involvement of department by giving faculties direct access to update PLOs and COs in our software and department head to update the PLO after further inspection
Check number of student enrollment in a department	1.Department 2.Dean	1.Register office collects all the new student's information. 2.Register office sends updated data to each department. 3.Department updates data to database. Then sends new data to Dean. 4. Dean makes calculation to see student enrollment comparison.	Same information is being send to different stakeholders individually. Which creates unnecessary repetition. Which makes the overall process time consuming.	We can make this information centralized, so that all the stakeholders can see latest information any time. We can also generate custom comparison Graphs/charts for any individual stakeholder.
Record Student Assessment Data to SPM	1.Faculty	1. Faculty had to calculate the total assessments marks and convert finals and midterms Marks of each student. 2. Bring all the marks of every student for a course into a Marksheet. 3. Grade the student	Making all the calculation manually is too much time consuming and chances human error is greater.	All the calculation can be done in SPM and graded accordingly. Adjustment in marks distribution can easily be made if change is needed
Produce OBE	1.Faculty	1. All	Making all the	Calculation can

Marksheet & Course Assessment Report		calculation have to done manually 2. Need to send data to register office to update database	calculation manually and waiting for register office to update data is too much time consuming and chances human error is greater.	be done by the help of the software and OEB marksheet can directly uploaded to database using the software
View records, OBE marksheets and Course assessment report	1.IEB/UGC 2.Dean 3.VC 4.Faculty	1. Faculty can't access the OEB marksheet directly 2. Calculations have to done manually and charts have to make manually to make comparison	Too many manual processes which takes time and resource. Therefore, lowers overall efficiency	We will generate automated charts, graphs and report for relevant stakeholder. we can collect most of the relevant data directly from IRAS, which will eliminate any extra steps. Faculty can view OEB marksheet of past semesters.
Request for review and change grade	1.Faculty	1. Faculty need to send request to register office to change the grade	Grade change could be done by faculty. Sending request to register office for grade upgrade adds extra work.	By giving access to change grade in our system we could eliminate the involvement of register office in our system.

## **RICH PICTURE (TO-BE)**

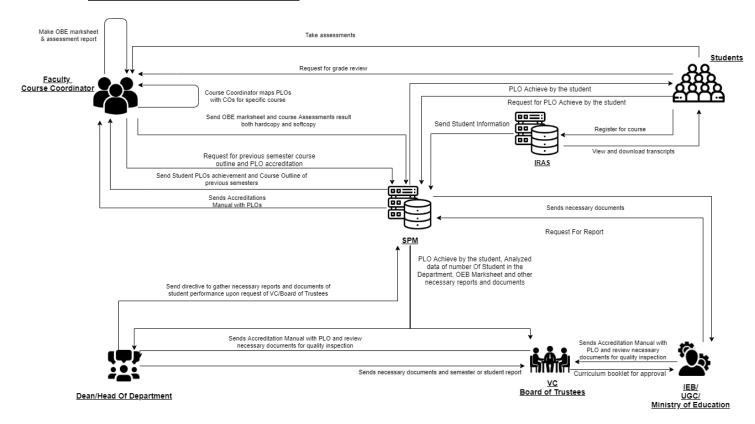


Figure 2.11: Rich Picture (To-Be)

# SIX ELEMENTS (TO-BE)

	System Roles					
Process	Human	Non-	Computing	Software	Databas	Network &
1100633		Comp	Hardware		е	Communicati
Мар	IEB/UGC/	Hardware Pen and	Computer:	MS	IRAS	on 1. Use the
Course	Ministry of	paper:	1. Course	Word:	Databas	internet and
Outcom	Education:	1. Is used	Coordinator	1.	е	emails
es (COs)	1. Send	for noting	s use	Course	server:	to
to	Accreditation	down	computers	Coordina	1. IRAS	communicate
Program	Manual	intermedia	to make	tors use	uses a	with
Learning	with PLOs	te	softcopies of	MS Word	databas	UGC/IEB or
Outcom	defined to VC/ Board Of	brainstorm	Course	to make	e server	other
es (PLOs)	trusties.	ing ideas. Board	Outcomes (COs) of	a detailed	to store	stakeholders to discuss
(1 203)	VC/ Board Of	and	the specific	course	and	important
	trusties	marker:	courses	outline	maintain	topics related
	1. Receive	1. Is used	they are	and	student	to
	Accreditation	for noting	experts in.	Course	grades'	mapping
	Manual	down	Printer:	Assessm	informati	Course
	from IEB.  2. Send the	intermedia te	To print out	ent	on. SPM	Outcomes to
	Accreditation	เe brainstorm	hardcopies	Reports with	databas	Program Learning
	manual	ing ideas.	of Course	Course	e:	Outcomes.
	to Department		Outcomes	Outcome	1.	Others:
	Staff.		(COs).	s	Records	1. Use phones
	Head of			(COs)	of	or physical
	Department /			mapping	PLOs	means with
	Dean of			to		stakeholders
	School: 1. Receive			Program Learning		to discuss
	Accreditation			Outcome		important
	Manual			s (PLOs).		topics
	from IEB.			Excel		related to
	2. Send the			Sheet:		mapping
	Accreditation			1. Excel		Course
	manual to SPM			Sheet is used by		Outcomes to Program
	3. Direct			Course		Learning
	Department			Coordina		Outcomes.
	Staff to tell			tors to		
	Course			map		
	Instructors			specific		
	and			questions		
	Coordinators to design			in the Midterm,		
	Course			Final		
	Outline and			exams		
	Course			and		
	Assessment			Project		
	Reports.			work to		
	Course Instructor:			specific Course		
	1.Check if			Outcome		
	previous			S		
	course			(COs).		
	content is					
	present from					
	SPM,					

Check Number of student enrollme nt in a departm	otherwise make new course content. 2. List COs. 3. Map Course Content to Course Outcomes (COs). 4. Map COs to PLOs. 5. Map COs to specific questions of Mid-term, Final Exams questions and Project Work. 6. Starting to design course assessment report using course outline, Course Content and COs.  Student: 1. Student enroll in a specific Degree program. 2. Student in a starting to the starting to t	Pen and Paper 1. Sheet of number of students in a	Computer/ Phone: 1. Uses computers to make softcopies of	Coded Excel sheet: 1.Depar ment head or dean	IRAS databas e 1. Records of students	Internet/Mail: 1. An Online platform (such as Google Sheets) may be used
of student enrollme nt in a	enroll in a specific Degree program. 2. Student information is sent to SPM from IRAS.  Department Head/Dean: 1.Recieve the data from SPM 2. Schoolwise,	1. Sheet of number of students	1. Uses computers to make	sheet: 1.Deparment head or dean uses automate d excel sheets to calculate the number student's in the departme nt. MS	e 1. Records of	platform (such as Google Sheets) may
	department- wise and program-wise			Word: 1. Used	enrollme	

	data from SPM 2. School- wise, department- wise and program-wise student enrollment comparison can be seen.					
Register for course	Student: 1. Login to IRAS 2. Student enroll in a specific course if all the pre requisite courses are completed otherwise can't process end. 3. Request for bill 4. Receive for bill 5. Pay the bill  Instructor 1. Receive data of enrolled student. 2. Add student data in OEB marksheet.	Pen and Paper 1. Sheet of number of students enrolled for the course.	Computer/ Phone: 1. Uses computers to make softcopies of report or sheet of student information enrolled for the course. Printer: 1. Print hardcopies of report and sheet	Coded Excel sheet: 1.Instruct or uses automate d excel sheets for the semester OEB markshe et. MS Word: 1. Used to make report softcopie s.	Depart ment Storage: 1. Records of students, enrollme nt in the course.  IRAS databas e: 1. Records of students, enrollme nt in the course.	Internet/Mail: 1. An Online platform (such as Google Sheets) may be used for processing the student information data spreadsheet.
Record Student Assess ment Data to SPM	Faculty/ Course Coordinator: 1. Assign project work and assignments according to course outline. 2. Take quizzes and exams throughout the semester according to course	Pen & Paper: 1. Use pen & paper to record assessme nt data and marks obtained on physical paper in tabular format(har dcopies).	Computer: 1. Creating softcopies of records of all assessment data for specific courses are done on computers.	Excel Sheet: 1. Record necessar y assessm ent data and final grades on Excel Sheets. IRAS: 1. Upload students' final	SPM: 1. Records of students, assess ment data and final grades may be saved in the SPM for future referenc	Internet: 1. The Internet is used to communicate with IRAS to store final grades of students. 2.Internet to access SPM

_					T
	outline.		grades to	e.	
	3. Record		IRAS for	IRAS	
	assessment		viewing	Databas	
	data of		by	е	
	students		students	server:	
	throughout		or the	1. IRAS	
	-				
	the semester		registrar'	uses a	
	of each		s office.	databas	
	student for		SPM	e server	
	every		<ol> <li>Upload</li> </ol>	to	
	assessment		student	store	
	(quizzes,		from	and	
	assignments,		IRAS to	maintain	
	project,		SPM	student	
	exams) on		O. III	grades'	
	softcopies			informati	
	•				
	and			on.	
	hardcopies.				
	4. Record				
	marks for				
	each specific				
	question in				
	the midterms				
	and final				
	exams.				
	5. SPM				
	calculate total				
	marks of				
	quizzes,				
	assignments				
	and midterm				
	and final				
	exams and				
	assign final				
	grades to				
	each student				
	of specific				
	courses.				
	6. Convert				
	finals and				
	midterms				
	marks.				
	7. Bring all the				
	marks of				
	every				
	student for a				
	course into a				
	Marksheet.				
	8. Grade the				
	student				
	according to				
	current mark				
	distribution if				
	no change is				
	needed else				
	adjustment				
	has been				
	made.				
	9. Submit				
	students' final				

	grades and marksheet on					
	SPM.					
Produce	Faculty:	Pen and	Computer/	Coded	SPM	Internet/Mail:
OBE	1. Upload	Paper	Phone:	Excel	Storage	1. An Online
Markshe	Marks in SPM	1. OBE	1. Uses	sheet:	÷	platform (such
et &	to calculate	marksheet	computers	1.Faculty	1.	as
Course	total marks	stored in	to	/Course	Records	Google
Assess	received for	hardcopy.	make	Coordina	of students	Sheets) may
ment Report	each CO by	Additional	softcopies of the OBE	tor uses automate	, students	be used for processing
to SPM	calculating the marks	markings may be	Marksheet	d excel	assess	the OBE
10 01 101	received for	made to	and Course	sheets to	ment	assessment
	questions	further	Assessment	calculate	data	data
	and/or other	separate	Reports	the	and final	spreadsheet.
	assessments	between	from SPM.	student's	grades	2. Internet to
	mapped to	students.	Printer:	success/	will be	Access SPM
	COs.		1. Print	failure in	saved in	
	2. SPM		hardcopies	achieving	the	
	calculate total		of	PLOs	departm	
	percentages received		final versions of	from SPM	ent for future	
	for each COs		the	MS	referenc	
	on the OBE		OBE	Word:	e in the	
	Marksheet.		Marksheets	1. Used	SPM	
	3. Declare if a		and	to make		
	student has		Course	Course		
	achieved a		Assessment	Assessm		
	specific CO (if		Reports	ent		
	CO percentage is		from SPM	Report softcopie		
	greater than			Sultcopie S.		
	or equal to			SPM		
	40).			1. Store		
	4. Declare if a			CLO and		
	student has			PLO		
	received a			informati		
	PLO for a			on to		
	related CO.			SPM		
	5. SPM make a table giving					
	the verdict					
	and					
	analysis of					
	how many					
	students were					
	able to					
	receive a					
	certain CO and PLO					
	and other					
	documents					
	containing					
	necessary					
	information					
	and data.					
	6. Design					
	Course					
	Assessment					
<u> </u>	Report				<u> </u>	

	using Course Outline, Course Content and Course Outcomes. 7. Submit the final version of the OBE Marksheet to the SPM					
View grades and downloa d Transcripts	Students: 1. Log into SPM. 2. Search semester wise result for intended semester. 3. See grades for specific semesters. 4. Download transcript through browser into hard disk.  Dean/DOH: 1. Log into SPM. 2. Search semester wise result for intended semester for a specific student. 3. See grades for specific semesters. 4. Download transcript through browser into hard disk.  Faculty/High er Officials: 1. Log into SPM. 2. Search semesters. 4. Download transcript through browser into hard disk.  Faculty/High er Officials: 1. Log into SPM. 2. Search semester wise result for intended semester for a specific student. 3. See grades	Pen and Paper 1. Tabulated transcripts may be printed onto paper. Hardcopy is used as the primary source of truth during applications and other paperwork.	Computer/ Phone: 1. Used for accessing IRAS. Printer: 1. Used to print the tabulated transcript. Prints tabulated transcripts.	IRAS: 1. Store's letter grades of each complete d course 2. Provides the online user interface for viewing grades and transcript s. SPM 1. Store transcript data	IRAS Databas e Server: 1. A Databas e Manage ment Service is used to store, maintain , edit and receive student grades informati on in IRAS. Web Server: 1. User interface and website pages are served using a remote web server. SPM Storage : 1. Records of students , assess ment data and final grades	Internet/ Email 1. The Internet is used to communicate with IRAS to store final grades of students. 2. Softcopies may be mailed.

	for specific semesters. 4. Download transcript through browser into hard disk.				will be saved in the departm ent for future referenc e in the SPM	
View Records OBE Markshe ets, Course Assess ment Reports over a time period for inspection and analysis of student perform ance trend from SPM	IEB/ UGC:  1. Login to SPM 2. View records of OBE marksheet course Assessment report over time period for inspection and analysis of student performance trend 3. Download OBE marksheet course assessment report  Head of Dept/Dean of School: 1. Login to SPM 2. View records of OBE marksheet course Assessment report over time period for inspection and analysis of student performance trend 3. Download OBE marksheet course Assessment report over time period for inspection and analysis of student performance trend 3. Download OBE marksheet course assessment report performance trends .	Pen and Paper:  1. May be used for noting/mar king down key points of the report.  2. Hardcopie s of reports may be used.	Computer: 1. Used to display OBE Marksheet and Course Assessment Reports softcopies from SPM. 2. Send OBE and Course Assessment Reports to SPM. 3. View OBE Marksheet from SPM	SPM 1.Store informati on of OBE into SPM	Depart ment Record s 1. Retrieva I of OBE markshe ets and Course Assess ment reports when needed from SPM 2. Stores records on stakehol ders' interpret ation of student perform ance trends from SPM	The internet: 1. OBE marksheets and course assessment reports may be mailed online. 2. Online platforms such as Google Docs/Sheets display reports of softcopies. 3. Internet to access SPM

	VC/Board of Trustees: 1. Login to SPM 2. View records of OBE marksheet course Assessment report over time period for inspection and analysis of student performance trend 3. Download OBE marksheet course assessment report  Faculty/High er Officials: 1. Login to					
Request	SPM 2. View records of OBE marksheet course Assessment report over time period for inspection and analysis of student performance trend 3. Download OBE marksheet course assessment report	Donand	Computar	<b>QDM</b> →	SDM	Internet
Request for review and change of grades	Students: 1. Request for grade change and review to faculty.  Faculty/ Course Coordinator: 1. Check	Pen and Paper: 1. May be used to note down key points or marks on the students' answer sheets.	Computer/ Phone: 1. Used for communicati ng with the faculty.	SPM: 1. Used by the admin for changing the grade.	spm server: 1. Update student grade data.	Internet: 1. Email is primarily used for communicatio n. Phone: 1. May be used for communicatio n.

exam papers			
and other			
assessments			
upon request.			
2. If change			
needs to be			
made,			
grade is			
changed in			
SPM and re-			
submitted.			
If not, end the			
process.			
Presses:			

### **PROCESS DIAGRAM (TO-BE)**

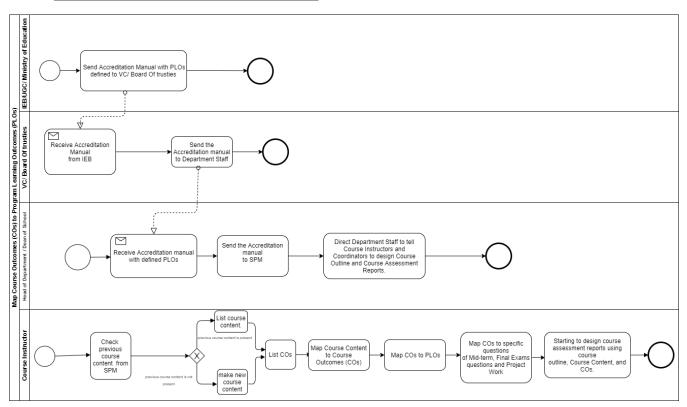


Figure 2.12: Process diagram for Map Course Outcomes (COs) to Program Learning Outcomes (PLOs)

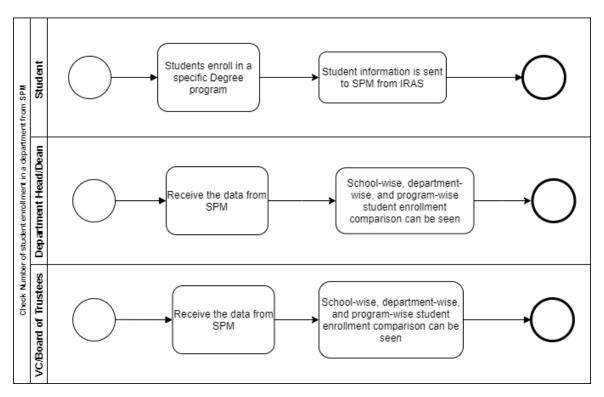


Figure 2.13: Process diagram for Check Number of student enrollment in a department from SPM

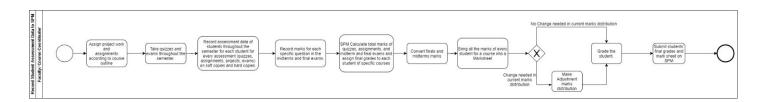


Figure 2.14: Process diagram for Record Student Assessment Data to SPM

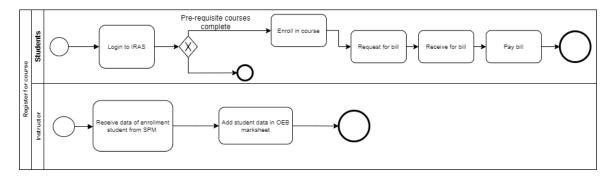


Figure 2.15: Process diagram for Register for course

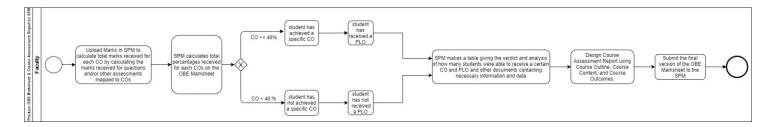


Figure 2.16: Process diagram for Produce OBE Marksheet & Course Assessment Report to SPM

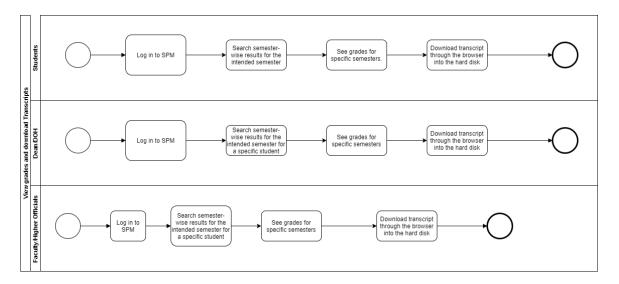


Figure 2.17: Process diagram for View grades and download Transcripts

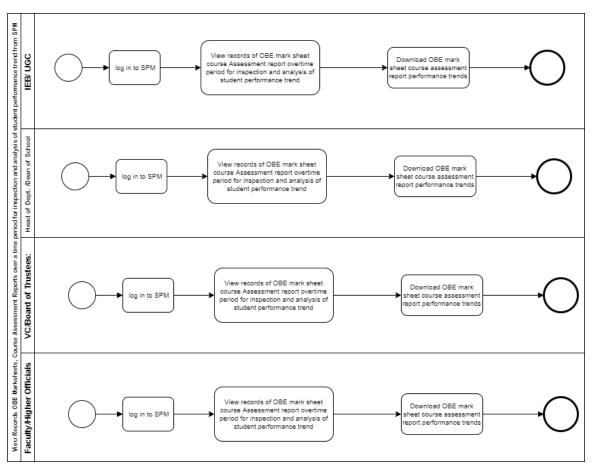


Figure 2.19: Process diagram for View Records OBE Marksheets, Course Assessment Reports over a time period for inspection and analysis of student performance trend from SPM

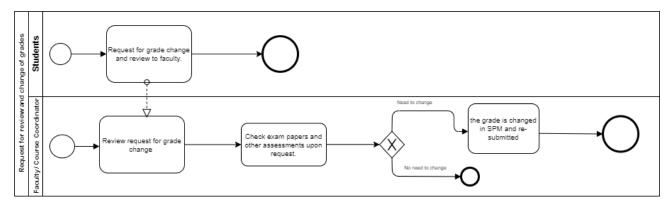


Figure 2.20: Process diagram for Request for review and change of grades

# **CHAPTER 3**

## LOGICAL SYSTEM DESIGN

- BUSINESS RULE
- ENTITY RELATIONSHIP DIAGRAM
- ENTITY RELATIONSHIP DIAGRAM TO RELATIONAL SCHEMA
- NORMALIZATION
- DATA DICTIONARY

#### **BUSINESS RULE**

All PLO (Program Learning Outcome) of each department and CO (Course Outcome) information of every course is recorded in the SPM system, which can be access by course instructor, department head, deans, VC, board of trustees and higher officials. In the case of a particular semester, the course instructor will be able to see how many students have been enrolled in each course. Department head, deans and VC can check how many students had enroll in a particular department and can also compare it with other departments. Faculty or Department Head or VC can view course / department-wise Student Performance Trends. The faculty can update the CO for each course, and the COs are be mapped to the PLOs, by the course coordinator, before the semester begins so that the faculty can determine whether or not each student has achieved the required PLOs.

in the system, IEB / UGC / Ministry of education has no permission to update PLOs, they can only view so it has to be sent to the VC/Board of trustees after which they update the PLOs for maps. Instructor, Head of department, Dean, VC and board of trustees can see the student performance trends and can compare with students that have taken same courses by the same instructor as well as other instructors. Students can view their earned PLOs for a specific course they've taken. Student performance trends for particular some courses or instructors can be seen. The system can see the PLOs required for this program 'IEB / UGC / Ministry of education or VC / Head of department 'might be able to monitor the performance of the students.

#### **ENTITY RELATIONSHIP DIAGRAM**

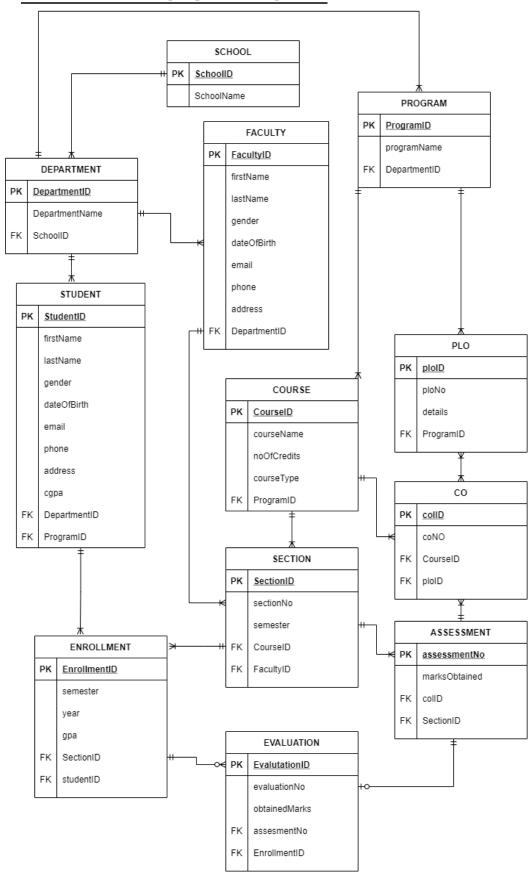


Figure 3.1: Entity Relationship Diagram of SPM

### **ENTITY RELATIONSHIP DIAGRAM TO RELATIONAL SCHEMA**

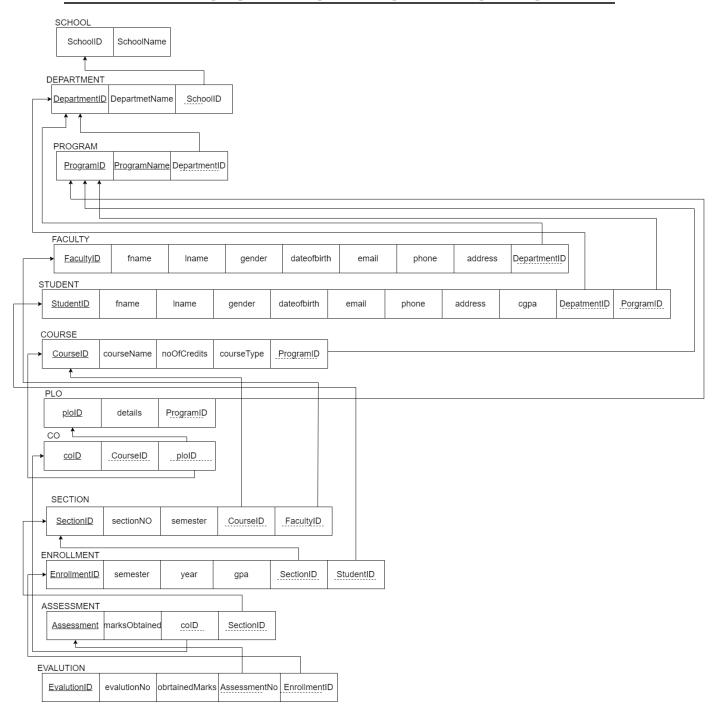


Figure 3.2: Relational Schema Diagram of SPM

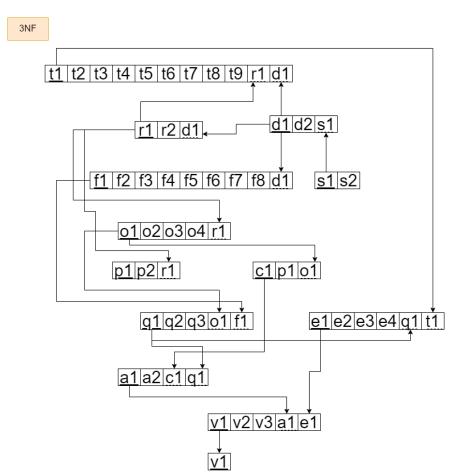
## **NORMALIZATION**

		1		<u> </u>	
School	SchoolID	s1		FacultyID	f1
	SchoolName	s2		fname	f2
	DepartmentID	d1		Iname	f3
Department	DepartmentName	d2		gender	f4
	SchoolID	s1	Faculty	dateOfBirth	f5
	ProgramID	r1		email	f6
Program	ProgramName	r2		phone	f7
	DepartmentID	d1		address	f8
	StudentID	t1		DepartmentID	d1
	fname	t2		CourseID	o1
	Iname	t3		courseName	o2
	dateOfBirth	t4	Course	noOfCredits	о3
	gender	t5		courseType	04
Student	email	t6		ProgramID	r1
	phone	t7	PLO	ploID	p1
	address	t8		details	p2
	сдра	t9		ProgramID	r1
	DepartmentID	d1		SectionID	q1
	ProgramID	r1		sectionNo	q2
	coID	c1	Section	semester	q3
CO	ploID	p1		CourseID	o1
	CourselD	o1		FacultyID	f1
	EnrollmentID	e1		EvaluationID	Ŋ
	semester	e2		evaluationNo	v2
	year	e3	Evaluation	obtainedMarks	v3
Enrollment	gpa	e4		assessmentNo	a1
	StudentID	t1		EnrollmentID	e1
	SectionID	q1		assessmentNo	a1
			Assessment	marksObtained	a2
			Assessment	colD	c1
				SectionID	q1

s1 <del>→</del>	s2
d1→	d2, s1
r1→	r2, d1
f1→	f2, f3, f4, f5, f6, f7, f8, d1
t1→	t2, t3, t4, t5, t6, t7, t8, t9, r1, d1
01→	o2, o3, o4, r1
p1 <del>→</del>	p2, r1
c1 <del>→</del>	p1, o1
q1 <del>→</del>	q2, q3, o1, f1
e1→	e2, e3, e4, q1, t1
a1 <del>-&gt;</del>	a2, c1, q1
v1 <b>→</b>	v2, v3, a1, e1

SchoolID→	SchoolName
DepartmentID→	DepartmentName, SchoolID
ProgramID→	programName, DepartmentID
FacultyID→	fname, Iname, gender, dateOfBirth, email, phone, address, DepartmentID
StudentID→	fname, Iname, dateOfBirth, gender, email, phone, address, cgpa, DepartmentID, ProgramID
CourseID→	courseName, noOfCredits, courseType, ProgramID
ploID→	details, ProgramID
coID→	ploID, CourseID
SectionID→	sectionNo, semester, CourseID, FacultyID
EnrollmentID→	semester, year, gpa, SectionID, StudentID
assessmentNo→	marksObtained, ocID, SectionID
EvaluationID→	evaluationNo, obtainedMarks, assesmentNo, EnrollmentID





# **DATA DICTIONARY**

School\_T

Name	Data Type	Size	Remark
			This is the
cschoolID	VARCHAR22	5	Primary Key of
CSCHOOLD	VARCHAR22	3	School Example:
			"SETS"
			This is the name
			of the School.
			Example:
cschoolName	VARCHAR22	50	"School of
			Engineering,
			Technology and
			Science"

# Department\_T

Name	Data Type	Size	Remark
			This is the
cdepartmentID	VARCHAR22	5	Primary Key of
cucparimenti	VARCHAR22	3	the Department.
			Example: "CSE"
			This is the name
		50	of the
			Department.
cdepartmentName	VARCHAR22	50	Example:
			"Computer
			Science and
			Engineering"
			This is the
			Foreign Key of
cschool_id	VARCHAR22	5	the table School.
			Example:
			"SETS"

## Program\_T

Name	Data Type	Size	Remark
			This is the
cprogramID	VARCHAR22	5	Primary Key for
cprogrammo	VARCHARZZ	J	a Program
			Example:" B.Sc".
			This is the name
			of the Degree
cprogramName	VARCHAR22	50	Program.
cprogrammame	VARCHAR22	30	Example:
			"Bachelor of
			Science"
			This is the
		a Program Example:" B.Sc This is the nam of the Degree Program. Example: "Bachelor of Science" This is the Foreign Key from the Department tabl	Foreign Key
cdepartment_id	oartment_id VARCHAR22		5
			Department table.
			Example: "CSE

# Course\_T

Name	Data Type	Size	Remark
			This is the
			Primary Key for
ccourseID	VARCHAR22	7	the Course.
			Example:
			"CSE203"
			This is the name
ccourseName	VARCHAR22	50	of the Course.
CCOUISENAINE	VAKCHAK22	30	Example:" Data
			Structure"
			This is the credit
nnoOfCredits	INTEGER	1	for the Course.
			Example: "3"
agaurga Tura	VARCHAR2	20	This is the type
ccourseType	VAKUNAKZ	20	of the Course.

			Example: "Core"
			This is the
			Foreign Key
cprogram_id	VARCHAR2	5	from Program
			table Example:"
			B.Sc".

# Faculty\_T

Name	Data Type	Size	Remark
			This is the Primary
cfacultyID	VARCHAR22	4	Key for Faculty.
			Example: "1803"
			This is the first
cfname	VARCHAR22	50	name of the Faculty.
			Example: "Sadita"
			This is the last name
clname	VARCHAR22	20	of the Faculty
			Example: "Ahmed"
			This the Date of
			Birth of the Faculty
ddateOfBirth	DATE	DD-MM-Y	YYY
			Example: "01-01-
			1993"
			This is the gender of
cgender	VARCHAR22	1	the Faculty.
			Example: "F"
			This is the email
cemail	VARCHAR22	50	address of the
Cernan	VIIICIIIII22	30	Faculty. Example:
			"sadita@iub.edu.bd"
			This is the phone
cphone	CHAR	11	number of the
ephone	CIIIII	11	Faculty. Example:
			"01292383111"
caddress	VARCHAR22	50	This is the address

			of the Faculty.
			Example: "House 1,
			Road 1, Sector 1,
			Area, Dhaka,
			Bangladesh,
			This is the Foreign
cdepartment_id	VARCHAR22	5	Key from the
			Department table.
			Example: "CSE"

# Student\_T

Name	Data Type	Size	Remark
cstudentID	VARCHAR22	7	This is the Primary Key for the Student. Example: "1800001"
cfname	VARCHAR22	50	This is the first name of the Student. Example: "Shoban"
clname	VARCHAR22	50	This is the last name of the Student. Example: "Bhowmik"
ddateOfBirth	DATE	DD-MM- YYYY	This the Date of Birth of the Student. Example: "01-01-1998"
cgender	VARCHAR22	1	This is the gender of the Student. Example: "M"
cemail	VARCHAR2		This is the email address of the Student. Example: "1850105@iub.edu.bd"
cphone	CHAR	11	This is the phone

			number of the Student.
			Example:
			"0191211141"
			This is the address of
			the Student. Example:
caddress	VARCHAR2	50	"House 1, Road 1,
			Sector 1, Area, Dhaka,
			Bangladesh"
nagna	NUMBER	2.2	This is the cgpa of the
ncgpa	NUMBER	3,2	Student. Example: 4.00
			This is the Foreign Key
cdepartment_id	VARCHAR2	50	from the Department
			table. Example: "CSE"
			This is the Foreign Key
cprogram_id	VARCHAR2	50	from Program table
			Example:" B.Sc".

# Section\_T

Name	Data Type	Size	Remark
			This is the
nsection_id	INTEGER		Primary Key for
			Section
			This is the
nsectionNo	INTEGER		section number.
			Example: "1"
	VARCHAR2	7	This is the
			foreign key from
ccourse_id			the Course table.
			Example:
			"CSE101"
cfaculty_id	VARCHAR2	4	This is the
			foreign key from
			Faculty table
			Example: "CO1"

# **Evaluation\_T**

Name	Data Type	Size	Remark
	INTEGER		This is the
nevaluationID			Primary Key for
			Evaluation
	NUMBER		This is the marks
nobtainedMarks		5,2	obtained by the
Hootameuriarks			Student Example:
			"29.5"
nassessment_id	INTEGER		This is the
			Foreign Key
			from Assessment
			table

# Enrollment\_T

Name	Data Type	Size	Remark
			This is the
nenrollmentID	INTEGER		Primary Key for
			Enrollment
			This is the
			semester of
csemester	VARCHAR2	6	Enrollment
			Example:
			"Summer"
			This is the year
dyear	YEAR	YYYY	of Enrollment.
			Example: "2018"

ngpa	NUMBER	3,2	This is the gpa of the semester. Example: 4.00
nsection_id	INTEGER		This is the Foreign Key from Section table
cstudent_id	VARCHAR2	7	This is the Foreign key from the Student Table. Example: "1800001"

## Assessment\_T

Name	Data Type	Size	Remark
			This is the
nassessmentID	INTEGER		Primary Key for
			Enrollment
			This is the
			semester of
cmarks	VARCHAR2	6	Enrollment
			Example:
			"Summer"
			This is the
ngaatian id	INTEGER		Foreign Key
nsection_id			from Section
			table
ncourse_id	INTEGER		This is the
			Foreign Key
			from the Course
			Outcome table
			Example:

PLO\_T

Name	Data Type	Size	Remark
cplo_id	VARCHAR22	5	This is the primary key for Program Learning

			Outcome.
			Example:
			"PLO1"
			This is the details
			of the Program
			Learning
	VARCHAR22	50	Outcome.
cdetails			Example: "An
Cuctans			ability to select
			and apply the
			knowledge,
			techniques, skills,
			and modern
	VARCHAR22	5	This is the
cprogram_id			foreign key from
			Program table
			Example: "B.Sc".

# CO\_T

Name	Data Type	Size	Remark
	INTEGER	2	This is the
nco_id			number of the
nco_ia			Course Outcome.
			Example: "1"
		7	This is the
	VARCHAR22		Foreign Key
ccourse_id			from the Course
			table. Example:
			"CSE101"
			This is the
	VARCHAR22	5	foreign key from
			the Program
cplo_id			Learning
			Outcome table.
			Example:
			"PLO1"